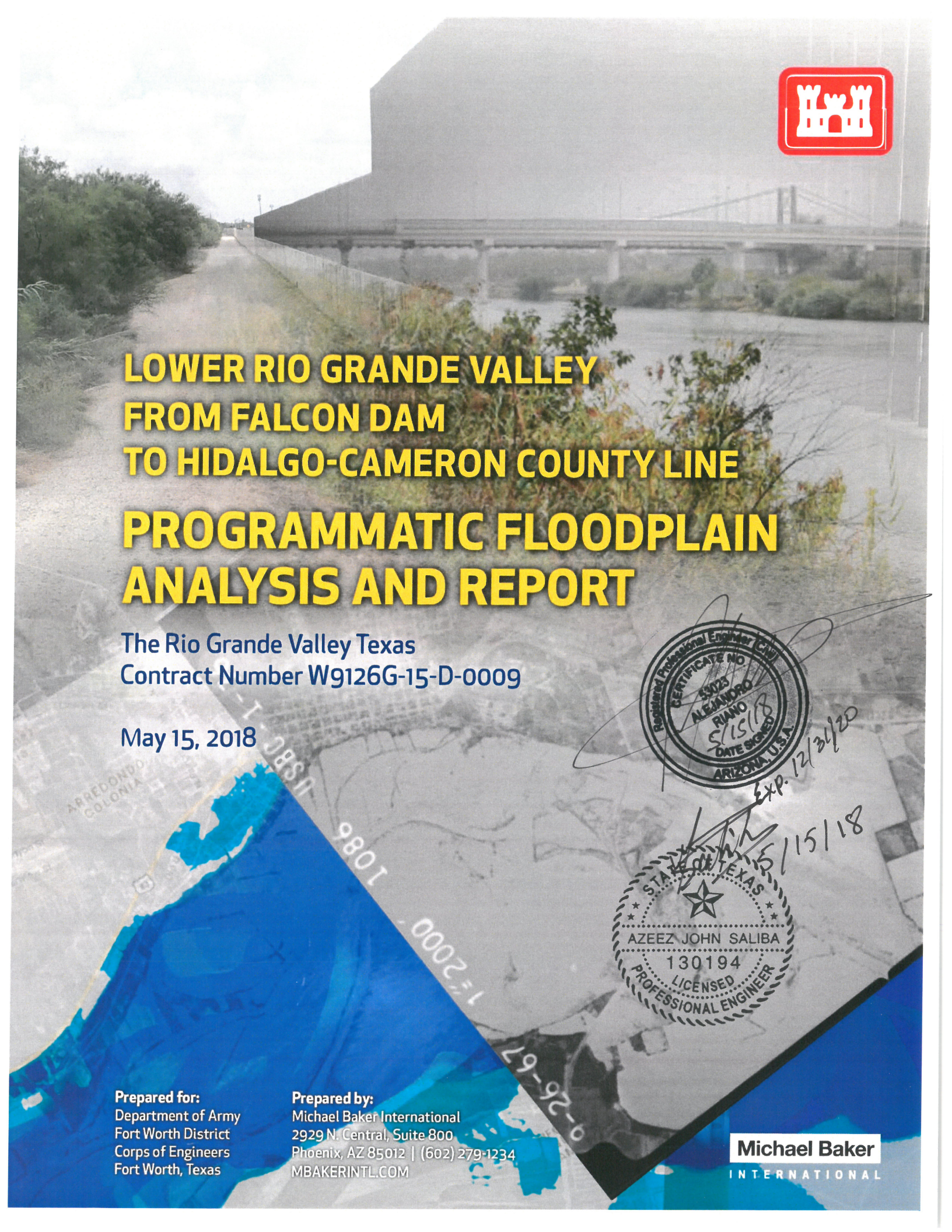


LOWER RIO GRANDE VALLEY FROM FALCON DAM TO HIDALGO-CAMERON COUNTY LINE

PROGRAMMATIC FLOODPLAIN ANALYSIS AND REPORT

The Rio Grande Valley Texas
Contract Number W9126G-15-D-0009

May 15, 2018

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FINAL
LOWER RIO GRANDE: FALCON DAM TO HIDALGO COUNTY LINE PROGRAMMATIC FLOODPLAIN ANALYSIS AND REPORT

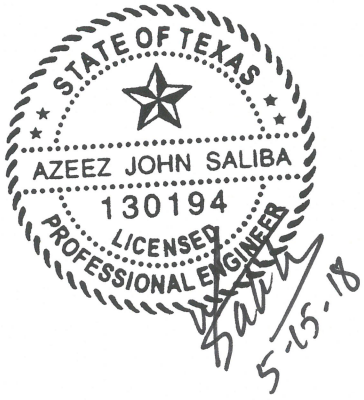
The Rio Grande Valley, Texas

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ATTACHMENTS	TITLE
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B	Hydraulics Documentation
C	Construction Documents
D	USIBWC Coordination and Documentation





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1.0 SECTION 1: PROJECT DESCRIPTION AND SUMMARY

1.1.0 INTRODUCTION/PURPOSE

Michael Baker International (Michael Baker) has prepared this Draft Final Programmatic Drainage Report for the United States Army Corps of Engineers (USACE) – Fort Worth District, Engineering and Construction Support Office (ECSO) in support of the United States (US) Customs and Border Protection (CBP) Border Patrol Air and Marine Program Management Office (BPAM-PMO) relative to their Tactical Infrastructure (TI) on the Southern International Border (Border).

The purpose of this Programmatic Drainage Report is to assess the impacts of the proposed wall projects and to ensure that the US Section of the International Boundary and Water Commission (USIBWC) criteria can be met. Those criteria state that the design flood Water Surface Elevations (WSE), in proposed conditions, shall not increase more than 6-inches in rural areas or 3-inches in urban areas when compared to the existing floodplain conditions (existing condition with no wall) and have no more than a 5% increase in flow deflection. FEMA Criteria identified in Title 44, Code of Federal Regulations, Part 65, Subpart 10 (44 CFR 65.10) identifies requirements such as freeboard criteria, structural design of the wall and foundation, and an Operations and Maintenance Plan.

This report contains a floodplain analysis of the Rio Grande along the following project wall segments, with the wall lengths indicated in miles: RGV-01 (2.9), RGV-02 (7.9), RGV-03 (10.8), RGV-04 (11.2), and RGV-63 (63). These wall segments are located along the International Boundary between Texas and Mexico (MX), north of the Rio Grande floodplain.

This report has been divided into 4 sections:

Section 1: Provides an overall description of the project purpose and details.

Section 2: Provides specific details on the 1-Dimensional (1-D) model analysis for the reach between the City of Penitas (Penitas) and Hidalgo-Cameron County border, for the levee area analysis.

Section 3: Provides specific details associated with the 2-Dimensional (2-D) model analysis for the reach between Falcon Dam and Penitas, for the non-levee areas.

Section 4: Combines all the references presented in this report.

This report also accompanies the Rio Grande Valley (RGV) Sector report submittals for RGV-01, RGV-02, RGV-03, RGV-04, and RGV-63 (which has some overlap with RGV-03).

1.2.0 LOCATION

The project is located on the Border along the RGV in Starr and Hidalgo Counties, Texas, and falls within the following limits (from west to east). As shown in Figure A1 (Vicinity Map) in Attachment A:

- RGV-03 spans from the eastern boundary of Fronton Island to Mission, Texas, and extends along USBP Zones 1 and 2 (which overlap RGV-63), and USBP Zones 6 and 8.
- RGV-04 spans from South Conway Avenue in Mission, Texas to South Stewart Road in Pharr, Texas, and extends along USBP Zones 9, 10, and 11.
- RGV-01 spans across the Santa Ana National Wildlife Refuge in Alamo, Texas, and is within USBP Zone 11.

- RGV-02 spans from the east boundary of the Santa Ana National Wildlife Refuge to the south boundary of the Mercedes District Settling Basin near Progreso, Texas; it extends along USBP Zones 11, 12, and 13.
- RGV-63 spans from the outlet of Falcon Dam to Penitas, along USBP Zones 1 through 5.

Table 1: Eastern and Western Project Wall Limits

Wall	Wall Miles		Latitude	Longitude	Station Area of Responsibility
RGV-03	10.8	Western Limit	26°24'36.47"N	99°02'49.84"W	Rio Grande City and McAllen
(1.66 Miles included in RGV- 63)		Eastern Limit	26°10'05.10"N	98°20'02.95"W	Rio Grande City and McAllen
RGV-04	11.2	Western Limit	26°10'05.10"N	98°20'02.95"W	McAllen and Weslaco
		Eastern Limit	26°04'57.40"N	98°10'08.42"W	McAllen and Weslaco
RGV-01	2.9	Western Limit	26°04'57.40"N	98°10'08.42"W	Weslaco
		Eastern Limit	26°04'36.54"N	98°07'27.75"W	Weslaco
RGV-02	7.9	Western Limit	26°04'36.54"N	98°07'27.75"W	Weslaco
		Eastern Limit	26°04'17.06"N	97°53'29.37"W	Weslaco
	TOTAL = 32.8				
RGV-63	*63*	Western Limit	26°24'38.40"N	99°02'43.82"W	Falcon Dam
		Eastern Limit	26°17'38.80"N	98°41'36.09"W	

Thirty miles of floodwalls are proposed along the levees in the RGV reach between Penitas and the Hidalgo County border, and a bollard wall is proposed in the reach between the Falcon Dam and Penitas. This report documents the impacts to the Rio Grande floodplain due to the proposed construction. The location of each proposed project segment shown in Table 1 can be seen in Figure A2 in Attachment A. The floodplain analysis for the two western segments was submitted by Michael Baker in 2011 and approved by USIBWC as part of the *PF225 Phase II Drainage Report Fence Segments O1, O2, O3* (Reference 1).

1.3.0 SITE DESCRIPTION

The proposed floodwall is to be located along the US side of the Rio Grande within the existing earthen levee cross-section. The Rio Grande within an approximately 13,500-foot (ft) wide floodplain, and flows from the western to the eastern coast at an overall 0.15% slope. The levees line both sides of the floodplain in most places, but no levees are present within Starr County. Bollard wall is proposed to be installed in the non-levee area within Starr County. The highly vegetated floodplain on the north side of the river thalweg is wide and fairly flat, consisting of agricultural land and former meanders of the river. The land north of the existing levees on the US side of the river is mostly agricultural with some rural development. Eight international bridges cross the Rio Grande, and two inline weirs are located within the study area.

Two lengths of the Rio Grande are included in this study, divided at Penitas. The first length of the Rio Grande extends downstream approximately 74 river miles from Penitas to the Hidalgo-Cameron County border. The second length is upstream of the first length, from Falcon Dam to Penitas.

1.4.0 FEMA FLOODPLAINS

The proposed wall alignment lay within sixteen Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panels in Texas. Table 2 below shows the FIRM panels.

Table 2: FEMA FIRM Panels by County in Texas

County	Panel	Effective Date	Zone	Wall Segment	Figure
Starr	48427C0350C	April 19, 2010	**A, X**	RGV- 63	A3-1
Starr	48427C0375C	April 19, 2010	**A, X**	RGV- 63	A3-2
Starr	48427C0525C	April 19, 2010	**A, X**	RGV- 63	A3-3
Starr	48427C0520C	April 19, 2010	**A, X**	RGV- 63	A3-4
Starr	48427C0540C	April 19, 2010	**A, X**	RGV- 63	A3-5
Starr	48427C0550C	April 19, 2010	**A, X**	RGV- 63	A3-6
Starr	48427C0675C	April 19, 2010	**A, X**	RGV- 63	A3-7
Starr	48427C0680C	April 19, 2010	**A, X**	RGV- 63	A3-8
Starr	48427C0565C	April 19, 2010	**A, X**	RGV- 63	A3-9
Starr	48427C0685C	April 19, 2010	**A, X**	RGV- 63	A3-10
Starr	48427C0725C	April 19, 2010	**A, X**	RGV- 63	A3-11
Starr	48427C0750C	April 19, 2010	**A**	RGV- 63	A3-12
Hidalgo	4803340375B	January 2, 1981	**A23**	RGV-03	A3-2
Hidalgo	4803340400C	November 16, 1982	**A, B**	RGV-03, RGV-04	A3-3
Hidalgo	4803340475B	January 2, 1981	**A, B, C**	RGV-04	A3-4
Hidalgo	4803340500B	January 2, 1981	**A, B, C**	RGV-01, RGV-02, RGV-03, RGV-04	A3-5
Hidalgo	4803340525B	January 2, 1981	**A, B, C**	RGV-02	A3-6

The Starr County FIRM panels (References 2-13) show that the proposed wall is located within the Special Flood Hazard Areas (SFHAs) Zone A and Zone X.

- Zone A is described as “no base flood elevations determined,” and
- Zone X is defined as “areas determined to be outside the 0.2% annual chance floodplain.”

The Hidalgo County FIRM panels (References 14-18) show that the proposed wall is located within the SFHA Zones A23, A, B and C.

- Zone A23 is described as “areas of 100-year flood where base flood elevations and flood hazard factors are determined.”

- Zone A is described as “areas of the 100-year flood where base flood elevations and flood hazard factors are not determined.”
- Zone B is described as, “areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) ft or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.”
- Zone C is described as “areas of minimal flooding.”

See Figures A3-1 through A3-12 for FEMA FIRM panels in Attachment A.

1.5.0 PROPOSED IMPROVEMENTS

The proposed improvements consist of constructing a 32.8-mile long floodwall which will be placed within the existing levee cross section. The floodwall alignment will fall between the toe and top of the levee on the river side. The top of the floodwall will extend upward for at least 24-ft, with the top of the wall being at 1% slope from the crest of the existing levee providing an area for a 24-foot maintenance road at the crest of the levee. The existing levee embankment on the river side of the levee will be cut and regraded as shown in Figure 1. The top of the floodwall will be set higher than the design WSE by 3-ft to provide freeboard. A bollard wall or lights/camera poles will be set atop the floodwall. The 75-ft enforcement zone shown below is proposed for RGV-01, but a maximum 150-ft enforcement zone is proposed for the remaining projects, allowing the patrol road centerline to shift within the zone. The final construction documents are included in Attachment C. Correspondence with USIBWC, regarding the proposed wall height dated August 10, 2017, is available upon request.

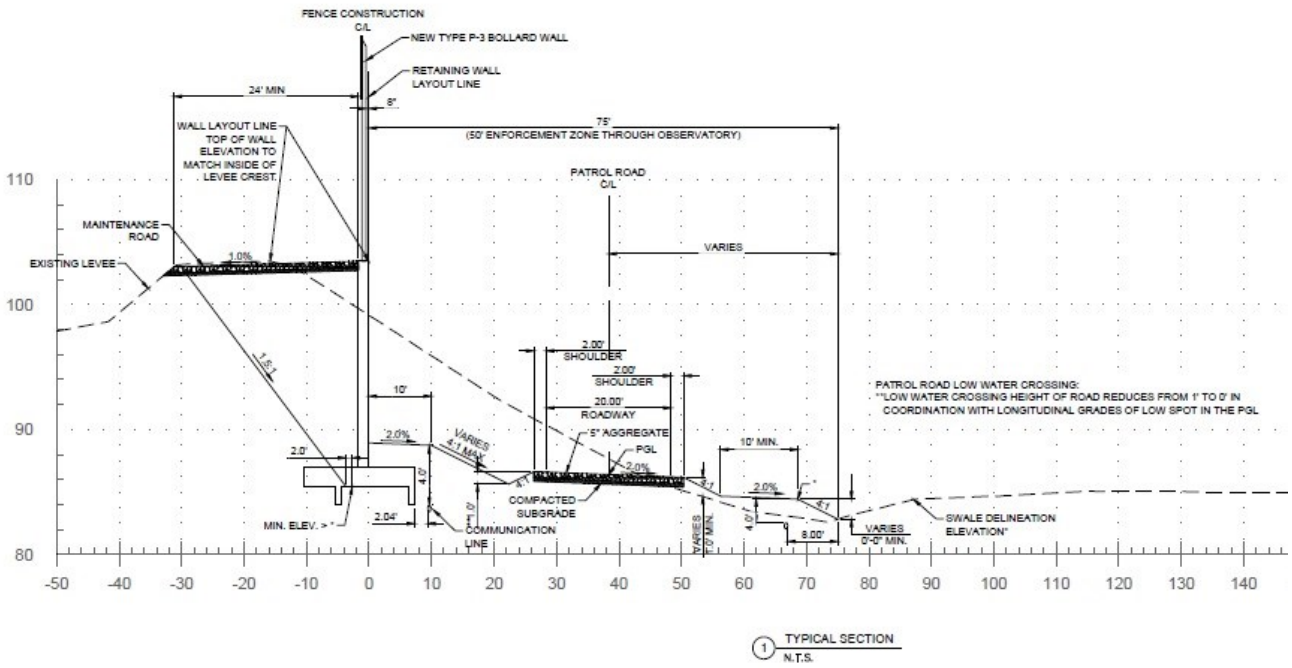


Figure 1: Cross Section of Proposed Levee and Wall

The floodwall is not proposed along the entire Rio Grande length; and is not proposed within Starr County. In addition, the two western segments of RGV-03, shown in Figure A2 (Attachment A) and within the aforementioned limits, were removed at CBP's request; therefore, they were not analyzed herein.

Within Starr County, no levee exists, so only a bollard wall is proposed. A type P-3 bollard wall with an anti-climb plate is proposed for the 63-mile non-levee reaach. The bollard wall consists of a typical configuration of 6-inch square steel bollards set on the diagonal with a 4-inch clearance between bollards or rotated steel bollards at 45-degrees with 5-inch clearance. The obstruction factor due to debris is evaluated using an obstruction factor of 35%. More details about the proposed conditions is discussed in Section 3.3.9 Proposed Wall Modeling.

Section 2 and Section 3 of this report discuss the details of the 1-D and 2-D models, respectively.

1.6.0 PROPOSED DRAINAGE CONDITION

The proposed drainage condition consists of the replacement of the levee with a floodwall and the modification to the floodplain ground elevations, due to requirements in the enforcement zones (as explained in Section 1.5.0). This proposed drainage condition will not result in impacts to deflection greater than 5% nor will it increase WSEs in excess of 6-inch in rural areas or 3-inches in urban areas. In some locations identified within the 1-D model (cross-sections 180.32, 178.5, 177.7, 174.2, 171.8, 171.15, 170.26, and 169.9), the original USIBWC condition modeling demonstrated that the levee did not meet the 3-ft of freeboard requirement. These locations are being re-evaluated and the height of the levee will be increased to meet the 3-ft freeboard requirement within those areas.

1.7.0 USIBWC COORDINATION AND DESIGN STANDARDS

All drainage analyses and designs are in compliance with the requirements of the Department of Homeland Security's TI Design Standards (Reference 19), and were agreed upon between Michael Baker and the USIBWC during the first technical meeting on June 28th, 2017, and a conference call held on July 13th 2017. These meetings and documents covered project specific details, including calculation methodologies, water surface increase thresholds of 3-inches in urban and 6-inches in rural areas, and the 5% increase of allowable deflection. USIBWC coordination and drainage excerpts of the TI Design Standards are provided in Attachment D. Meeting minutes can be provided upon request.

1.8.0 HYDROLOGIC AND HYDRAULIC ANALYSES

The existing design storm discharges, obtained from USIBWC, were utilized for hydraulic modeling. Hydrologic Engineering Center River Analysis System (HEC-RAS) Version 5.0.3 (Reference 20) was used for all hydraulic modeling procedures. Two independent hydraulic models were built for the different reaches of the river:

- A 1-D model for the reach between Penitas and the Hidalgo County line was used to evaluate impacts in the levee areas (described in Section 2).
- A 2-D model for the reach between Falcon Dam and Hidalgo County was used to evaluate impacts of the bollard wall in the Rio Grande floodplain (described in Section 3).

1.9.0 CONCLUSIONS

The proposed bollard wall between Falcon Dam and Penitas meets USIBWC criteria. The proposed levee wall between Penitas and Hidalgo-Cameron County Line, within the project parameters, will be designed such that 44 CFR 65.10 requirements will be met. This includes freeboard criteria, structural design of the wall and foundation, and an Operations and Maintenance Plan. In addition, both the floodwall design between Penitas and Hidalgo-Cameron County Line and the bollard wall segment between Falcon Dam and Penitas will not impact the existing Base Flood Elevations or floodplain limits identified on the FEMA FRIM panels. USIBWC deflection criteria is also met and demonstrated by both the 1-D and 2-D floodplain analysis.

2.0 SECTION 2: 1-D MODELING WITH LEVEE AREAS, PENITAS TO HIDALGO COUNTY

2.1.0 INTRODUCTION

The following section outlines the procedures implemented for the impact analysis of the 32-miles of proposed floodwall along the Rio Grande from Penitas to the Hidalgo-Cameron County Boundary in Texas.

2.2.0 HYDROLOGIC ANALYSIS

The discharge rates provided in Table 3 were applied at the following locations in the hydraulic model:

Table 3: USIBWC Applied Discharge Rates

HEC-RAS River Name	HEC-RAS Reach Name	Cross-Section River Miles	USIBWC Provided Peak Discharge (cfs)
River-1/Rio Grande	Reach-1/Lower	274.2	240,000
River-1/Rio Grande	Reach-1/Lower	186	235,000
River-1/Rio Grande	Reach-1/Lower	169.83	130,000
River-1/Rio Grande	Reach-1/Lower	156.93	125,000
River-1/Rio Grande	Reach-1/Lower	129.3	20,000

Table note: cfs – Cubic Feet per Second

According to the effective Flood Insurance Study (FIS), the discharge values are based on the historic peak flooding from the September 1988 flood (Hurricane Gilbert) at Rio Grande City, located downstream from the Rio San Juan and Rio Grande Confluence. Rio Grande is regulated by international treaties between the US and Mexico and the floodplain in the US is administered by USIBWC.

2.3.0 HYDRAULIC ANALYSES

HEC-RAS Version 5.0.3 (Reference 20) was used for all hydraulic modeling procedures. Two independent hydraulic models for the proposed 32 miles of floodwall were built for the different reaches of the river; a 1-D HEC-RAS model, and a "LowerRioGrande.prj" model, which contains a duplicate effective plan, a corrected effective plan, and a proposed plan that were generated using a USIBWC-approved model called "lrg2003NAVD88.prj". See Table

4: HEC-RAS Model LowerRioGrande Summary Table of Plans and Files for descriptions of the plans and associated flow, geometry, and hydraulic design files.

Table 4: HEC-RAS Model LowerRioGrande Summary Table of Plans and Files

Project Name	Plan Name	USIBWC File Names	New File Names
LowerRioGrande.prj	Duplicate Effective (LowerRioGrande.p02)	*Geometry:*	*Geometry:*
		LRGFCP UPDATED BRIDGES MARCH 2007.g04	Duplicate Effective (LowerRioGrande.g04)
		Steady Flow:	*Steady Flow:*
		LRGFCP DIVERSION FLOOD - MIN. 238.f01	Duplicate Effective Flow (LowerRioGrande.f02)
		Hydr Design:	*Hydr Design:*
		LRG UPDATED BRIDGE MARCH 2007.h01	Duplicate Effective (LowerRioGrande.h01)

Description:
The River and Reach names were changed to Rio Grande, Lower Reach, respectively, by Michael Baker.
March 2007
AN ADDITIONAL 70 cross sections THAT WERE SURVEYED in MARCH 2007 WERE ADDED TO THE IBWC'S 2003 HECRAS BACKWATER MODEL. THE EARLIER 2003 MODEL'S GEOMETRY WAS CONVERTED FROM 1929 DATUM TO CURRENT NAVD 88 DATUM.
THIS MODEL WAS PREPARED USING HEC-RAS VERSION 4.0. THE FINAL PLAN MODEL ADDRESSED ASBUILT CHANGES TO THE 2003 MODEL'S BRIDGES AT HIDALGO REYNOSA AND PROGRESO

January 2003 (Earlier Model)
CURRENT MAINTENANCE WITH CONTROLLED GROWTHHEC-RAS BACKWATER MODEL OF THE RIO GRANDE , FROM BELOW BROWNSVILLE TO PEÑITAS
This model used HEC-RAS Version 3.1.1. Newer versions may give slightly different results.
River sections generally surveyed during 1990. A few sections were surveyed earlier. This version contains 24 additional sections with respect to the 1992 model, that were surveyed in 2001.
Some of the geometry data at the dams, bridges, and floodway inlets was taken from construction drawings and other sources.
The flow of 235,000 cfs represents an attenuated flow from 250,000 cfs at Rio Grande City. An additional 5000 cfs attenuation in the flood peak is assumed to occur between Anzalduas Dam and Retamal Dam. Flows have been input to simulate this attenuation. Each flow diversion at the Main Floodway in the US and at the Mexican Floodway are 105,000 cfs, as agreed with MX in Minute No. 238. Starting elevation at River Mile 28 does not include storm surge or tidal effects.
All elevations are referenced to Mean Sea Level Datum.

Project Name	Plan Name	File Names
LowerRioGrande.prj	Corrected Effective (LowerRioGrande.p01)	*Geometry:*
		Corrected Effective (LowerRioGrande.g01)
		Steady Flow:
		Design Flow (LowerRioGrande.f01)
		Hydr Design:
		Duplicate Effective (LowerRioGrande.h01)

Description:
July 2017
The duplicate effective river reach and cross-sections were re-cut using the 2008 IBWC-provided surface, integrated with 2017 survey datum (at cross-sections 145-139.85, 161.4-160, and 155.2-135.5).

Reach lengths were approximated between structures based on the duplicate effective model. Then, cross-sections and cross-section configurations were approximated using USIBWC-provided hardcopy maps. Reach lengths for 169.83 and 169.49 were revised to 1300 ft, and for 167.4 and 167, were revised to 2500 ft. Applied reach lengths were imported from the GeoRAS and not copied from the duplicate effective model. The reach was also truncated at cross-section 112.2.

Cross-sections 186, 169.14, 169.12, 169.1, 156.93, 156.9, 156.87, 156.84, 151.27, 151.25, 129.23, 129.22, 129.216, 129.214, 129.213, 129.212, 129.211, 129.21, 120.62, 120.59, and 112.2; and structures at river stations at 169.13, 156.915, 156.855, 151.255, 129.215, and 120.605 were duplicated from the USIBWC 2008 model, except for 169.14 which was elevated on the left bank to match the surface elevations.

Manning's n-values, contraction and expansion coefficients, blocked obstructions, levees, and ineffective flow areas were approximated, following associated duplicate effective sections. Bathymetric stations and elevations were translated from the associated duplicate effective cross-sections by graphical interpretations.

New cross-sections were placed at the beginning and ending of the proposed wall. New cross-sections (excluding interpolated sections) include 180.32, 174, 172, 169.9, 166, 165, 163, 161.35, 161.3, 160, 159, 157.2, 155.2, 145.5, 145.2, 144.7, 144, 143.5, 143, 142, 141.5, 136.8, 136.2, 136, and 135.5. Cross-sections 155.01, 154.6, 154.23, and 153.85 were extended on the left bank to the levee. Bathymetric elevations, n-values, blocked obstructions, levees, and ineffective flow areas for these new sections were placed based on similar upstream or downstream cross-sections.

Cross-section 159.16 was removed due to conflicts with new cross-sections, and cross-sections downstream of 112.2 were eliminated.

Control System Group: United States / State Plane 1983
Zone: Texas South 4205 (GROUND)
Datum Transformation: NAD 1983 (Conus) (Molodensky)
Geoid Model: GEOID12B
Units: US Survey Feet
Vertical Datum: NAVD88.

The corrected effective and proposed flow boundary condition matches the WSE of the duplicate effective at cross-section 112.2 (72.10-ft)

2.3.1 DUPLICATE EFFECTIVE PLAN

The duplicate effective plan contains duplicate effective geometry, flow, and hydraulic design files. The duplicate effective geometry, which was not georeferenced, is part of the original USIBWC model called "lrg2003NAVD88.prj" that was received by Michael Baker on July 11, 2017 (see Attachment D for e-mail correspondence with USIBWC). The geometry extends from River Stations 186 to 28. The name of the river was changed from "River-01" to "Rio Grande," the name of the reach was changed from "Reach-01" to "Lower," and the geometry file was changed from "LRGFCP updated bridges March 2007" to "duplicate effective." The flow file was renamed to "Duplicate Effective Flow" and the hydraulic design file was changed from "LRG updated bridge March 2007" to "duplicate effective"; otherwise, all the hydraulic content of the model remains unmodified. The model was then named "LowerRioGrande.prj" using the updated HEC-RAS software.

2.3.2 CORRECTED EFFECTIVE PLAN

A corrected effective plan was generated from the duplicated effective plan to assess the proposed design along the left bank levee of the Rio Grande. In general, the corrected effective geometry was georeferenced after developing the terrain, and the river and cross-sections were placed as accurately as available data permitted. In addition, some cross-sections were added, one was deleted, and the geometry was truncated downstream of river station 112.2 at the Hidalgo Border. The geometry was built using ArcGIS 10.4.1 (Reference 21), HEC-GeoRAS 10.1 (Reference 22), and ESRI Aerial Imagery (Reference 23). Hydraulic features were then added to each section, closely matching the features of the duplicate effective model.

The terrain used for modeling is composed of 2007 and 2017 datum. The 2007 terrain surface extends from MX into the US, and was obtained from USIBWC. Bathymetry was not included. This terrain was used to build the cross-sections within the duplicate effective geometry. In July 2017, Aerotech Mapping flew a 2000-ft wide alignment along the proposed wall locations for this project. Michael Baker sewed these terrains together using ArcMap to form a cohesive surface for the model. Datum and elevations were verified to be consistent among all the surfaces received. The horizontal datum is NAD 1983, State Plane Texas South 4205-Ft, and the vertical datum is NAVD88. The survey datum has been provided in Attachment C.

After building the terrain, the geometry was georeferenced by drawing the hydraulic baseline (HEC-RAS river reach) of the Rio Grande from the Falcon Dam to the coast, using the aerial imagery in ArcMap and HEC-GeoRAS. Structures identified on the aerial imagery were matched to the structures in the USIBWC model. The reach lengths between the structures were stretched or shortened within the identified channel, and/or over the adjacent floodplain, in order to match the reach lengths found in the duplicate effective geometry. The cross-section/reach intersections were identified using the reach lengths provided in the model, before the cross-sections were placed. The cross-sections were placed left to right, looking downstream, using the Cross-Section Location Map of the *Hydraulic Model of the Rio Grande and Floodways within the Lower Rio Grande Flood Control Project* in Attachment A (prepared by USIBWC and dated June 2003 [Reference 24]), and the Cross-Section Survey and Location Map of the *HEC-RAS Hydraulic Model Update and Validation and FLO-2D Simulation for the Lower Rio Grande Flood Control Project* in Attachment C (prepared for USIBWC by S&B Infrastructure Limited, and dated July 2008 [Reference 25]). Cross-sections were not extended to contain the flow, but cross-sections 155.01, 154.6, 154.23, and 153.85 were extended to the north levee. The river reach was further manipulated between the cross-sections to match the downstream-channel reach lengths of the duplicate effective geometry.

New sections were drawn at the start and end of the new wall, if a cross-section was not already in place. Additional new sections were placed where interpolated cross-sections could not reasonably be used. These

would most often occur where tens of thousands of ft separated the USIBWC cross-sections, due to tight curvatures in the river. The left and right reach lengths were drawn roughly parallel to the river reach, about one-third the distance to the existing levees. The flow paths, river, and cross-sections with elevation and station data, were imported from HEC-GeoRAS into the HEC-RAS model. Interpolated cross-sections were introduced by using the HEC-RAS interpolation function after everything was imported and a maximum distance of 2000-ft between cross-sections was specified. All cross-sections were filtered using the cross-section points filter function within HEC-RAS, minimizing the change in area, down to 460 points.

Some features were duplicates of the original USIBWC datum, instead of features generated by the terrain. These features included the most-upstream cross-section, the most downstream cross-section, the cross-sections around the structures, and the structures which include in-line structures and bridges. Five cross-sections extended beyond the available terrain. These sections were completed with the original USIBWC cross-section datum.

Once the cross-section geometry was brought into HEC-RAS, the Manning's n-values, bank stations, levees, expansion and contraction coefficients, blocked obstructions, ineffective flow areas, and bathymetric elevations were approximated by referencing these parameters from the adjacent cross-sections of the duplicate effective geometry. In the new sections, these hydraulic parameters were placed by using the immediate upstream or downstream USIBWC cross-sections as guides.

Like the USIBWC model, n-values were applied horizontally across the cross-sections, ranging from 0.015, representing the sandy bottom of the Rio Grande, up to 0.188 for the overbank areas. Bank stations were set where changes in slope across the cross-section represented the break from channel to overbank, and at similar locations to those set by USIBWC. Levees were located along either side of most cross-sections, at the highest ground elevation. The HEC-RAS default coefficients for expansion and contraction are 0.1 and 0.3, respectively. Upstream and downstream of the structures, 0.2 and 0.5 default coefficients were applied respectively by USIBWC; these values were not modified by Michael Baker.

Blocked obstructions and ineffective flow areas were placed per the USIBWC cross-sections; below the overbank elevations in old river meanders, settling basins, or agricultural fields; approximating the original sections. Some blocked obstructions were placed to represent developed areas or settling basins set higher than the channel banks. For the new and interpolated cross-sections, these parameters were reviewed spatially and applied with reasonable consistency, reflecting no change or gradual changes between sections.

The bathymetric elevations for each cross-section were processed by applying the vertical and horizontal shifts that were evident after plotting the station and elevation data of the associated duplicate effective and corrected effective cross-sections. Some cross-sections approximated the duplicate effective cross-sections so no vertical translation was required. See Figure 2 for an example at River Station 171.8.

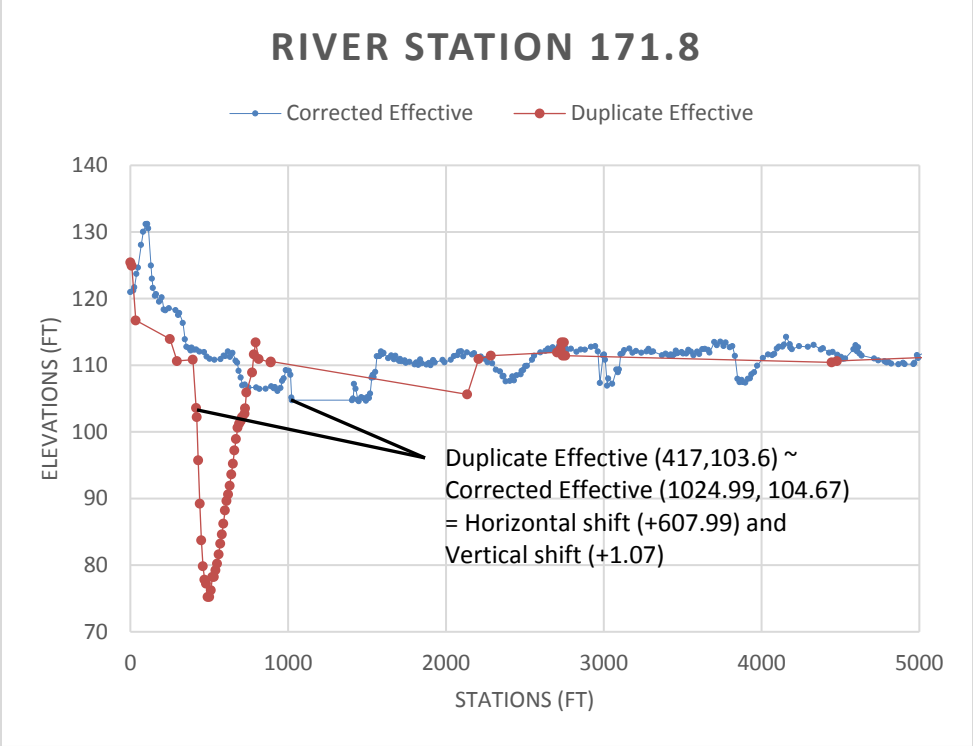


Figure 2: Graph used for Bathymetric Calculations

The design flow file applied in the corrected effective plan maintains the flow rates of the duplicate effective flow file, but the boundary condition was revised to match the WSE of the duplicate effective output at River Station 112.2, which was 72.10-ft. No revisions were made between the duplicate effective and corrected effective hydraulic design files.

2.3.3 CORRECTED EFFECTIVE AND DUPLICATE EFFECTIVE PLAN COMPARISON

After the corrected effective plan was finalized, the duplicate effective and corrected effective plans were run, and the output WSEs were compared to assess the reasonable accuracy of the changes made. See Table 5 for a comparison of the WSEs. Changes can be attributed to a combination of topographic updates, additional cross-sections, and an updated version of the HEC-RAS software.

The maximum increase from the corrected effective plan to the duplicate effective water plan's surface elevation is 2.43-ft at River Station 178.5, and the maximum decrease is 0.35-ft at River Station 153.61. The average increase is 0.63-ft. In general, the largest increases are associated with the highest discharge rate of 235,000 cfs, with an average of 1.82-ft, and the smallest discharge rate is associated with the smallest changes, with an average 0.31-ft. These differences were deemed reasonable.

Table 5: Comparison of Corrected Effective and Duplicate Effective Water Surface Elevations

Corrected Effective Water Surface Elevations - Duplicate Effective Water Surface Elevations = ΔWSE									
River Station	**ΔWSE (ft)**	**River Station**	**ΔWSE (ft)**	**River Station**	**ΔWSE (ft)**	**River Station**	**ΔWSE (ft)**	**River Station**	**ΔWSE (ft)**
186	1.17	**168.85**	1.67	**153.61**	-0.35	**137.14**	0.10	**125.3**	0.31
185	1.22	**168.58**	1.12	**153.36**	-0.34	**135**	0.17	**125**	0.32
184	1.09	**168.3**	1.15	**152.53**	-0.20	**134.65**	0.13	**124.4**	0.08
183.2	1.50	**168**	0.32	**151.7**	0.15	**132.75**	0.38	**123.8**	0.09
182.4	1.77	**167.4**	0.12	**151.49**	0.11	**131.6**	0.37	**123.15**	0.07
181.35	1.78	**167**	-0.07	**151.27**	0.03	**131.35**	0.30	**122.5**	0.09
180.3	2.07	**166.6**	-0.14	**151.25**	0.03	**130.93**	0.50	**121.46**	0.13
179.4	2.02	**162.1**	0.04	**151.24**	0.04	**130.51**	0.76	**120.7**	-0.06
178.5	2.43	**161.4**	-0.17	**150.78**	0.00	**129.3**	0.68	**120.62**	-0.04
177.7	2.20	**157.15**	1.02	**150.31**	0.05	**129.27**	0.68	**120.59**	-0.05
176.8	2.04	**156.93**	0.57	**149**	0.10	**129.23**	0.69	**120.5**	-0.10
175.6	1.97	**156.9**	0.55	**147.68**	0.15	**129.22**	0.70	**120.38**	-0.11
174.6	2.13	**156.87**	0.55	**146**	0.36	**129.216**	0.75	**118.81**	0.09
174.2	2.08	**156.84**	0.55	**145**	0.60	**129.214**	0.61	**117.87**	0.28
171.8	2.21	**156.7**	-0.23	**144.55**	0.72	**129.213**	0.70	**117.2**	0.24
171.15	2.17	**156.6**	0.65	**143.25**	0.54	**129.212**	0.71	**116.5**	0.22
170.5	1.14	**156.15**	0.34	**142.5**	0.21	**129.211**	0.65	**116.1**	0.18
170.26	1.84	**155.7**	0.46	**141.9**	0.36	**129.21**	0.64	**115.7**	0.25
170.02	1.83	**155.36**	0.46	**140.74**	0.53	**129.2**	0.69	**115**	0.12
169.83	2.17	**155.01**	0.77	**140**	0.68	**129.03**	0.67	**114.8**	0.25
169.49	1.24	**154.81**	1.50	**139.85**	0.71	**128.5**	0.33	**114.65**	0.26
169.14	1.37	**154.6**	1.12	**139.01**	0.78	**127.7**	0.35	**114.1**	0.27
169.12	1.29	**154.23**	0.43	**138.36**	0.48	**127.4**	0.36	**113**	0.06
169.1	1.31	**153.85**	-0.11	**137.71**	0.29	**126.7**	0.25	**112.2**	0.00

2.3.4 PROPOSED PLAN

The proposed plan includes the same design flow file as the corrected effective plan, and a proposed geometry file that is based on the corrected effective geometry. See Table 6 for projects associated with the cross-sections that were updated with the proposed geometry. The proposed 75-feet enforcement zone cross-section geometry is reflected for RGV-01; the construction documents are included in Attachment C. A 150-feet enforcement zone is currently being proposed for RGV-02, -03, and RGV-04, and therefore the cross-sections associated with each of these projects will reflect that geometry.

Table 6: Projects and Associated Cross-Sections with Proposed Geometries

Project	Cross-Sections
RGV-03	180.32 – 171.8
RGV-04	171.48 – 169.9, 161.35 and 161.3, 155.2 – 145.5
RGV-01	145.5 – 139.85
RGV-02	139.57 – 135.5, 127.7 – 124.4, 120.8 – 120.4, 117.2 – 115.2

To generate the proposed geometry, two fixed points were identified: the existing levee elevation (1) and the existing grade 150-ft (the enforcement zone) south of the proposed wall location, also known as the daylight point (2). See Figure 3 for an illustration of these points at cross-section 155.2. These points were used to calculate the slope between two unknown points, A and B. The variables used to change the values of A and B are wall height (W) and side slopes, SS_1, SS_2, and SS_3.

The levee elevation in the cross-section (1) was identified and extended upward at 1% toward the river for 24-ft to represent the top of the wall. A 10-ft drop in elevation, at the same location, represents a 10-ft wall. From the bottom of the wall, a 2% slope away from the wall for 10-ft was used to calculate the elevation at point A.

From the daylight point (2), the adjacent SS_1 was initially set at 4:1 for 6-ft to accommodate a low water crossing. From that point, the slope extends up 10-ft at 2%. From here, SS_2 extends up initially at 4:1 for 6-ft to meet the first edge of the compacted subgrade. The roadway is sloped 2% for 24-ft. From there, the grade slopes down for 3-ft, initially at 4:1 SS_3 to point B.

W, SS_1, SS_2, and SS_3 (all side slopes, adjusted to be the same for modeling simplicity,) were adjusted to calculate the slope between points A and B. The slope was set to allow drainage to fall away from the wall at no more than a 4:1 slope. See Figure 3 for an example of the type of revisions made to each of the cross-sections outside of the RGV-01 project using a 150-ft enforcement zone. Wall heights varied from 1-ft to 10-ft, and side slopes were 4:1, 5:1, 10:1, and 100:1. Wall heights and side slopes that vary from 10-ft and 4:1 are identified in the cross-section description. These variables will change at the final design phase for each project. The enforcement zone within RGV-01 is 75-ft and 150-ft elsewhere. For the RGV-01 project area, the proposed cross-sections were cut using a proposed surface.

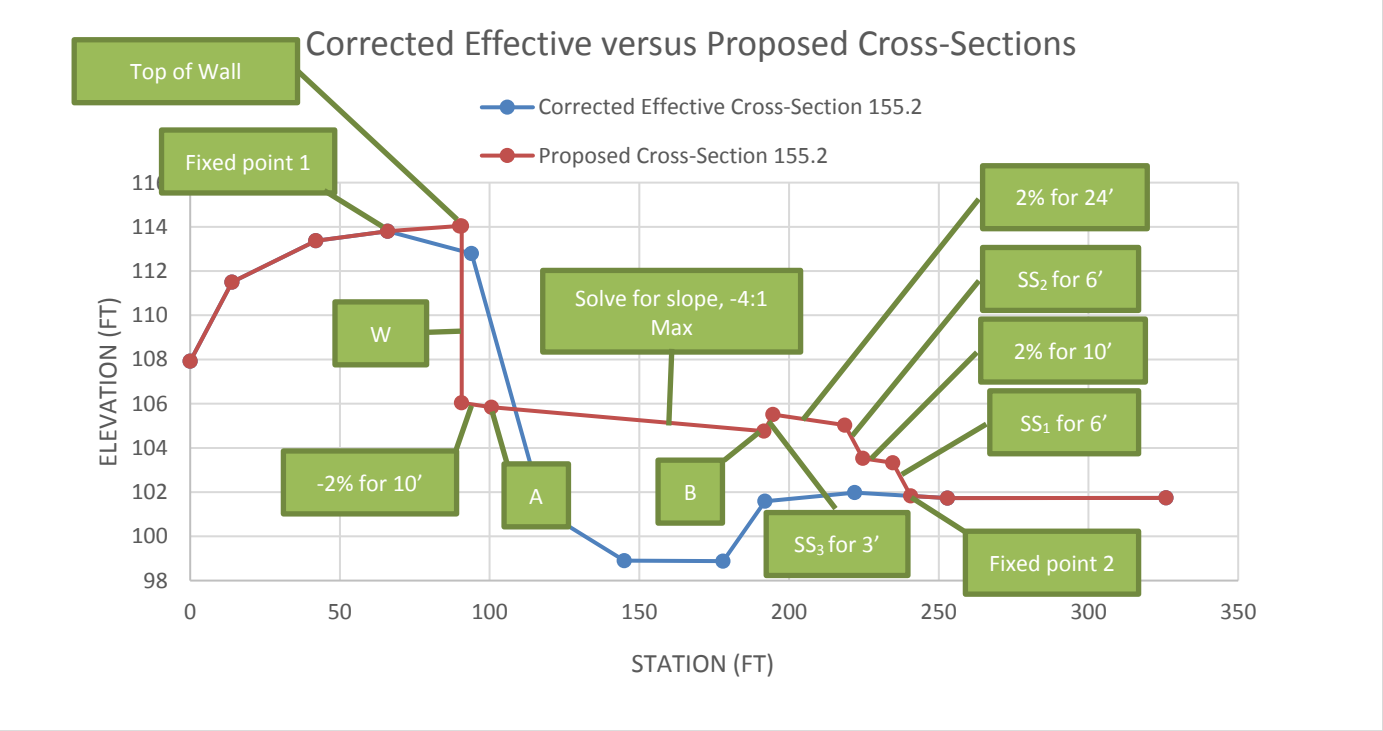


Figure 3: Proposed Cross-section Generation

2.4.0 IMPACTS

Hydraulic impacts are defined by increases in the WSE and deflection of flow from the north overbank to the south overbank. The hydraulic impacts due to WSE increases are calculated as the proposed WSE minus the corrected effective WSE. The hydraulic impacts due to increases in deflection of flows are calculated using the HEC-RAS variables 'Q Left,' 'Q Channel,' and 'Q Right,' per USIBWC guidance. These variables represent, respectively, flow in the left overbank, flow in the main channel, and flow in the right overbank. For each cross-section, the discharge on the MX side (QMX) is calculated as half the flow in the main channel plus the flow in the right overbank. Similarly, for each cross-section, the discharge on the US side (QUS) is calculated as half the flow in the main channel plus the flow in the left overbank. These calculations are made for both the corrected effective plan and the proposed plan. Finally, the increase in the percent deflection is calculated for each cross-section for MX and for the US. The WSE, velocity (Vel) in ft per second (fps), and discharge rate impacts in cfs are shown below in Table 7. The river stations listed with asterisks are interpolated and river stations with red font identify locations with the highest changes in values.

Table 7: Proposed Hydraulic Impacts

	WSE (ft)	Vel (fps)	Proposed Condition		Existing Condition		Deflection		Percent Deflection	
River Station	Δ	Δ	QUS (cfs)	QMX (cfs)	QUS (cfs)	QMX (cfs)	US (cfs)	MX (cfs)	US	MX
186	0.01	0.00	53545	181455	53556	181444	-11	11	-0.02%	0.01%
185.50*	0.01	0.00	93733	141267	93743	141257	-10	10	-0.01%	0.01%
185	0.02	0.00	112865	122135	112878	122122	-13	13	-0.01%	0.01%
184.50*	0.01	0.00	88243	146757	88260	146740	-17	17	-0.02%	0.01%
184	0.02	-0.01	56349	178651	56369	178631	-20	20	-0.04%	0.01%
183.80*	0.01	-0.01	60876	174124	60890	174110	-14	14	-0.02%	0.01%
183.60*	0.01	0.00	67425	167575	67425	167575	0	0	0.00%	0.00%
183.40*	0.02	-0.01	91295	143705	91297	143703	-2	3	0.00%	0.00%
183.2	0.01	-0.01	107644	127356	107647	127353	-3	3	0.00%	0.00%
183.00*	0.01	0.00	113266	121734	113277	121723	-11	11	-0.01%	0.01%
182.80*	0.02	-0.01	112947	122053	112954	122046	-7	7	-0.01%	0.01%
182.60*	0.02	0.00	114408	120592	114415	120585	-7	7	-0.01%	0.01%
182.4	0.01	-0.01	118283	116717	118288	116712	-5	5	0.00%	0.00%
182.05*	0.01	0.00	107824	127176	107830	127170	-7	7	-0.01%	0.01%
181.70*	0.01	0.00	95473	139527	95479	139521	-6	6	-0.01%	0.00%
181.35	0.02	-0.01	81982	153018	81978	153022	4	-4	0.00%	0.00%
181.01*	0.02	0.00	80793	154207	80790	154210	3	-3	0.00%	0.00%
180.66*	0.01	0.00	88400	146600	88404	146596	-4	4	0.00%	0.00%
180.32	0.01	0.00	95014	139986	95010	139990	4	-4	0.00%	0.00%
180.3	0.01	-0.01	70998	164002	71043	163957	-45	45	-0.06%	0.03%
180.08*	0.02	-0.01	88185	146815	87995	147005	190	-190	0.22%	-0.13%
179.85*	0.02	-0.01	120567	114433	120233	114767	333	-333	0.28%	-0.29%
179.63*	0.01	0.00	133915	101085	133983	101017	-68	68	-0.05%	0.07%
179.4	0.02	0.01	148402	86598	148777	86223	-374	375	-0.25%	0.43%
179.10*	0.02	0.01	156379	78621	156713	78287	-334	334	-0.21%	0.43%
178.80*	0.02	0.00	111239	123761	111533	123467	-294	294	-0.26%	0.24%
178.5	0.02	0.01	120407	114593	120649	114351	-241	241	-0.20%	0.21%
178.23*	0.02	0.00	125141	109859	125246	109754	-105	105	-0.08%	0.10%
177.97*	0.02	0.00	130049	104951	130055	104945	-6	6	0.00%	0.01%

River Station	WSE (ft) Δ	Vel (fps) Δ	Proposed Condition QUS (cfs)	Proposed Condition QMX (cfs)	Existing Condition QUS (cfs)	Existing Condition QMX (cfs)	Deflection US (cfs)	Deflection MX (cfs)	Percent Deflection US	Percent Deflection MX
177.7	0.02	-0.01	161146	73854	161132	73868	13	-13	0.01%	-0.02%
177.40*	0.02	-0.01	163471	71529	163474	71526	-3	3	0.00%	0.00%
177.10*	0.02	-0.01	153196	81804	153207	81793	-11	11	-0.01%	0.01%
176.8	0.02	-0.01	140526	94474	140486	94514	40	-40	0.03%	-0.04%
176.40*	0.02	0.00	109738	125262	109936	125064	-198	198	-0.18%	0.16%
176.00*	0.02	-0.02	94573	140427	94405	140595	168	-168	0.18%	-0.12%
175.6	0.02	0.01	49841	185159	50291	184709	-450	449	-0.89%	0.24%
175.27*	0.02	-0.01	88787	146214	88636	146365	151	-151	0.17%	-0.10%
174.93*	0.02	0.00	76613	158387	76774	158226	-160	161	-0.21%	0.10%
174.6	0.03	-0.01	103746	131254	103816	131184	-70	70	-0.07%	0.05%
174.2	0.02	0.00	183544	51456	183665	51335	-121	121	-0.07%	0.24%
174.10*	0.02	0.00	193717	41283	193838	41162	-121	121	-0.06%	0.29%
174	0.02	0.01	207752	27248	207820	27180	-68	68	-0.03%	0.25%
173.33*	0.03	0.00	182159	52841	182266	52734	-107	107	-0.06%	0.20%
172.67*	0.02	-0.01	151611	83389	151598	83402	13	-13	0.01%	-0.02%
172	0.02	0.00	123412	111588	123733	111267	-321	321	-0.26%	0.29%
171.90*	0.03	0.00	90853	144147	90926	144074	-73	73	-0.08%	0.05%
171.8	0.02	0.01	59302	175698	59822	175178	-520	520	-0.87%	0.30%
171.48*	0.03	0.00	55622	179379	55712	179287	-91	91	-0.16%	0.05%
171.15	0.03	-0.01	60337	174663	60242	174758	95	-95	0.16%	-0.05%
170.83*	0.02	-0.01	93582	141418	93593	141407	-11	11	-0.01%	0.01%
170.5	0.01	0.02	117779	117221	117959	117041	-180	180	-0.15%	0.15%
170.38*	0.01	0.03	122384	112616	122632	112369	-248	248	-0.20%	0.22%
170.26	0.01	0.08	153918	81082	154883	80117	-965	965	-0.62%	1.20%
170.02	-0.01	0.02	97629	137371	97806	137194	-177	177	-0.18%	0.13%
169.9	0.00	0.00	94119	140881	94157	140843	-38	38	-0.04%	0.03%
169.83	0.00	0.00	48832	81168	48832	81168	0	0	0.00%	0.00%
169.49	0.00	0.00	60997	69003	60997	69003	-1	1	0.00%	0.00%
169.14	0.00	0.00	65000	65000	65000	65000	0	0	0.00%	0.00%
169.12	0.00	0.00	65000	65000	65000	65000	0	0	0.00%	0.00%

River Station	WSE (ft) Δ	Vel (fps) Δ	Proposed Condition QUS (cfs)	Proposed Condition QMX (cfs)	Existing Condition QUS (cfs)	Existing Condition QMX (cfs)	Deflection US (cfs)	Deflection MX (cfs)	Percent Deflection US	Percent Deflection MX
169.1	0.01	0.00	65000	65000	65000	65000	0	0	0.00%	0.00%
168.85	0.00	0.00	74585	55415	74584	55416	1	-1	0.00%	0.00%
168.58	0.00	0.00	82982	47018	82981	47019	1	-1	0.00%	0.00%
168.3	0.00	0.00	72679	57321	72677	57323	2	-2	0.00%	0.00%
168	0.00	0.00	97973	32027	97970	32030	2	-2	0.00%	-0.01%
167.70*	0.00	0.00	90473	39527	90470	39530	2	-2	0.00%	-0.01%
167.4	0.00	0.00	93609	36391	93607	36393	2	-2	0.00%	-0.01%
167	0.00	0.00	67991	62009	67988	62012	3	-3	0.00%	0.00%
166.6	0.00	0.00	79081	50919	79078	50922	3	-3	0.00%	-0.01%
166	0.00	0.00	88494	41506	88486	41514	8	-8	0.01%	-0.02%
165	0.01	0.00	102392	27608	102391	27609	0	0	0.00%	0.00%
163	0.01	0.00	58640	71361	58642	71358	-2	2	0.00%	0.00%
162.1	0.01	0.00	37677	92323	37682	92318	-5	5	-0.01%	0.01%
161.4	0.00	0.00	65709	64291	65712	64288	-4	4	-0.01%	0.01%
161.35	0.00	0.00	73233	56767	73230	56770	2	-2	0.00%	0.00%
161.3	0.01	0.01	65578	64422	65708	64292	-130	130	-0.20%	0.20%
160	0.01	0.00	60962	69038	60966	69033	-4	4	-0.01%	0.01%
159	0.01	0.00	39829	90171	39838	90162	-10	10	-0.02%	0.01%
157.2	0.01	-0.01	97235	32765	97237	32763	-2	2	0.00%	0.01%
157.15	0.01	0.00	79189	50811	79180	50820	10	-10	0.01%	-0.02%
156.93	0.01	0.00	63673	61327	63672	61327	0	0	0.00%	0.00%
156.9	0.01	0.00	64087	60913	64087	60913	0	0	0.00%	0.00%
156.87	0.01	0.00	64416	60584	64416	60584	0	0	0.00%	0.00%
156.84	0.01	0.00	60849	64151	60850	64150	-2	2	0.00%	0.00%
156.7	0.01	0.00	60041	64959	60042	64958	-1	1	0.00%	0.00%
156.6	0.01	-0.01	57447	67553	57450	67550	-3	3	0.00%	0.00%
156.15	0.01	0.00	84475	40525	84456	40544	19	-19	0.02%	-0.05%
155.7	0.01	-0.01	67940	57060	67945	57055	-5	5	-0.01%	0.01%
155.36	0.02	-0.01	70629	54371	70634	54367	-5	5	-0.01%	0.01%
155.2	0.01	0.02	71333	53667	71832	53168	-499	499	-0.70%	0.94%

River Station	WSE (ft) Δ	Vel (fps) Δ	Proposed Condition QUS (cfs)	Proposed Condition QMX (cfs)	Existing Condition QUS (cfs)	Existing Condition QMX (cfs)	Deflection US (cfs)	Deflection MX (cfs)	Percent Deflection US	Percent Deflection MX
155.01	0.01	0.00	61844	63156	61849	63151	-5	5	-0.01%	0.01%
154.81	0.01	0.01	37598	87402	38018	86982	-420	420	-1.10%	0.48%
154.6	0.01	0.00	62787	62213	62895	62105	-108	108	-0.17%	0.17%
154.23	0.01	0.01	62430	62570	62586	62414	-156	156	-0.25%	0.25%
153.85	0.01	0.00	50996	74004	51028	73972	-32	32	-0.06%	0.04%
153.61	0.00	-0.01	46188	78812	46204	78796	-16	15	-0.03%	0.02%
153.36	0.01	0.00	46679	78321	46917	78083	-239	239	-0.51%	0.31%
153.08*	0.00	0.01	50029	74971	50147	74853	-119	118	-0.24%	0.16%
152.81*	0.01	0.00	47351	77649	47393	77607	-42	42	-0.09%	0.05%
152.53	0.01	0.00	25642	99358	25635	99365	8	-8	0.03%	-0.01%
152.25*	0.01	0.00	48767	76233	48843	76157	-76	76	-0.15%	0.10%
151.98*	0.01	0.01	53852	71148	53950	71050	-98	98	-0.18%	0.14%
151.7	0.01	0.00	51044	73956	51182	73818	-138	138	-0.27%	0.19%
151.49	0.01	0.01	55680	69320	56009	68991	-329	329	-0.59%	0.48%
151.27	0.00	0.01	70552	54448	70807	54193	-255	255	-0.36%	0.47%
151.25	0.00	0.01	68140	56860	68398	56602	-258	258	-0.38%	0.46%
151.24	0.01	0.00	70824	54176	70957	54043	-134	134	-0.19%	0.25%
150.78	0.01	0.00	57159	67841	57104	67896	55	-55	0.10%	-0.08%
150.31	0.00	0.00	95305	29695	95355	29645	-50	50	-0.05%	0.17%
149.66*	0.01	0.01	84799	40201	84925	40075	-126	126	-0.15%	0.32%
149	0.01	0.01	87871	37129	88048	36952	-178	178	-0.20%	0.48%
148.34*	0.00	0.01	69322	55678	69426	55574	-104	104	-0.15%	0.19%
147.68	0.01	0.00	64014	60986	64143	60857	-129	129	-0.20%	0.21%
147.34*	0.01	0.00	52606	72394	52655	72345	-49	49	-0.09%	0.07%
147.01*	0.00	0.00	53619	71381	53633	71367	-14	14	-0.03%	0.02%
146.67*	0.00	0.00	44916	80084	44935	80065	-19	19	-0.04%	0.02%
146.34*	0.00	0.00	45481	79519	45725	79275	-244	244	-0.53%	0.31%
146	0.00	0.00	37658	87342	37640	87360	17	-17	0.05%	-0.02%
145.67*	0.00	0.01	52412	72588	52614	72386	-202	202	-0.38%	0.28%
145.5	0.00	0.00	57237	67763	57260	67740	-23	23	-0.04%	0.03%

River Station	WSE (ft) Δ	Vel (fps) Δ	Proposed Condition QUS (cfs)	Proposed Condition QMX (cfs)	Existing Condition QUS (cfs)	Existing Condition QMX (cfs)	Deflection US (cfs)	Deflection MX (cfs)	Percent Deflection US	Percent Deflection MX
145.2	0.01	0.13	61019	63981	61218	63782	-199	199	-0.32%	0.31%
145	0.00	0.00	73303	51697	73427	51573	-123	123	-0.17%	0.24%
144.7	0.01	0.03	51931	73069	51005	73995	926	-926	1.82%	-1.25%
144.55	0.00	0.00	34798	90202	34753	90247	46	-46	0.13%	-0.05%
144	0.00	0.01	60485	64515	60607	64393	-122	122	-0.20%	0.19%
143.5	0.00	0.01	67482	57518	67756	57244	-274	274	-0.40%	0.48%
143.25	0.00	0.00	45796	79204	45833	79167	-37	37	-0.08%	0.05%
143	0.00	0.00	79453	45547	79531	45469	-78	78	-0.10%	0.17%
142.5	0.00	-0.01	76791	48209	76725	48275	66	-66	0.09%	-0.14%
142	0.00	0.00	77977	47023	77987	47013	-10	10	-0.01%	0.02%
141.9	0.00	-0.01	60818	64182	60753	64247	64	-64	0.11%	-0.10%
141.5	0.00	0.00	50488	74512	50664	74336	-177	177	-0.35%	0.24%
140.74	0.00	-0.01	27844	97156	27635	97365	209	-209	0.76%	-0.21%
140	0.00	0.00	45839	79161	45850	79150	-11	11	-0.02%	0.01%
139.85	0.00	-0.01	35983	89017	35881	89119	102	-102	0.29%	-0.11%
139.57*	0.00	0.00	38859	86141	38856	86144	3	-3	0.01%	0.00%
139.29*	0.00	0.00	43358	81642	43297	81703	61	-61	0.14%	-0.08%
139.01	0.00	0.00	25693	99307	25628	99372	65	-65	0.25%	-0.07%
138.69*	0.00	0.00	21411	103589	21388	103612	23	-23	0.11%	-0.02%
138.36	0.00	0.00	28820	96180	28806	96194	14	-14	0.05%	-0.01%
138.04*	0.00	0.00	26043	98957	26014	98986	29	-29	0.11%	-0.03%
137.71	0.00	0.00	37687	87313	37647	87353	40	-40	0.11%	-0.05%
137.43*	0.00	0.00	38022	86978	37998	87002	24	-24	0.06%	-0.03%
137.14	0.00	0.00	46927	78073	46959	78041	-32	32	-0.07%	0.04%
136.8	0.00	-0.01	31482	93518	31359	93641	123	-123	0.39%	-0.13%
136.2	0.00	0.00	27872	97128	27727	97273	146	-146	0.52%	-0.15%
136	0.00	0.00	28665	96335	28666	96334	0	0	0.00%	0.00%
135.5	0.00	0.00	29201	95799	29161	95839	41	-41	0.14%	-0.04%
135	0.00	0.00	28944	96056	28945	96055	0	0	0.00%	0.00%
134.65	0.00	0.00	28979	96021	28979	96021	0	0	0.00%	0.00%

River Station	WSE (ft) Δ	Vel (fps) Δ	Proposed Condition QUS (cfs)	Proposed Condition QMX (cfs)	Existing Condition QUS (cfs)	Existing Condition QMX (cfs)	Deflection US (cfs)	Deflection MX (cfs)	Percent Deflection US	Percent Deflection MX
134.33*	0.00	0.00	35157	89843	35157	89843	0	0	0.00%	0.00%
134.02*	0.00	0.00	46371	78629	46372	78628	0	0	0.00%	0.00%
133.70*	0.00	0.00	47503	77497	47503	77497	0	0	0.00%	0.00%
133.38*	0.00	0.00	52741	72259	52741	72259	0	0	0.00%	0.00%
133.07*	0.00	0.00	63164	61836	63164	61836	0	0	0.00%	0.00%
132.75	0.00	0.00	79598	45402	79598	45402	0	0	0.00%	0.00%
132.46*	0.00	0.00	62539	62461	62539	62461	0	0	0.00%	0.00%
132.18*	0.00	0.00	49706	75294	49706	75294	0	0	0.00%	0.00%
131.89*	0.00	0.00	41498	83502	41498	83502	0	0	0.00%	0.00%
131.6	0.00	-0.01	31319	93681	31319	93681	0	0	0.00%	0.00%
131.35	0.00	0.00	45864	79136	45864	79136	0	0	0.00%	0.00%
130.93	0.00	0.00	55914	69086	55915	69085	0	0	0.00%	0.00%
130.51	0.00	0.00	54495	70505	54494	70506	1	-1	0.00%	0.00%
129.3	0.00	0.00	10244	9756	10244	9756	0	0	0.00%	0.00%
129.27	0.01	0.00	12413	7587	12413	7587	0	0	0.00%	0.00%
129.23	0.00	0.00	10000	10000	10000	10000	0	0	0.00%	0.00%
129.22	0.00	0.00	10000	10000	10000	10000	0	0	0.00%	0.00%
129.216	0.00	0.00	10000	10000	10000	10000	0	0	0.00%	0.00%
129.214	0.00	0.00	10000	10000	10000	10000	0	0	0.00%	0.00%
129.213	0.00	0.00	10000	10000	10000	10000	0	0	0.00%	0.00%
129.212	0.00	0.00	10000	10000	10000	10000	0	0	0.00%	0.00%
129.211	0.00	0.00	10000	10000	10000	10000	0	0	0.00%	0.00%
129.21	0.00	0.00	10000	10000	10000	10000	0	0	0.00%	0.00%
129.2	0.00	0.00	12210	7790	12210	7790	0	0	0.00%	-0.01%
129.03	0.00	0.00	10040	9960	10040	9960	0	0	0.00%	0.00%
128.5	0.00	0.00	9081	10919	9081	10919	0	0	0.00%	0.00%
128.23*	0.00	0.00	10164	9836	10164	9836	0	0	0.00%	0.00%
127.97*	0.00	0.00	10291	9709	10291	9709	0	0	0.00%	0.00%
127.7	0.00	0.01	10584	9417	10592	9408	-9	9	-0.08%	0.09%
127.4	0.00	0.01	14431	5569	14463	5537	-32	32	-0.22%	0.57%

River Station	WSE (ft) Δ	Vel (fps) Δ	Proposed Condition QUS (cfs)	Proposed Condition QMX (cfs)	Existing Condition QUS (cfs)	Existing Condition QMX (cfs)	Deflection US (cfs)	Deflection MX (cfs)	Percent Deflection US	Percent Deflection MX
127.05*	0.00	-0.01	12029	7971	12024	7976	5	-5	0.04%	-0.06%
126.7	0.00	0.01	11345	8655	11348	8652	-3	3	-0.03%	0.04%
126.35*	0.00	0.00	6600	13400	6599	13401	1	-1	0.02%	-0.01%
126.00*	0.00	0.00	7357	12643	7356	12644	1	-1	0.01%	-0.01%
125.65*	0.00	0.00	7721	12279	7721	12279	1	-1	0.01%	-0.01%
125.3	0.00	0.00	8145	11855	8143	11857	2	-2	0.02%	-0.01%
125	0.00	0.00	8795	11205	8794	11206	0	0	0.01%	0.00%
124.80*	-0.01	0.00	7278	12722	7270	12730	7	-7	0.10%	-0.06%
124.60*	0.00	0.00	8683	11317	8675	11325	7	-7	0.09%	-0.07%
124.4	0.00	0.00	10190	9810	10184	9816	6	-6	0.06%	-0.06%
124.20*	0.00	0.01	8723	11277	8723	11277	0	0	0.00%	0.00%
124.00*	0.00	0.00	8069	11931	8068	11932	1	-1	0.01%	-0.01%
123.8	0.00	0.00	9354	10646	9353	10647	1	-1	0.01%	0.00%
123.48*	0.00	0.00	9642	10358	9641	10359	1	-1	0.01%	-0.01%
123.15	0.00	0.00	12716	7284	12718	7282	-2	2	-0.02%	0.03%
122.83*	0.00	0.00	11599	8401	11599	8401	0	0	0.00%	0.00%
122.5	-0.01	0.00	10288	9712	10287	9713	1	-1	0.01%	-0.01%
121.98*	0.00	0.00	8738	11262	8737	11263	1	-1	0.01%	-0.01%
121.46	0.00	0.00	8730	11270	8729	11271	1	-1	0.01%	-0.01%
121.13*	0.00	0.00	8867	11133	8866	11134	0	0	0.01%	0.00%
120.8	-0.01	0.00	9782	10218	9778	10222	4	-4	0.04%	-0.04%
120.7	-0.01	0.00	9911	10089	9909	10091	2	-2	0.02%	-0.02%
120.62	-0.01	0.00	10010	9990	10010	9990	0	0	0.00%	0.00%
120.59	0.00	0.01	9986	10014	9986	10014	0	0	0.00%	0.00%
120.5	-0.01	0.00	9731	10269	9730	10270	1	-1	0.01%	-0.01%
120.4	0.00	0.00	9513	10487	9512	10488	1	-1	0.01%	-0.01%
120.39*	-0.01	0.00	11079	8921	11080	8920	-1	1	-0.01%	0.01%
120.38	-0.01	0.00	11154	8846	11156	8844	-2	2	-0.02%	0.03%
120.07*	0.00	0.00	10570	9430	10571	9429	-1	1	-0.01%	0.01%
119.75*	0.00	0.00	10531	9469	10532	9468	0	1	0.00%	0.01%

River Station	WSE (ft) Δ	Vel (fps) Δ	Proposed Condition QUS (cfs)	Proposed Condition QMX (cfs)	Existing Condition QUS (cfs)	Existing Condition QMX (cfs)	Deflection US (cfs)	Deflection MX (cfs)	Percent Deflection US	Percent Deflection MX
119.44*	-0.01	0.00	10751	9249	10751	9249	0	0	0.00%	0.00%
119.12*	0.00	0.01	9231	10769	9230	10770	2	-2	0.02%	-0.01%
118.81	0.00	0.00	7816	12184	7813	12187	3	-3	0.04%	-0.03%
118.50*	-0.01	0.00	10751	9249	10750	9250	1	-1	0.01%	-0.01%
118.18*	0.00	0.00	11111	8889	11111	8889	0	0	0.00%	0.00%
117.87	-0.01	0.00	11930	8070	11933	8067	-3	3	-0.03%	0.04%
117.54*	0.00	0.00	11670	8330	11673	8327	-3	3	-0.03%	0.04%
117.2	-0.01	0.00	10486	9514	10481	9519	4	-4	0.04%	-0.05%
116.5	0.00	-0.02	10629	9371	10557	9443	72	-72	0.68%	-0.76%
116.1	0.00	0.00	8316	11684	8316	11684	0	0	0.00%	0.00%
115.7	0.00	0.00	11479	8521	11479	8521	0	0	0.00%	0.00%
115.45*	0.00	0.00	9236	10764	9236	10764	0	0	0.00%	0.00%
115.2	0.00	0.00	9492	10508	9492	10508	0	0	0.00%	0.00%
115	0.00	0.00	9179	10821	9179	10821	0	0	0.00%	0.00%
114.8	0.00	0.00	11813	8187	11813	8187	0	0	0.00%	0.00%
114.65	0.00	0.00	13249	6751	13249	6751	0	0	0.00%	0.00%
114.47*	0.00	0.00	9878	10122	9878	10122	0	0	0.00%	0.00%
114.28*	0.00	0.00	10487	9513	10487	9513	0	0	0.00%	0.00%
114.1	0.00	0.00	10828	9172	10828	9172	0	0	0.00%	0.00%
113.73*	0.00	0.00	11039	8961	11039	8961	0	0	0.00%	0.00%
113.37*	0.00	0.00	14289	5711	14289	5711	0	0	0.00%	0.00%
113	0.00	0.00	12367	7633	12367	7633	0	0	0.00%	0.00%
112.73*	0.00	0.00	12326	7674	12326	7674	0	0	0.00%	0.00%
112.47*	0.00	0.00	10723	9277	10723	9277	0	0	0.00%	0.00%
112.2	0.00	0.00	10582	9418	10582	9418	0	0	0.00%	0.00%

*Interpolated Cross-Sections Red Font – Locations with highest changes in values

The maximum WSE change is an increase of 0.03 ft at cross-sections 174.6 and 171.15, and at interpolated sections 173.33, 171.90, and 171.48. The maximum change in velocity is 0.08 ft per second at section 170.26. The maximum deflection on the QUS is an increase of 1.82%, and on the QMX, is an increase of 1.20%. These occur at River Stations 144.7 and 170.26. Therefore, modeling results suggest changes to the floodplain and WSEs, as a result of the wall construction, are within the allowable thresholds set by USIBWC.

2.5.0 FREEBOARD

Finally, locations along RGV-03 and RGV-04 have been identified where 3-ft of freeboard have not been met for the proposed condition. These include the following cross-sections in Table 8:

Table 8: Cross-Sections Showing Less than Three Feet of Freeboard for the Proposed Condition

Cross Section ID	Comment	Design WSE (ft)	Proposed Levee Elev (ft)	Available Freeboard	Project Area
180.32	New XS	132.90	134.88	1.98	RGV-04
178.5	USIBWC XS	132.00	132.54	0.56	RGV-04
171.15	USIBWC XS	128.18	128.71	0.53	RGV-03
170.26	USIBWC XS	125.46	126.53	1.07	RGV-03
169.9	New XS	122.23	123.55	1.32	RGV-03

Upon final design drawings for this area, 3-ft of freeboard above the design WSE will be provided.

2.5.1 MODEL COMPARISONS

Because the levee elevations in this area did not meet the 3-ft freeboard requirement in the proposed condition, additional comparisons were made using the 2003 model, the 2003 model in NGVD88, the 2008 model/duplicate effective model, the elevations provided by the USIBWC (see Attachment D) for the Mission Levee, and the corrected effective model. Interpolated cross-sections are not included in the comparison, and cross-sections 180.3, 179.4, 176.8, 175.6, 174.6, 174, 172, 170.5, 170.02, located between 180.32 and 169.9, are shown, but not compared because the 3-ft freeboard criterion is met at those locations.

Differences exist between the 2003 model and the 2008/duplicate effective model that may explain the differences between the results. The 2003 model contains cross-sections that were surveyed in 1990, 1992, and 2001. The 2008 model shows the same cross-sections, but with added sections surveyed in 2007. Blocked obstructions were shown in the 2003 model, but more were added and all were modified in the 2008 model. Levees and ineffective flow areas were not used in the 2003 model and both were added in the 2008 model.

See Table 9: 2003 Model NGVD88 and 2008/Duplicate Effective Model Comparison for the differences in WSEs between the 2003 model converted to NGVD88, and the 2008 model. Additionally, Table 9 shows the WSEs, plus 3-ft, to determine what would have been the minimum proposed top of levee elevation (TOLE), using any of the three models. 0.36-ft was subtracted from the 2003 model to convert it to NGVD88. The acronym DNE (Does Not Exist) is used to show the cross-sections used in the proposed and corrected effective models that do not exist in the earlier models.

Table 9: 2003 Model NGVD88 and 2008/Duplicate Effective Model Comparison

Cross-Section ID	2003 Model (Mean Sea Level)		2003 Model NGVD88 = 2003 Model (Mean Sea Level – 0.36')		2008 Model/Duplicate Effective	
	WSE (ft)	WSE + 3 (ft)/ Min. TOLE	WSE (ft)	WSE + 3 (ft) / Min. TOLE	WSE (ft)	WSE + 3 (ft) / Min. TOLE
180.32	DNE	DNE	DNE	DNE	DNE	DNE
180.3	Meets 3-foot Freeboard Requirement					
179.4	Meets 3-foot Freeboard Requirement					
178.5	131.06	134.06	130.7	**133.7**	129.65	132.65
177.7	DNE	DNE	DNE	DNE	129.37	132.37
176.8	Meets 3-foot Freeboard Requirement					
175.6	Meets 3-foot Freeboard Requirement					
174.2	DNE	DNE	DNE	DNE	127.17	130.17
174	Meets 3-foot Freeboard Requirement					
172	Meets 3-foot Freeboard Requirement					
171.8	127.6	130.6	127.24	**130.24**	126.42	129.42
171.15	DNE	DNE	DNE	DNE	126.18	129.18
170.5	Meets 3-foot Freeboard Requirement					
170.26	DNE	DNE	DNE	DNE	123.94	126.94
170.02	Meets 3-foot Freeboard Requirement					
169.9	DNE	DNE	DNE	DNE	DNE	DNE

Only two of the cross-sections identified as not meeting the 3-ft freeboard requirement in the corrected effective geometry are included in the 2003 model. The 2003 NGVD88 model shows the higher elevations over the 2008 model and are highlighted in bold above. As can be seen in the following Table 10, one of these elevations is also higher than the TOLE data obtained from the USIBWC for the Mission Levee.

To compare the levee elevations in the cross-sections with the levee elevations listed in the Mission Levee tables, the northings and eastings listed in the Mission Levee table were matched to the northings and eastings of the levee location in the cross-sections. See Table 10 for a TOLE comparison between the models and the Mission Levee.

Table 10: TOLEs compared between 2003 and Corrected Effective Model, and Mission Levee

	2003 Model NGVD88		Corrected Effective	Mission Levee		TOLE
Cross-Section	WSE (ft)	WSE + 3'/ **Min. TOLE**	TOLE (ft)	Station	TOLE	Highest Value?
180.32	DNE	DNE	134.64	385+00	**134.76**	Mission Levee
180.3	Meets 3-foot Freeboard					
179.4	Meets 3-foot Freeboard					
178.5	130.7	**133.7**	132.23	269+00	133.21	2003 Model
177.7	DNE	DNE	**134.24**	259-00	132.81	Corrected Effective
176.8	Meets 3-foot Freeboard					
175.6	Meets 3-foot Freeboard					
174.2	DNE	DNE	**132.04**	162+00	130.88	Corrected Effective
174	Meets 3-foot Freeboard					
172	Meets 3-foot Freeboard					
171.8	127.24	130.24	**131.22**	103+00	129.88	Corrected Effective
171.15	DNE	DNE	**128.47**	60+00	127.39	Corrected Effective
170.5	Meets 3-foot Freeboard					
170.26	DNE	DNE	**126.29**	30+00	125.18	Corrected Effective
170.02	Meets 3-foot Freeboard					
169.9	DNE	DNE	123.31	0+00	**124.76**	Mission Levee

The existing levee elevations used in the corrected effective geometry are highest everywhere except at the upstream-most cross-section, downstream-most cross-section, and one cross-section in between, where the freeboard requirement was not met.

2.6.0 CONCLUSIONS

The proposed floodwall, within the project parameters, will be designed such that 44 CFR 65.10 requirements will be met. This includes freeboard criteria, structural design of the wall and foundation, and an Operations and Maintenance Plan. In addition, the levee design will not impact the existing Base Flood Elevations or floodplain limits. USIBWC flow deflection and WSE criterion is also met and demonstrated by the 1-D floodplain analysis.

3.0 SECTION 3: 2-D MODELING ANALYSIS FOR NON-LEVEE AREAS

3.1.0 INTRODUCTION

The following section outlines the procedures implemented for the impact analysis of the 63-miles of proposed bollard wall along the Rio Grande from Falcon Dam to Penitas in Texas.

3.2.0 HYDROLOGIC ANALYSIS

The hydrologic analysis for this report was limited to comply with the 1970 Agreement between the US and MX, Minute 238 (Reference 26). In accordance to the agreement, the greatest measured historical discharge at the River was recorded during Hurricane Beulah in September 1967 as shown in table Table 11. The agreement also establishes the design discharge to a flow rate of 250,000 cfs at Rio Grande City. Further discussion on the calibration and design discharge rates is provided in sections 3.3.6 and 3.3.8 in this report.

Table 11: Hurricane Beulah Historical Discharges

Geographical Location	Location with Respect to Rio Grande City Gage Station	Hurricane Beulah Discharge Rate (cfs)
Rio Grande City, Rio Grande	-	220,000
Ciudad Mier, Rio Alamo	27 Miles Upstream	86,500
Ciudad Camargo, Rio San Juan	4 Miles Upstream	166,000
Falcon Dam Outlet	39 Miles Upstream	18.0

3.3.0 HYDRAULIC ANALYSIS

This section discusses the methodology and procedures used to develop the hydraulic model and analysis.

3.3.1 MODELING SOFTWARE

USACE's Hydrologic Engineering Center River Analysis System, HEC-RAS 5.0.3 September 2016 (Reference 20), was used for the analysis.

3.3.2 GRID SIZE AND 1-DIMENSIONAL (1-D) CHANNEL APPROACH

HEC-RAS supports simultaneous 2-D and 1-D models within a single interface, performing calculation iterations between 2-D and 1-D components. For this RGV-63 model, the left and right overbanks (looking downstream) for the Rio Grande are modeled using the 2-D approach and the perennial channel is represented using the 1-D approach.

The 1-D and 2-D components are connected using lateral structures. These structures use the weir equation to exchange flows between the 1-D component and the 2-D mesh. In accordance to the HEC-RAS 2-D Manual (Reference 32), the recommended weir coefficients for "non-elevated overbank terrain" range between 0.2 to 0.5. Because of test runs, the most stable coefficient used in this projects is 0.2. A total of 16 lateral structures was used to exchange flows between each of the 2-D meshes in the floodplain.

HEC-RAS 2-D models can contain multiple computational meshes, each composed of irregular-shaped grids of up to eight-sided cells. In this project, the floodplain surrounding the Rio Grande is agricultural in nature and flat; therefore, a maximum 150-ft resolution was deemed appropriate for the model. Areas requiring additional detail at significant features were added to the meshes by using breaklines and internal 2-D connections.

Smaller resolution grids were added to the mesh using hand-drawn and imported breaklines that can be placed anywhere within the mesh, representing important at-grade topographical features such as roads, abandoned meanders, proposed wall alignment and other features that impact flow direction. The mesh is recomputed using these breaklines, resulting in finer resolution around the desired features.

Internal 2-D connections are used within the model to represent limits of study, to elevate a roadway, and to represent the bollard wall in the proposed condition. These are placed by converting breaklines into internal 2-D connections. Limits of study are represented by raising the elevation of the terrain, using internal 2-D connections placed at the confluence of tributaries along the Rio Grande and locations where the flow ponds in the floodplain. Ponding in the floodplain can be extensive and result in additional numerical computational overhead for the model. For this reason, and the extensive run times, additional boundaries were placed in MX to improve run times, resulting in more conservative results as this volume is routed downstream. The elevated terrain then acts as a barrier to flow (i.e. against backwater entering tributaries), thereby reducing the amount of flow attenuation downstream. See section 3.3.6 for the discussion of the revisions made to the International Roadway on the Mexican side, and section 3.3.9 for the modeling of the bollard wall. The existing and proposed conditions contain the same limits of study and revision to the roadway. Only the proposed condition reflects the bollard wall.

Because the Rio Grande consists of many tight meanders, the 1-D channel is simulated using cross-sections spaced at approximately 600-ft intervals, with a width corresponding to the perennial main channel. Two bridges are represented in the 1-D channel: Roma Bridge, located 20 miles downstream of Falcon Dam, and Rio Grande City Bridge, located 40 miles downstream of Falcon Dam. As-builts were not available for the bridge modeling.

Modeling parameters were based on field photographs and an approved 1-D calibrated model, discussed further in section 3.3.6.

3.3.3 BOUNDARY CONDITIONS

The boundary conditions are applied upstream, downstream, and laterally. The upstream boundary condition consists of quasi-steady inflow hydrographs presented in sections 3.3.6 and 3.3.9. A quasi-steady state hydrograph is applied at the mouth of the dam instead of an unsteady state, because it is intended to represent a multi-day, steady release from the dam and account for the uncertainty of the reach hydrology. The quasi-steady inflow hydrograph for Falcon Dam is located at cross-section river station 477257.8 with no inflow hydrographs entering the 2-D areas. The downstream boundary condition is set to normal depth at river station 187.58 and for both 2-D overbank areas. The slope, applied to all the normal depth calculations, is 0.0002 ft/ft. The lateral boundaries and the inflow hydrograph values are discussed in section 3.3.6 Model Calibration and section 3.3.3 Design Flows and Existing Conditions. Limits of study are also discussed in section 3.3.2.

3.3.4 NUMERICAL STABILITY TOLERANCE VALUES

Some computational settings were adjusted depending on the performance of the model. Since the thresholds provided by USIBWC are within three significant figures of a ft unit of measurement, the calculations were set to hundredths of a ft, where possible.

For 1-D modeling, the water surface calculation tolerance and the storage area elevation tolerance were set to 0.05 ft. For the 2-D and 2-D/1-D tolerances, the WSE and the volume tolerance were set to 0.1 ft. The maximum number of iterations was set at 40. Ten warm-up time steps were allotted, the lateral structure flow stability factor was set to 3, and the weir flow submergence decay exponent was set to 3. The other 1-D and all of the 2-D parameters were set to the default. The maximum iterations between 1-D and 2-D were set to 20, and the minimum flow tolerance was set to 10 cfs. The percentage of flow and water surface tolerances were set to the default.

To help with model stablity, the computational time steps were balanced between model run time and stability. For the calibration, existing, and proposed condition, the time step was set to 10 seconds.

3.3.5 RIO GRANDE MAIN CHANNEL BATHYMETRY

The terrain used for modeling is composed of 2007 and 2017 datum, provided by USIBWC. The 2007 terrain surface extends from MX into the US, and bathymetry was not included. To address this issue, a combination of two methods was used to represent the river bottom. The first method consisted of using an earlier Rio Grande HEC-RAS 1-D Model (Falcon Dam to Penitas 1991-1992) geometry to develop and interpolate the bottom of the river using HEC-RAS tools. The second digital terrain incorporated an acceptable bathymetry, approved by the USIBWC in 2017. The terrain was sewn together using HEC-RAS tools. Datum and elevations were verified to be consistent among all the surfaces received. The horizontal datum is NAD 1983, State Plane Texas South 4205 Feet, and the vertical datum is NAVD88.

3.3.6 MODEL CALIBRATION

For model calibration, the USIBWC provided Michael Baker with a hydrograph and rating table from Hurricane Beulah, and an IBWC-approved, 1-D calibrated HEC-RAS model about fourteen miles long, within the vicinity of Rio Grande City. The parameters refined, during the calibration, include inflow hydrographs, cross-section geometry, n-values used for 1-D modeling, land use and n-values for 2-D modeling, and modifications to the terrain to reflect elevations for the "International Road" leading to the Rio Grande City bridge on the Mexican side.

Hurricane Beulah occurred in the fall of 1967 and had been recorded at the USIBWC gage station 08464700, located at Rio Grande City, just 0.13 mile upstream from the Rio Grande City Bridge. The peak discharge of 220,000 cfs was recorded at midnight of September 22nd-23rd, as indicated in the 1970 Agreement between the US and MX, Minute 238 (Reference 26).

Figure 4 shows the hydrograph provided by USIBWC for model calibration. The calibration modeling would adhere to 220,000 cfs arriving at Rio Grande City, located 39 miles downstream of Falcon Dam. Because the 2-D model attenuates the flow, additional inflows are required at point locations upstream of Rio Grande City. Three inflows were determined upstream.

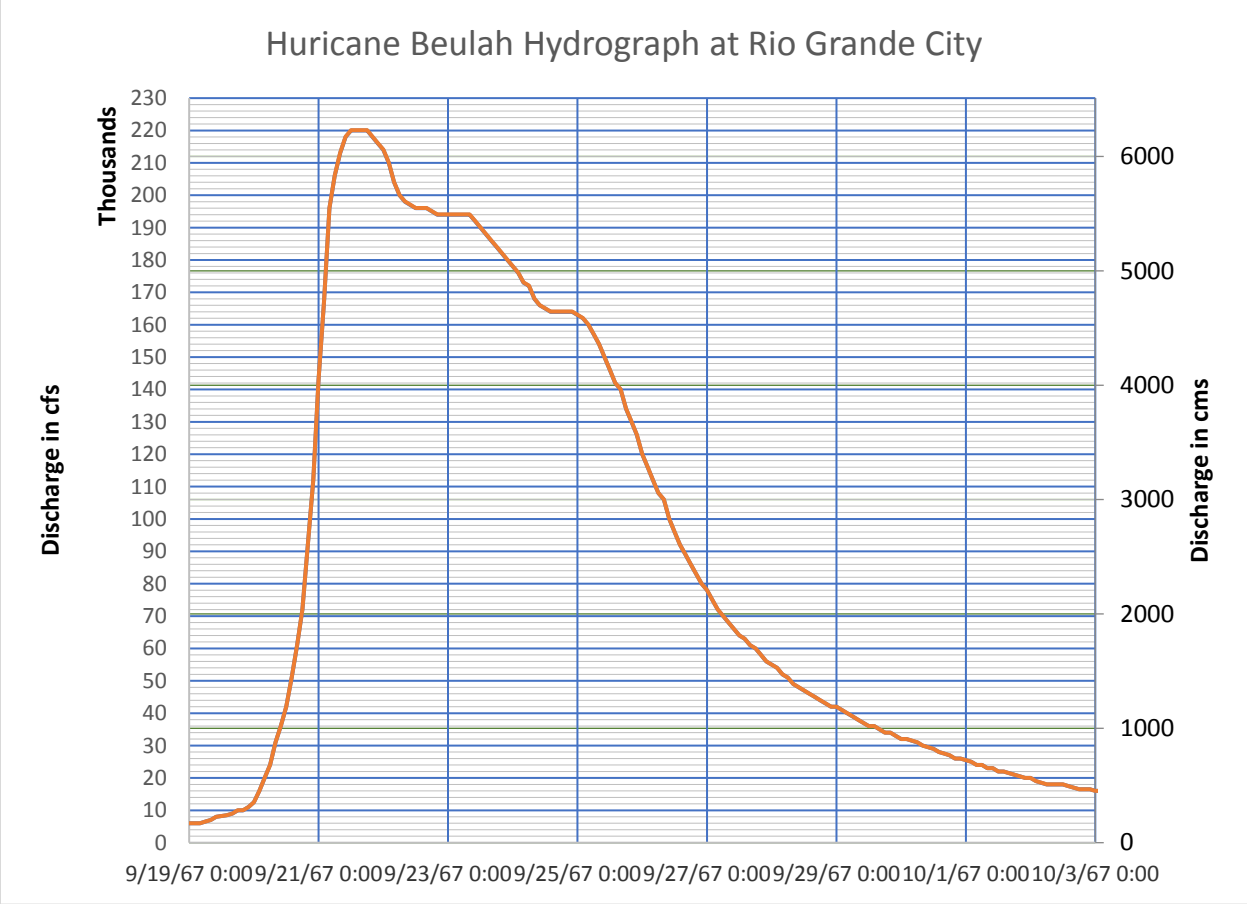


Figure 4. USIBWC-Provided Inflow Hydrograph for Hurricane Beulah at Rio Grande City in both Thousands of Cubic Feet per Second (cfs) and Cubic Meters per Second (cms)

The three inflows were based on a document entitled *Floods of September-October 1967 in South Texas and Northeastern Mexico Geological Survey Water-Supply Paper 188-B* by the United States Geological Survey (USGS) (Reference 27). According to the document, peak flows of 86,500 cfs were reached at Ciudad Mier (Rio Alamo confluence, 27 miles upstream of the Rio Grande City gage station) and 166,000 cfs at Ciudad Camargo (Rio San Juan confluence, 4 miles upstream of the Rio Grande City gage station), and only 18 cfs was flowing from Falcon Dam (39 miles upstream of the Rio Grande City gage station). To develop the inflow hydrographs, the peak flows for Ciudad Mier and Ciudad Camargo were translated to hydrographs of the same shape as the USIBWC-provided hydrograph. The hydrograph applied at Falcon Dam is an adjusted quasi-steady state hydrograph with a peak flow of 36,000 cfs to reach a flow of 220,000 cfs at Rio Grande City. This hydrograph represents the hydrology of the reach between Falcon Dam and the Rio Alamo confluence and was used to match the discharge at Rio Grande City. See Figure 5 for the resulting hydrographs. See Table 12 for the final calibration peak discharge rates applied, their geographical locations, the associated cross-section where the flows are applied, and the state of the flow rate applied.

Table 12: 2-D Model Calibration Flows

Geographical Location	Location with Respect to Rio Grande City Gage Station	HEC-RAS Cross-Section Station ID	Calibration Peak Discharge Rate (cfs)	State of Hydrograph
Ciudad Mier, Rio Alamo	27 Miles Upstream	412349	86,500	Unsteady
Ciudad Camargo, Rio San Juan	4 Miles Upstream	285435	166,000	Unsteady
Falcon Dam Outlet	39 Miles Upstream	477257.8	36,000	Quasi-Steady

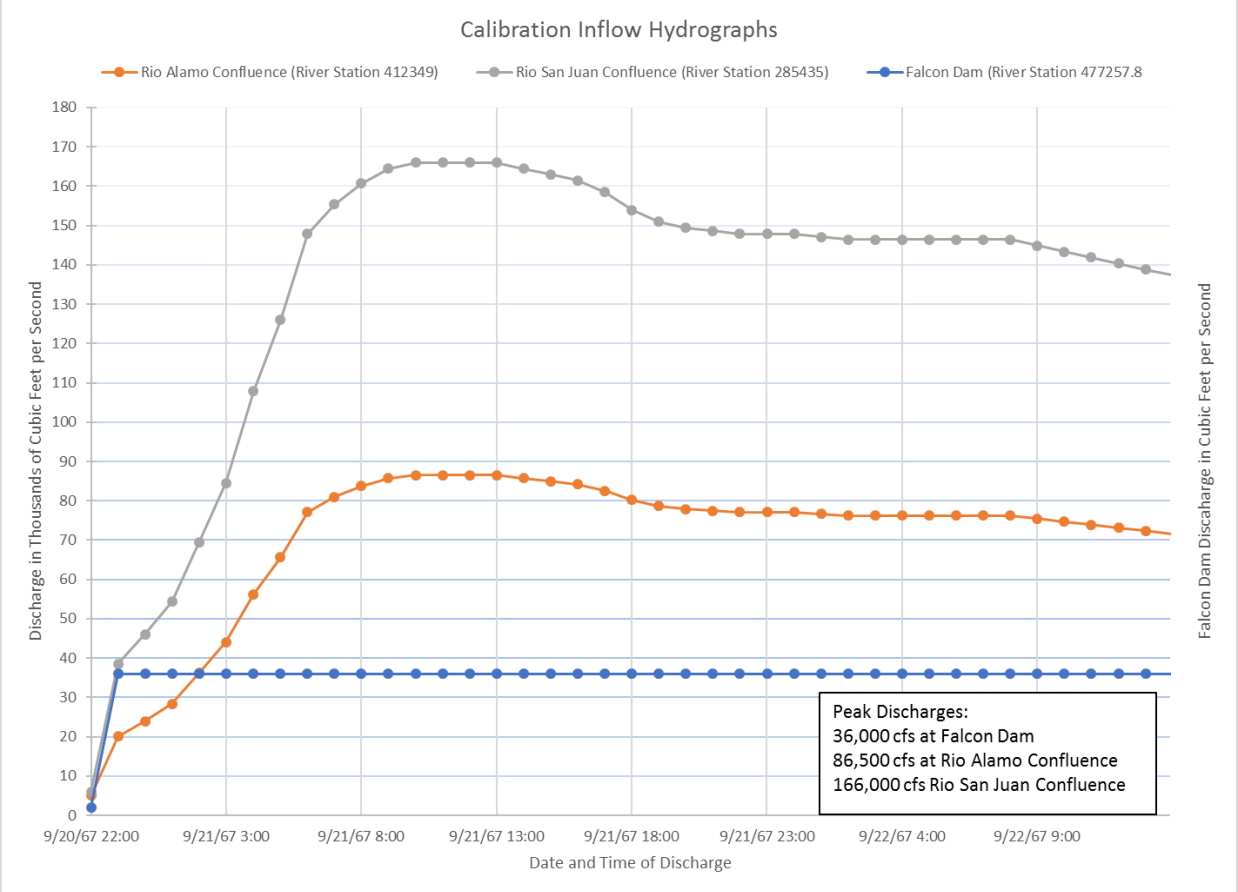


Figure 5: Inflow Hydrographs for 2-D Calibration Model. Falcon Dam Discharges Plotted Using Secondary-Axis

In addition to calibrating the flows, 1-D cross-section geometry and the model n-values were calibrated to the measured WSE at the gaging station at Rio Grande City. To facilitate this, the calibrated 1-D model at Rio Grande City, provided by USIBWC, serves as the basis of the 1-D channel modeling herein, where the models are coincident. The 1-D hydraulic model at Rio Grande City is associated with the *Rio Grande Hydraulic Modeling Final*

Report for the Rio Grande City/Ciudad Camargo Reach, dated November 2017 by Stantec for USIBWC (Reference 28).

The calibrated 1-D model employs surveyed cross-sections that span the Rio Grande floodplain. The model covers six river miles upstream of the Rio Grande City Bridge to five river miles downstream of it. Using accepted, calculated bathymetry, blocked obstructions, ineffective flow areas, and slightly higher n-values throughout the reach, this model meets a WSE of 0.81-ft below the WSE rating curve for this discharge, shown in Figure 6, at the Rio Grande City gage station for Hurricane Beulah. In response to the calibrated model, the 1-D model's channel geometry and the 2-D model's terrain were modified to generate an acceptable WSE at Rio Grande City.

Modifications to the model occur between river stations 296261.2 and 232404.6, where the two models are coincident. Modifications to the 1-D model's channel geometry included adding ineffective flow areas to the overbanks where ponding is likely to occur. The 2-D model's terrain was modified to reflect the elevations of the International Road connecting to Rio Grande City on the Mexican side. This was done by using an internal 2-D connection, and revising the elevations along the roadway to match ineffective flow areas in the calibrated USIBWC model. Changes to the roughness coefficients were made based on the calibrated model and are discussed in the following section.

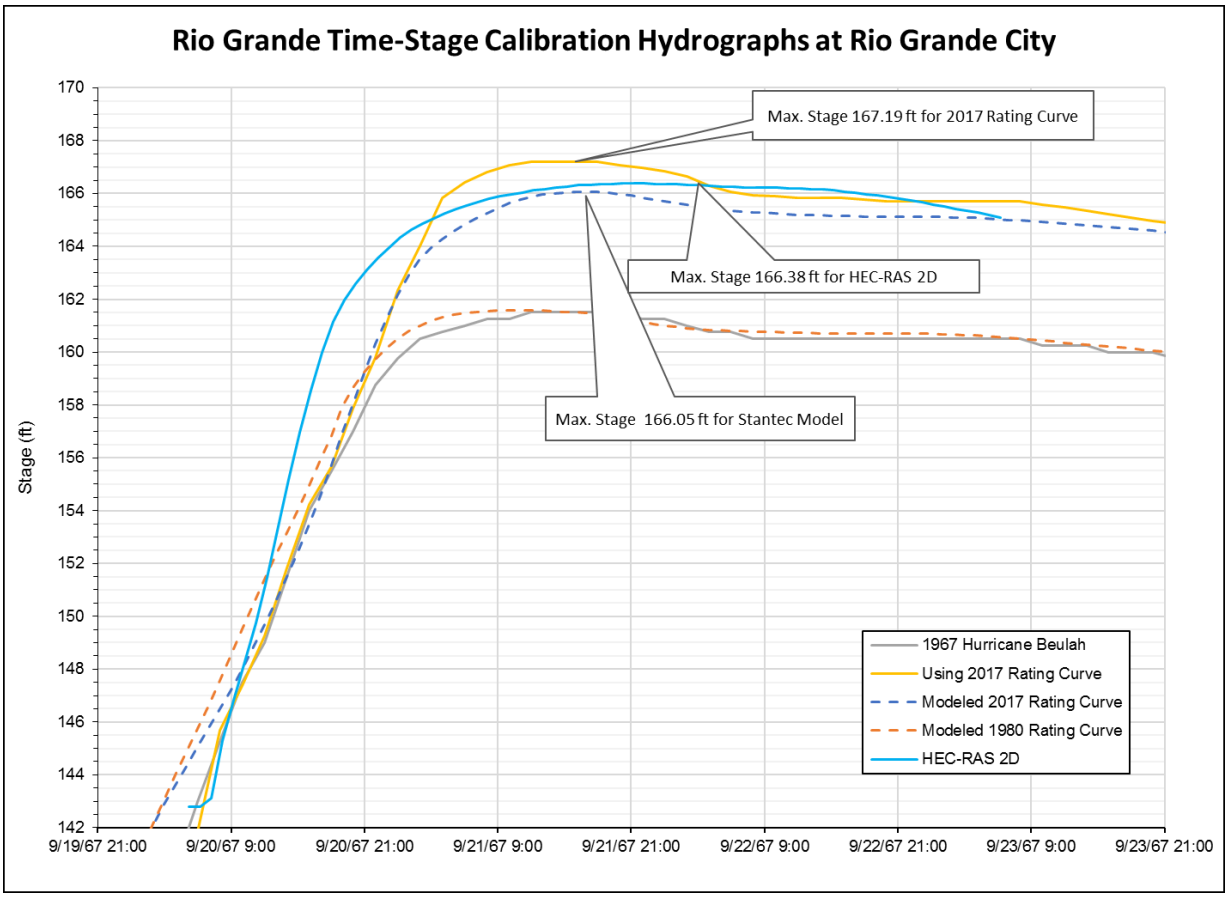


Figure 6: Time-Stage Calibration Hydrographs used for model calibration.

Using the peak discharge recorded, and a rating table developed by USIBWC in 2017, Hurricane Beulah had a WSE corresponding to 167.19 ft. The USIBWC calibrated model has a WSE corresponding to 166.38 ft. The 2-D model results in a WSE corresponding to 166.05 ft. This WSE at the gage corresponds to two flow rates that total 223,940 cfs: one of 86,206 cfs, reported by the Bridge station 265371 BR at model time 22Sep1967 1400; and another of 137,744 cfs over the storage area connection at the International Road at the same time, just downstream from the gage station. The flow measurement was made at these alternative locations with the assumption of flow continuity. Particle tracking lines, shown in Figure 7, illustrate that flow distributions near the Rio Grande City gage station are turbulent at the moment of the peak discharge.

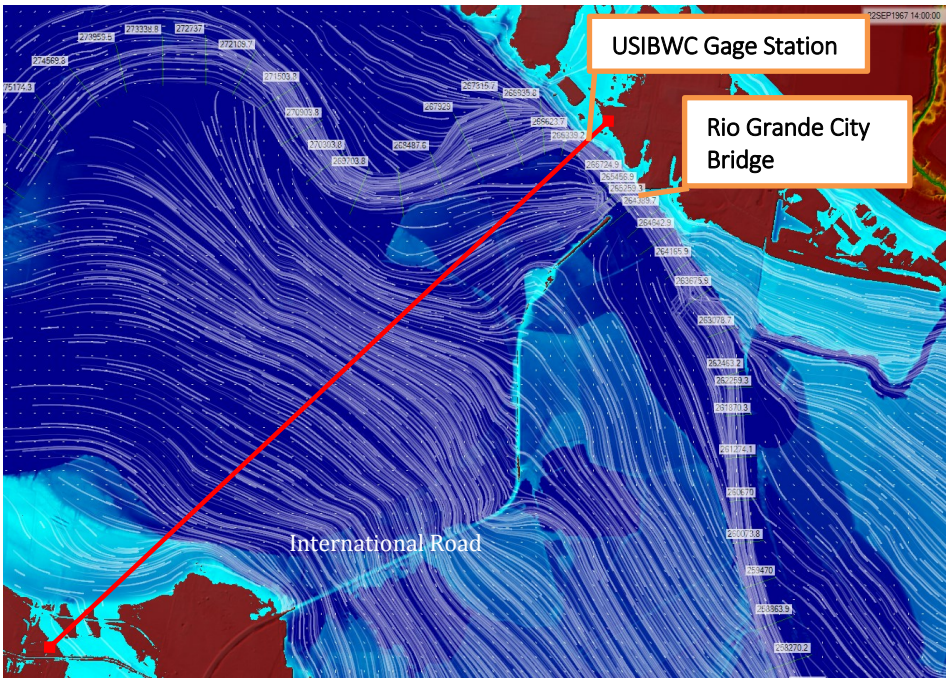


Figure 7: Rio Grande City particle tracking and Floodplain Cross-Section at Gage Station

3.3.7 ROUGHNESS COEFFICIENTS

For the 1-D channel, the Manning's n-values applied were calibrated to be 0.1 - 0.2 for the overbanks and 0.075 for the main channel. These values are higher than typical land-use designated n-values, shown below, but are consistent with the roughness coefficients used in the USIBWC calibrated models.

The land use database was developed using a combination of open-source, land use Geographic Informational Systems (GIS) datasets downloaded from the United States Geological Service (USGS) and Instituto Nacional de Estadistica y Geografia (INEGI) data webservices. The Rio Grande main channel was delineated as a shapefile and incorporated as part the land use/n-value designations. The USGS provides access to the National Land Cover Database (NLCD) 2011 (Reference 29). This database has GIS layers representing the different land uses in the US, and the data contains land use descriptions that can be used to assign roughness coefficients. This data only covers

the north floodplain of the Rio Grande. The webservice for INEGI also provides GIS layers with descriptions of land use in MX (Reference 30). The land use in this layer was matched with NLCD data to make equivalent land use descriptions. The layers from NLCD and INEGI overlapped on a few areas over the Rio Grande, but the Rio Grande main channel delineation was overlaid and used as an additional land use type. See Table 13 for the land use and associated n-values applied after the calibration for the 2-D areas. Final n-values were determined based on the model calibration described in the previous section, and fall within the n-values reported in the *Rio Grande Hydraulic Modeling Final Report for the Rio Grande City/Ciudad Camargo Reach* by Stantec (Reference 28).

Table 13: Manning's n-Values and Associated Land Uses for 2-D Areas

Land Use Description	n-value	Land Use Description	n-value
Rio Grande	0.050	**Evergreen Forest**	0.100
Open Water	0.050	**Mixed Forest**	0.120
Developed, Open Space	0.030	**Shrub/Scrub**	0.100
Developed, Low Intensity	0.068	**Herbaceous**	0.070
Developed, Medium Intensity	0.068	**Hay/Pasture**	0.050
Developed, High Intensity	0.040	**Cultivated Crops**	0.050
Barren Land (Bare Ground)	0.030	**Woody Wetlands**	0.200
Deciduous Forest	0.080	**Emergent Herbaceous Wetlands**	0.060

3.3.8 DESIGN FLOWS AND EXISTING CONDITIONS

The 2-D model between Falcon Dam and Rio Grande City is required to produce a design discharge of 250,000 cfs at Rio Grande City, as indicated in Minute 238. The hydrologic inflows used for design were placed at the same locations as the calibration flows. That is, an upstream boundary condition using a quasi-steady state hydrograph was entered at the mouth just downstream of Falcon Dam. And, two lateral unsteady inflow hydrographs were entered to represent inflows from Rio San Juan and Rio Alamo. As discovered during the calibration, inflows are required to mitigate the attenuation of the flows from the mouth of the dam to Rio Grande City, 39 river miles downstream from the dam.

The peak discharge rate for Falcon Dam was based on stream gage 08-4613.00 (Reference 31), published by the USIBWC, located below Falcon Dam. Records indicate two major events, one in 1971 for 76,280 cfs and one in 2010 for 68,157 cfs were identified as outliers in the Bulletin 17B Analysis, based on the gage data as shown in Figure 8. The design event would be considered a multi-day event, and hence be represented by a steady inflow boundary condition at the head of the model. A design discharge of 80,000 cfs was assumed as the design event representative of Falcon Dam's release operations, in addition to the cumulative discharges generated from the tributaries in the reach upstream of the Rio Alamo confluence.

For the Rio Alamo Confluence Discharge, the flow was kept the same as reported for Hurricane Beulah, using the same shape for calibration.

For Rio San Juan, the inflow hydrograph was adjusted to account for the flow attenuation in the River and to match the design flow at Rio Grande. An inflow hydrograph of 152,000 cfs results in a generated peak of about

249,000 cfs at Rio Grande City corresponding to two flow rates: one of 85,925 cfs, reported by the Bridge station 265371 BR at model time 22Sep1967 1500; and another of 16,3042 cfs over the storage area connection at the International Road at the same time, just downstream from the gage station. See Table 14 and Figure 9.

Table 14: Design Inflows for RGV- 63

Geographical Location	Location with Respect to Rio Grande City Gage Station	HEC-RAS Cross-Section Station ID	Design Peak Discharge Rate (cfs)	State of Hydrograph
Ciudad Mier, Rio Alamo	27 Miles Upstream	412349	86,500	Unsteady
Ciudad Camargo, Rio San Juan	4 Miles Upstream	285435	152,000	Unsteady
Falcon Dam Outlet	39 Miles Upstream	477257.8	80,000	Quasi-Steady

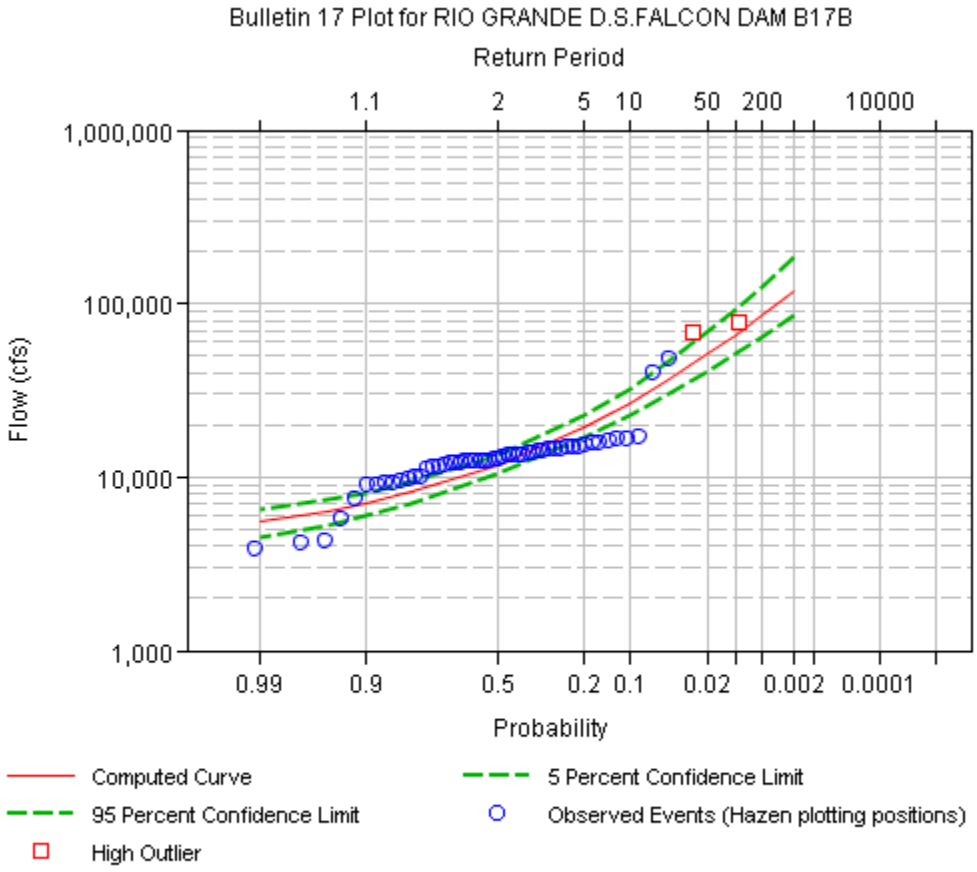


Figure 8: Bulletin 17B Flood Frequency Analysis for Rio Grande below Falcon Dam

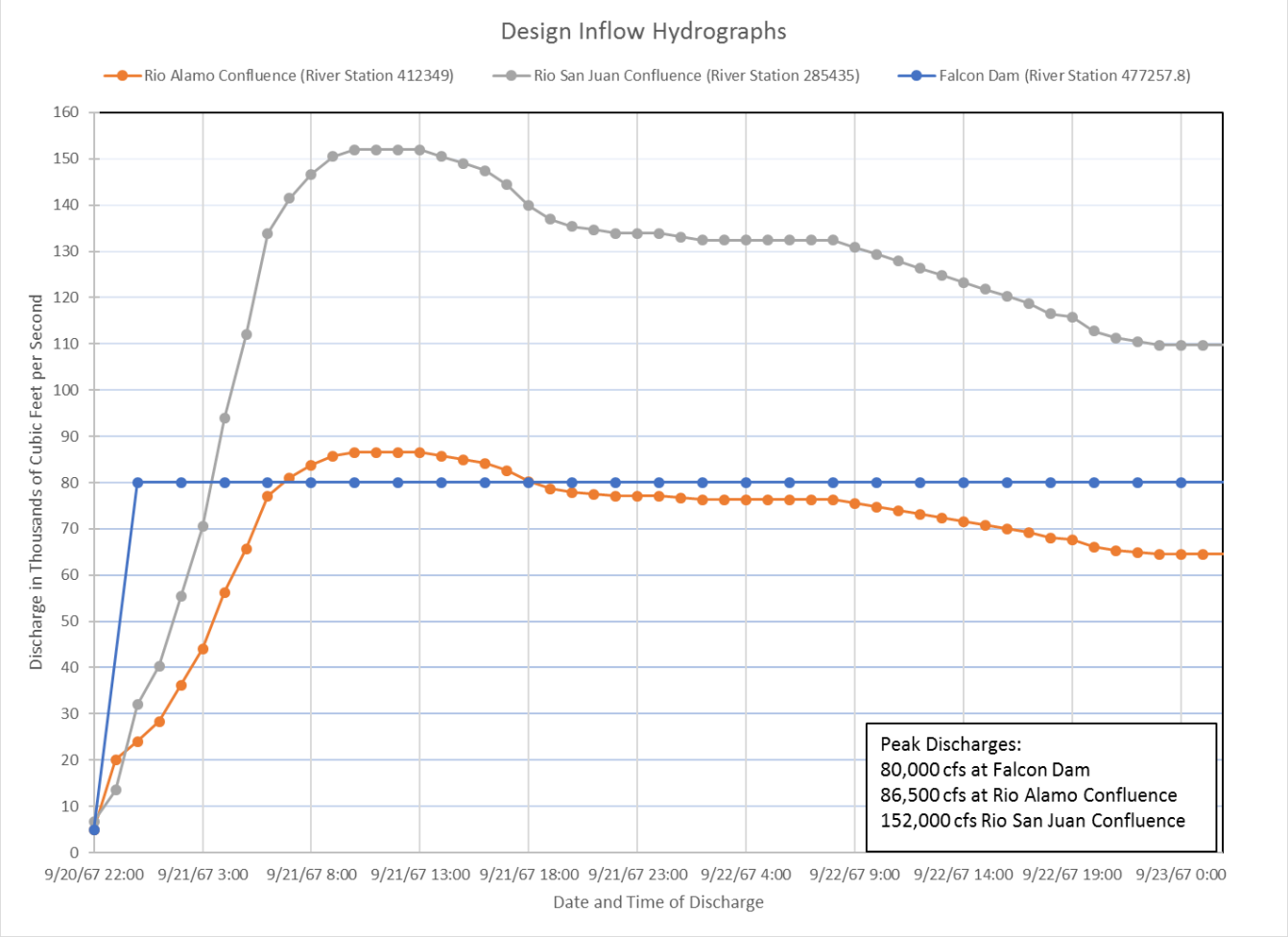
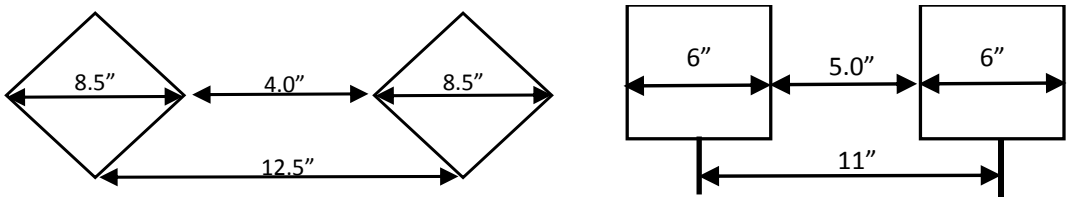


Figure 9: Design Inflow Hydrographs for RGV-63 Model

3.3.9 PROPOSED WALL MODELING

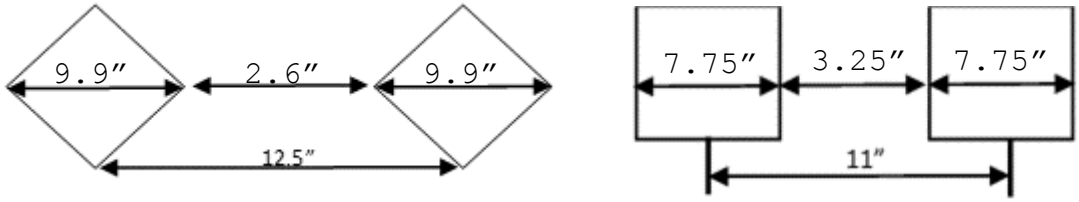
A type P-3 bollard wall with an anti-climb plate is proposed for the 63-mile and modeled using HEC-RAS. The bollard wall consists of a typical configuration of 6-inch square steel bollards set on the diagonal with a 4-inch clearance between bollards, as shown in Figure 10. To meet the required drainage criteria, the steel bollards may be rotated 45-degrees with 5-inch clearance. More details about the proposed construction are provided in the draft construction drawings provided in Attachment C.



(Typical) (Rotated)

Figure 10: Steel Bollard Configuration (not to scale)

The obstruction factor due to debris is evaluated using an obstruction factor of 35%. For the proposed condition to account for debris in the model the clear space is reduced by 35% and that distance is added to the bollard width, while the centerline to centerline spacing stays the same. In the typical configuration, the open space becomes 2.6-inches and the bollard width becomes 9.9-inches (increased from 8.5-inches). In the low water crossing (rotated) configuration, the open space is reduced to 3.25-inches and the bollard width becomes 7.75-inches (increased from 6-inches). Refer to Figure 11. The multiplication factor is used to generate the open space in the 2-D storage area connection profile.



(Typical) (Rotated)

Figure 11: Steel Bollard Clear Space Adjustment (not to scale)

The proposed 63-mile wall along the Rio Grande’s floodplain is modeled using internal 2-D storage area connections within the north storage area (2-D mesh) HEC-RAS component. Internal 2-D area connections are converted from breaklines (described in section 3.3.2) and allow quantification of overland flow discharges across the 2-D storage area connection (based on the weir equation) within a single 2-D mesh at the ground elevation or at user-defined elevations. For the proposed wall, the connection elevation profile is modified to reflect the bollard wall of specific geometries, shown in Figure 12.

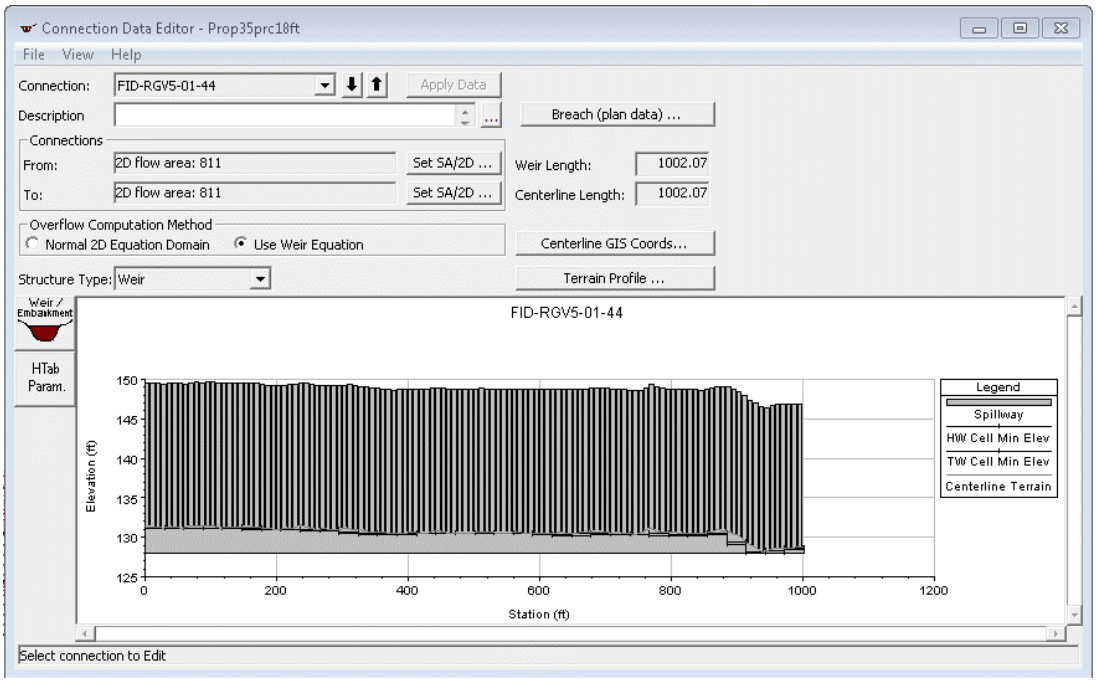


Figure 12: Typical 2-D Storage Connection Profile

The stations and elevations in the 2-D storage area connection, representing the wall, are processed to generate the stations and elevations of an 18-ft tall bollard wall on the existing ground, using a multiplier ranging with a factor of 8 - 9 to represent the bollard spacing and thickness. In some cases, where the wall alignment was close to the 1-D component boundary, additional modifications, such as increasing multiplier factors, reducing weir coefficients, and complete blocking, were applied to achieve stable solutions. The weir coefficient used in most cases to represent the wall was a value of 3.1 representing sharp crested weirs. In some cases, the weir was reduced to 1.0 for areas where the weir solver was unstable. Similarly, the multiplier factor was increased iteratively for those 2-D storage area connections that presented numerical instabilities. Some connections used factors as high as 50 to represent the bollards. Table B1 in Attachment B provides a list of the 2-D storage area connections and the factors, configuration types and weir coefficients used in the model. Figure A8 shows the proposed alignment configuration for the RGV 63-Miles comparing openings, rotated and typical configurations. The wall segments names modeled were inherited from the original alignment provided by CBP and its last number indicates the number of partitions of the original segment. Most importantly, these names are not directly related to project identifications.

The bollard wall 2-D storage area connections are composed of approximately 1,000-ft to 1,500-ft segments to accommodate the 500 stations and elevation data point limitations within HEC-RAS. The bollard wall is represented as an impediment to flow in the proposed condition, and the impact is measured as described in the next section.

Due to numerical stability conditions, run time lengths and other factors in the proposed conditions model, the existing conditions model and proposed conditions model were initiated using simulation restart files.

3.4.0 IMPACTS

The impacts for the proposed wall were compared with the USIBWC criteria. This section discusses the criteria and the methodology used to calculate the impacts.

3.4.1 USIBWC CRITERIA: DEFLECTION CALCULATIONS AND WATER SURFACE ELEVATION IMPACTS

Hydraulic impacts for 1-D models are defined by increases in the WSE and deflection of flow from the north overbank to the south overbank. The hydraulic impacts due to WSE increases are calculated as the proposed WSE minus the existing WSE. The hydraulic impacts due to increases in deflection of flows are calculated using the HEC-RAS variables 'Q Left,' 'Q Channel,' and 'Q Right,' per USIBWC guidance. These variables represent, respectively, flow in the left overbank, flow in the main channel, and flow in the right overbank. For each 1-D cross-section, the discharge on the QMX is calculated as half the flow in the main channel plus the flow in the right overbank. Similarly, for each cross-section, the discharge on the QUS is calculated as half the flow in the main channel plus the flow in the left overbank.

This 2-D model can be analyzed for impacts in an equivalent manner described above using profile cross-sections within RAS Mapper. As mentioned in the previous paragraph, 1-D model cross-sections are composed of flows within the left overbank, the channel, and the right overbank; and the flow through each of those segments is processed separately to determine the deflection. For 2-D models, the flow within these areas can be estimated using profile cross-sections; the cross-sections are placed within the left and right overbanks of the 1-D models, as shown in Figure A9 in Attachment A. They can be processed similarly to quantify the deflection, using the maximum peak discharge, and placed at locations of interest. The profile cross-sections are drawn through the left and right 2-D mesh as extensions of prescribed 1-D cross-sections, spaced one to two miles apart. Because of the flow variations throughout the reach, these sections are drawn perpendicular to the floodplain general flow direction. No new cross-sections within the 1-D channel are added.

Prescribed cross-section locations will be spaced out with a maximum 2-mile range, except for large urban areas where the prescribed locations will be closer together. Prescribed locations are identified as urban or rural. A figure of the cross-section locations for impact calculations will be submitted for review. Additional impact calculation locations may be added later.

WSEs can be compared by developing maximum WSE rasters using the HEC-RAS mapper tools. These resulting rasters can be subtracted from those used in ArcGIS tools and develop a raster of the difference. This new raster represents the difference in maximum WSE of the existing and proposed conditions, which identify regions or clusters of changes in units of ft, that are the result of the impacts of the proposed wall.

The established thresholds as per USIBWC coordination for 1-D models are:

Water Surface Elevation Increase Thresholds: Maximum 3-inches (0.25-ft) in urban areas and 6-inches (0.5-ft) in rural areas.

Percent Flow Deflection Threshold: 5% increase of allowable deflection (+5%).

3.4.2 DEFLECTION IMPACTS

Figure A9 showing the cross-sections used to calculate deflection parameters is provided in Attachment A. The deflection calculations are shown in Table 15. The deflection values range from -12.59% to 1.84% in the US and from -6.04% to 2.62% in MX, all under the USIBWC +5% criteria.

Table 15: Deflection Impact Calculations

River Station	Proposed Condition		Existing Condition		Deflection		Percent Deflection	
	QUS (cfs)	QMX (cfs)	QUS (cfs)	QMX (cfs)	US (cfs)	MX (cfs)	US	MX
474302.7	41828	38161	42445	37589	-617	572	-1.45%	1.52%
470116.3	43493	37580	43872	37219	-380	361	-0.87%	0.97%
464710.5	39113	40863	39114	40870	-1	-6	0.00%	-0.01%
459276.8	44306	35966	44305	35969	1	-2	0.00%	-0.01%
454353.3	37543	42336	37565	42338	-21	-2	-0.06%	0.00%
448923.3	44256	36395	44504	36182	-248	213	-0.56%	0.59%
443496.9	46544	33508	46963	33114	-419	394	-0.89%	1.19%
437488.6	44874	35623	45072	35411	-198	212	-0.44%	0.60%
432162.6	39121	41569	39156	41582	-35	-13	-0.09%	-0.03%
424255.2	50983	31043	50768	30958	215	85	0.42%	0.27%
420635.1	40135	39324	40362	38661	-227	663	-0.56%	1.72%
417188.8	42388	36349	42643	35875	-256	474	-0.60%	1.32%
411758.4	69023	74381	70065	75038	-1042	-657	-1.49%	-0.88%
408651.4	51787	104394	52550	105926	-763	-1532	-1.45%	-1.45%
401493.3	72269	85915	71503	87211	766	-1296	1.07%	-1.49%
398599.3	113340	58159	115092	58943	-1752	-784	-1.52%	-1.33%
388386.7	99720	57606	100979	58117	-1260	-511	-1.25%	-0.88%
384038.6	54505	102456	55048	103743	-543	-1286	-0.99%	-1.24%
379386.4	44888	110438	45495	111619	-606	-1182	-1.33%	-1.06%
375184.5	51547	90786	54671	90105	-3124	681	-5.71%	0.76%
368476.6	96564	62612	100351	61013	-3786	1599	-3.77%	**2.62%**
361927.6	71635	80350	72766	79439	-1131	911	-1.55%	1.15%
359534.6	66181	88002	64987	87631	1194	371	**1.84%**	0.42%

River Station	Proposed Condition		Existing Condition		Deflection		Percent Deflection	
	QUS (cfs)	QMX (cfs)	QUS (cfs)	QMX (cfs)	US (cfs)	MX (cfs)	US	MX
354116.3	44706	109461	46252	110216	-1546	-755	-3.34%	-0.68%
348708.7	71537	83013	73547	83448	-2010	-435	-2.73%	-0.52%
343297.7	146229	45922	149203	46218	-2974	-296	-1.99%	-0.64%
336118.1	190334	28589	193808	28961	-3475	-372	-1.79%	-1.28%
328321.7	103744	68180	105872	68793	-2128	-613	-2.01%	-0.89%
323177.6	49917	101143	51008	102336	-1091	-1193	-2.14%	-1.17%
316816.5	130794	49326	132384	49931	-1591	-605	-1.20%	-1.21%
311418.8	107927	69314	109353	70138	-1426	-824	-1.30%	-1.17%
305368.3	55250	91444	56348	92165	-1098	-721	-1.95%	-0.78%
301894.8	67079	81420	68189	81534	-1110	-113	-1.63%	-0.14%
296261.2	57819	88032	59174	89383	-1355	-1351	-2.29%	-1.51%
291447.7	50628	98833	52682	100281	-2054	-1448	-3.90%	-1.44%
287845.2	46878	102133	50371	104565	-3493	-2432	-6.93%	-2.33%
279971.8	142815	130932	148359	134378	-5543	-3446	-3.74%	-2.56%
274569.8	111744	163721	116885	168378	-5142	-4657	-4.40%	-2.77%
269096.8	86768	212186	91580	219629	-4812	-7443	-5.25%	-3.39%
265259.3	47994	215515	48057	222922	-63	-7407	-0.13%	-3.32%
258863.9	119747	186184	125324	192687	-5577	-6503	-4.45%	-3.37%
253445.8	124778	142001	130998	147034	-6220	-5032	-4.75%	-3.42%
248004	207961	100812	214426	105768	-6465	-4956	-3.02%	-4.69%
243176.8	150760	159004	154803	163896	-4044	-4892	-2.61%	-2.98%
237789.1	69259	205211	79236	206712	-9977	-1500	-12.59%	-0.73%
232404.6	111672	175224	121118	177334	-9446	-2110	-7.80%	-1.19%
206394.8	210774	90554	221158	92557	-10384	-2003	-4.70%	-2.16%
200943.2	168548	107064	179586	108671	-11038	-1607	-6.15%	-1.48%
174320.4	248392	41738	259461	43381	-11069	-1643	-4.27%	-3.79%
169479.8	218095	53382	229165	55228	-11070	-1846	-4.83%	-3.34%
163953.8	248459	49109	260401	50547	-11941	-1439	-4.59%	-2.85%
153236.2	337938	31315	351876	32133	-13938	-818	-3.96%	-2.55%
147834.4	262839	61199	275428	62579	-12589	-1380	-4.57%	-2.21%
142419.3	218576	114293	230374	116597	-11798	-2303	-5.12%	-1.98%
132212.6	144014	157201	155686	160254	-11672	-3053	-7.50%	-1.91%
123809.5	81800	187906	90854	192770	-9054	-4864	-9.97%	-2.52%
121371.1	73565	192941	83090	197462	-9525	-4521	-11.46%	-2.29%
116547.7	66511	202724	75230	207909	-8719	-5186	-11.59%	-2.49%
111156.6	113667	177527	123691	181866	-10023	-4339	-8.10%	-2.39%

River Station	Proposed Condition		Existing Condition		Deflection		Percent Deflection	
	QUS (cfs)	QMX (cfs)	QUS (cfs)	QMX (cfs)	US (cfs)	MX (cfs)	US	MX
105978	99434	181986	110591	184682	-11157	-2696	-10.09%	-1.46%
100704.1	88408	204465	98692	208861	-10284	-4396	-10.42%	-2.10%
95473.03	127294	198448	135596	205545	-8302	-7097	-6.12%	-3.45%
90050.02	85675	204718	95065	213680	-9390	-8962	-9.88%	-4.19%
68438.08	63529	205119	66406	217098	-2877	-11978	-4.33%	-5.52%
50388.52	115874	152987	121013	162829	-5139	-9843	-4.25%	-6.04%
47327.57	119197	154149	125206	163077	-6009	-8928	-4.80%	-5.47%
42570.44	191920	130163	201427	138043	-9508	-7879	-4.72%	-5.71%
37205.68	190166	115718	199043	123135	-8876	-7418	-4.46%	-6.02%
31770.64	165331	125152	173356	132843	-8025	-7690	-4.63%	-5.79%
16221.11	97158	168516	102237	178221	-5079	-9705	-4.97%	-5.45%
10825.22	66289	200336	69937	211531	-3648	-11194	-5.22%	-5.29%
3307.529	47084	227428	49370	240276	-2285	-12847	-4.63%	-5.35%
585.7317	18530	247835	19810	261387	-1280	-13552	-6.46%	-5.18%

Red Font – Locations with highest changes in values

3.4.3 WATER SURFACE ELEVATION IMPACTS

WSE impacts are presented in Figure A10 provided in Attachment B. This map shows very small areas where the impacts exceed the USIBWC established threshold, but they are not showing significant impacts on the overall floodplain area. Figure A9 in Attachment shows that the proposed fence alignment meets USIBWC established criteria.

3.5.0 CONCLUSION

The proposed bollard wall, within the project parameters, will be designed to meet USIBWC deflection and WSE criterion. In addition, the proposed wall will not impact floodplain limits.

4.0 SECTION 4: REFERENCES

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2) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0350C effective April 19, 2010 of Starr County, Texas.

3) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0375C effective April 19, 2010 of Starr County, Texas.

4) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0525C effective April 19, 2010 of Starr County, Texas.

5) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0520C effective April 19, 2010 of Starr County, Texas.

6) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0540C effective April 19, 2010 of Starr County, Texas.

7) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0550C effective April 19, 2010 of Starr County, Texas.

8) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0675C effective April 19, 2010 of Starr County, Texas.

9) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0680C effective April 19, 2010 of Starr County, Texas.

10) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0565C effective April 19, 2010 of Starr County, Texas.

11) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0685C effective April 19, 2010 of Starr County, Texas.

12) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0725C effective April 19, 2010 of Starr County, Texas.

13) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 48427C0750C effective April 19, 2010 of Starr County, Texas.

14) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 4803340375B effective January 2, 1981 of Hidalgo County, Texas.

15) *National Flood Insurance Program Flood Insurance Rate Map* Panel Number 4803340400C effective November 16, 1982 of Hidalgo County, Texas.

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20) Hydrologic Engineering Center River Analysis System (HEC-RAS) Version 5.0.3, US Army Corps of Engineers, September 2016.

21) ESRIArcMap 10.4.1.5686 ArcDesktop 10.4.1 ESRI Inc., Copyright © 1999-2015.

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23) Aerial Imagery Esri, DigitalGlobe, GeoEye, Eartstar Geographics, Cnes/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

24) Hydraulic Model of the Rio Grande and Floodways within the Lower Rio Grande Flood Control Project for the Rio Grande from Penitas to Below Brownsville prepared by USIBWC dated June 2003.

25) HEC-RAS Hydraulic Model Update and Validation and FLO-2D Simulation for the Lower Rio Grande Flood Control Project (LRGFCP) Penitas to River Mile 28 and Off-River Floodways in Texas and Mexico prepared for USIBWC by S&B Infrastructure Limited, Contract Number IBM05D0001, July, 2008.

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ATTACHMENT A

FIGURES

- **Figure A1: Vicinity Map**
- **Figure A2: Project Segment Locations**
- **Figure A3: FEMA Maps**
- **Figure A4: Penitas to Hidalgo-Cameron County 1-D Model Cross-Section Map**
- **Figure A5: Falcon Dam to Penitas Land Use Designations**
- **Figure A6: Falcon Dam to Penitas 2-D Mesh and 1-D Cross-sections**
- **Figure A7: Falcon Dam to Penitas 2-D Model Floodplain**
- **Figure A8: Falcon Dam to Penitas 2-D Proposed Wall Configuration**
- **Figure A9: Falcon Dam to Penitas 2-D Deflection Calculation Cross-sections**
- **Figure A10: Falcon Dam to Penitas 2-D WSE Comparison (Proposed – Existing)**

Figure A1: Vicinity Map of RGV-01, 02, 03, 04, and RGV 57 miles



LEGEND

Rio Grande Valley (RGV) Projects

- RGV-03
- RGV-04
- RGV-01
- RGV-02
- USBP Station Zones
- Rio Grande
- RGV 63 Miles

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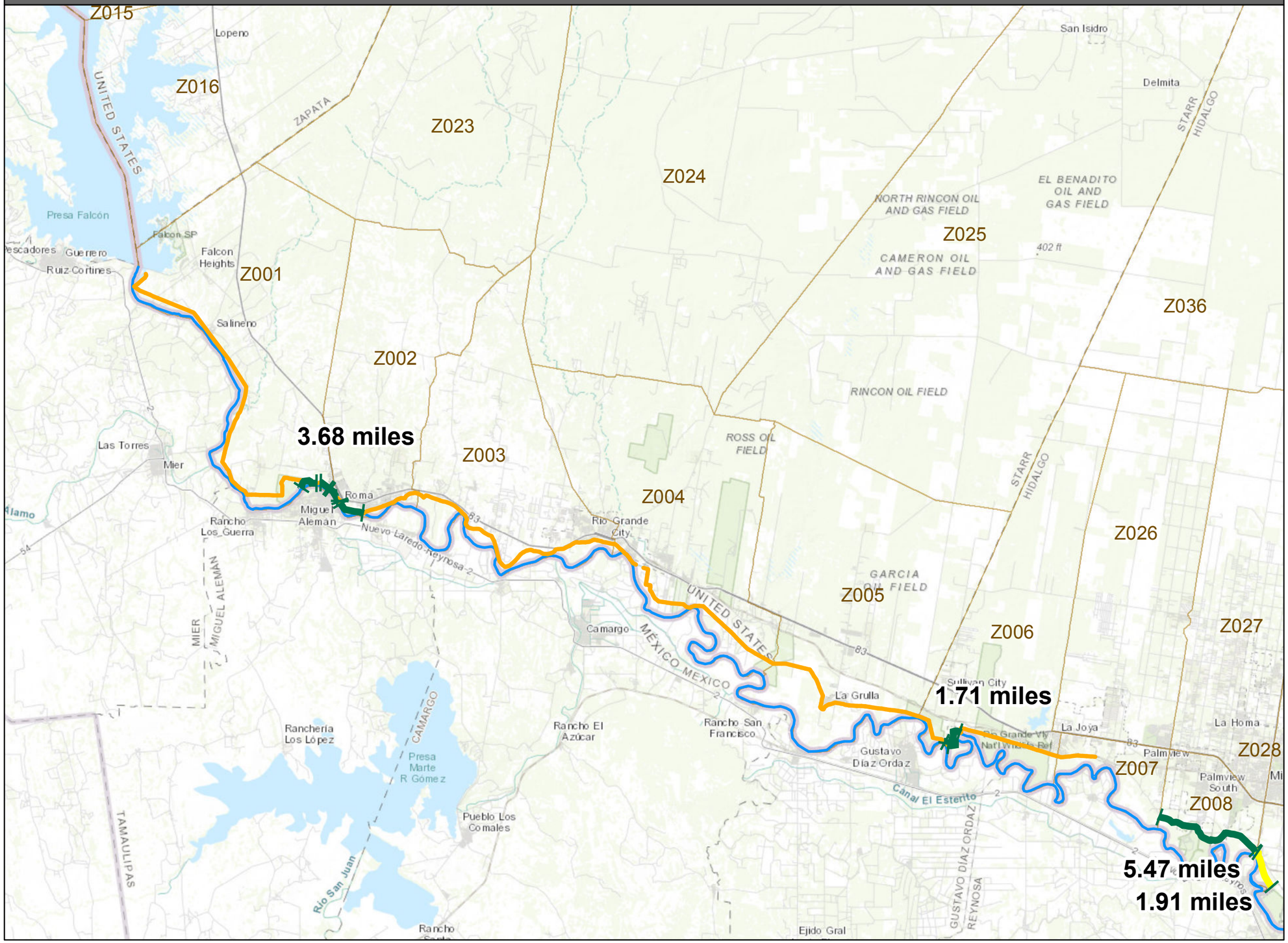
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Figure A2: Project Segment Locations



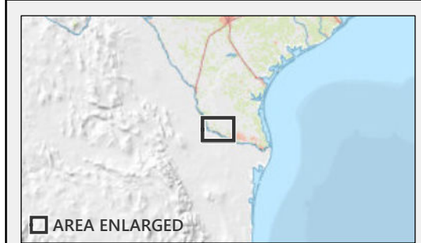
LEGEND

Rio Grande Valley (RGV) Projects

- RGV-03 (10.8 miles)
- RGV-04 (11.2 miles)
- RGV-01 (2.9 miles)
- RGV-02 (7.9 miles)
- RGV 63 Miles
- USBP Station Zones
- Rio Grande

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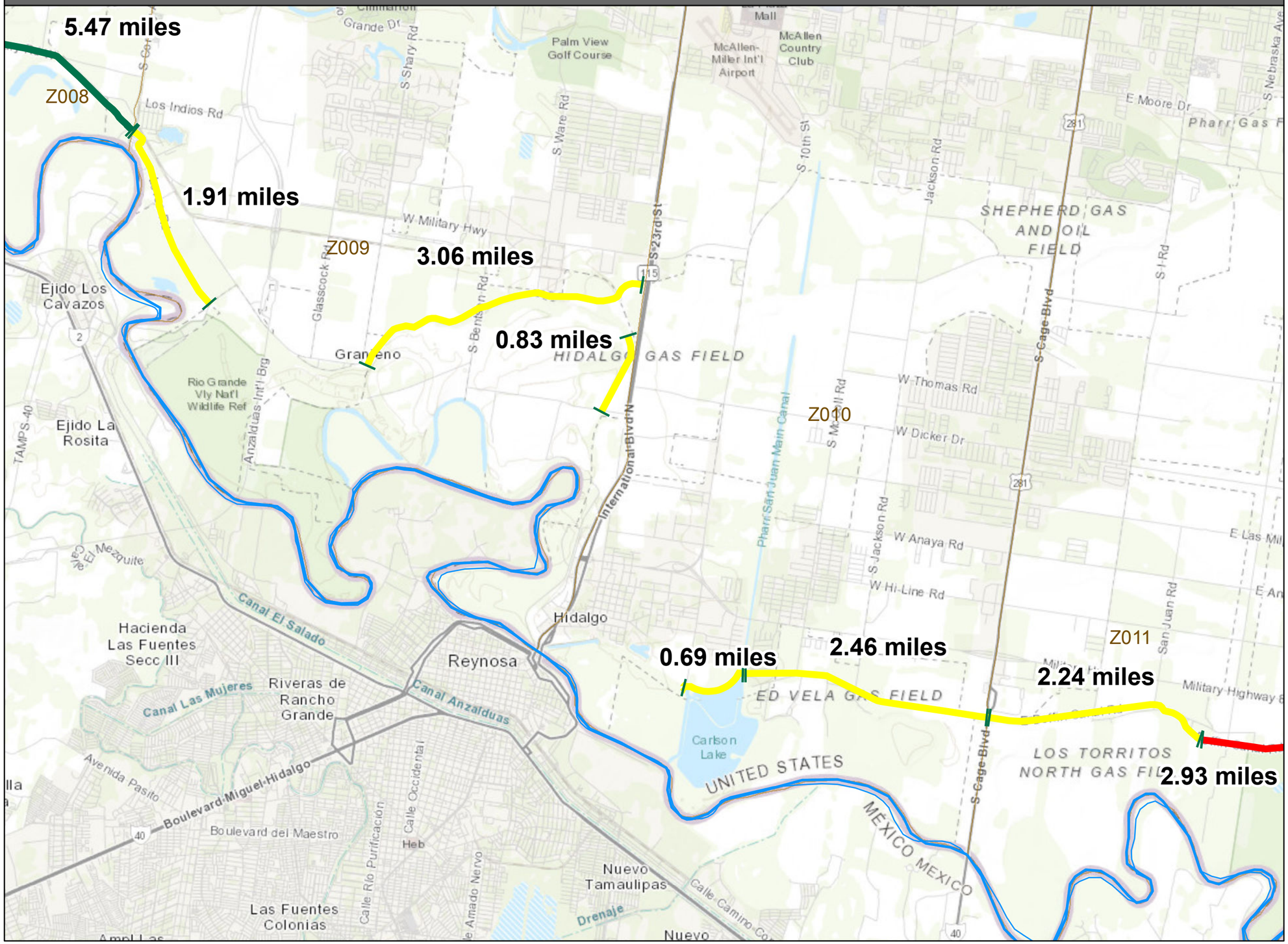
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Figure A2: Project Segment Locations



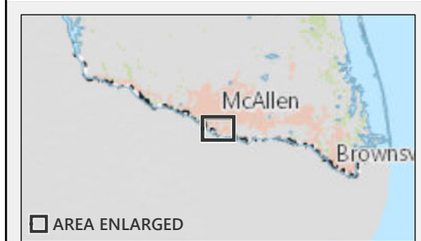
LEGEND

Rio Grande Valley (RGV) Projects

- RGV-03 (10.8 miles)
- RGV-04 (11.2 miles)
- RGV-01 (2.9 miles)
- RGV-02 (7.9 miles)
- RGV 63 Miles
- USBP Station Zones
- Rio Grande

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Figure A2: Project Segment Locations



LEGEND

Rio Grande Valley (RGV) Projects

- RGV-03 (10.8 miles)
- RGV-04 (11.2 miles)
- RGV-01 (2.9 miles)
- RGV-02 (7.9 miles)
- RGV 63 Miles
- USBP Station Zones
- Rio Grande

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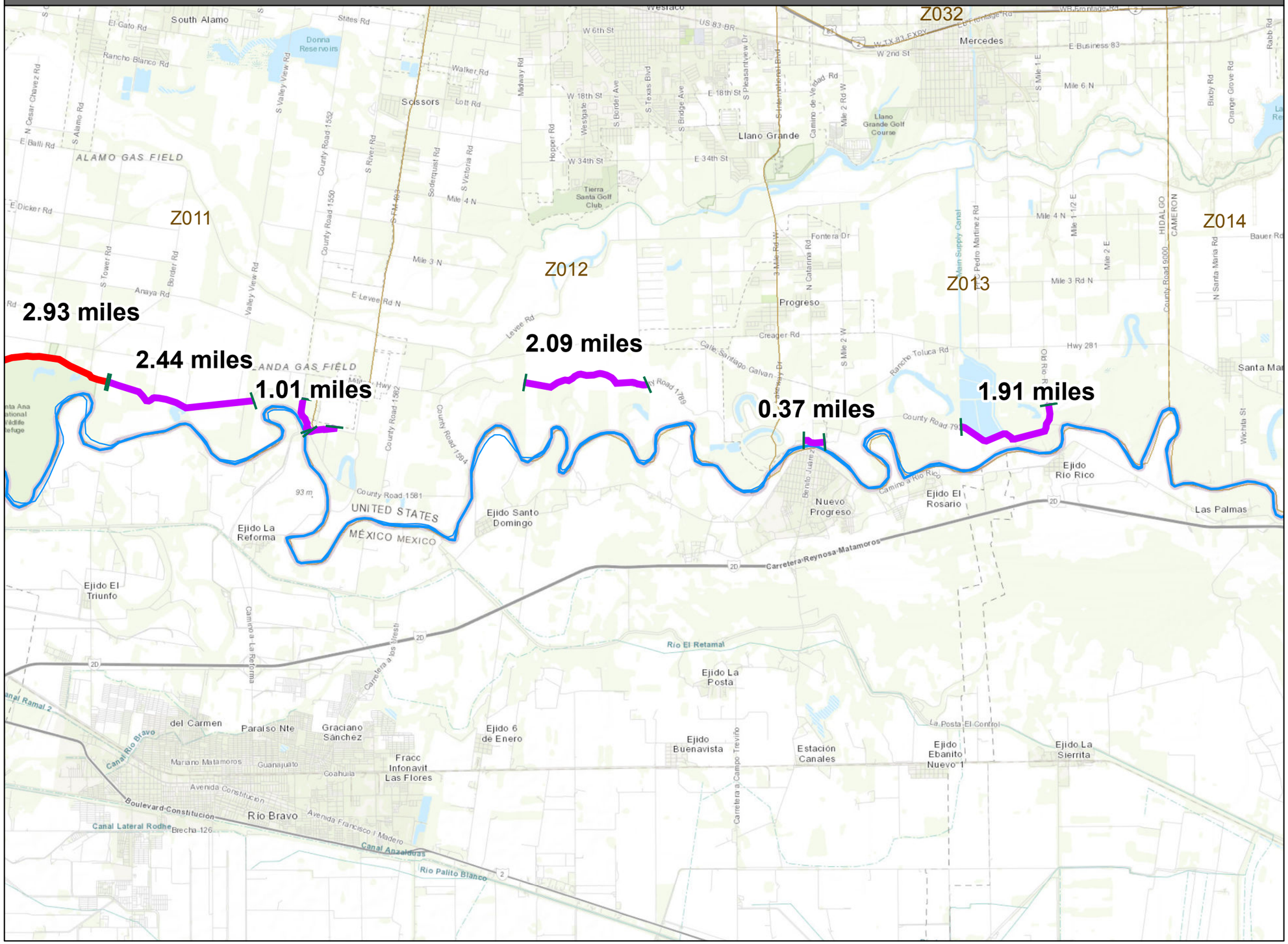
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Figure A2: Project Segment Locations



LEGEND

Rio Grande Valley (RGV) Projects

- RGV-03 (10.8 miles)
- RGV-04 (11.2 miles)
- RGV-01 (2.9 miles)
- RGV-02 (7.9 miles)
- RGV 63 Miles
- USBP Station Zones
- Rio Grande

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NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane South Zone (FIPS zone 4205). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey **at (301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from USDA-FSA-APFO Aerial Photography Field Office at a scale of 1:12,000 from photography dated 2004 or later.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

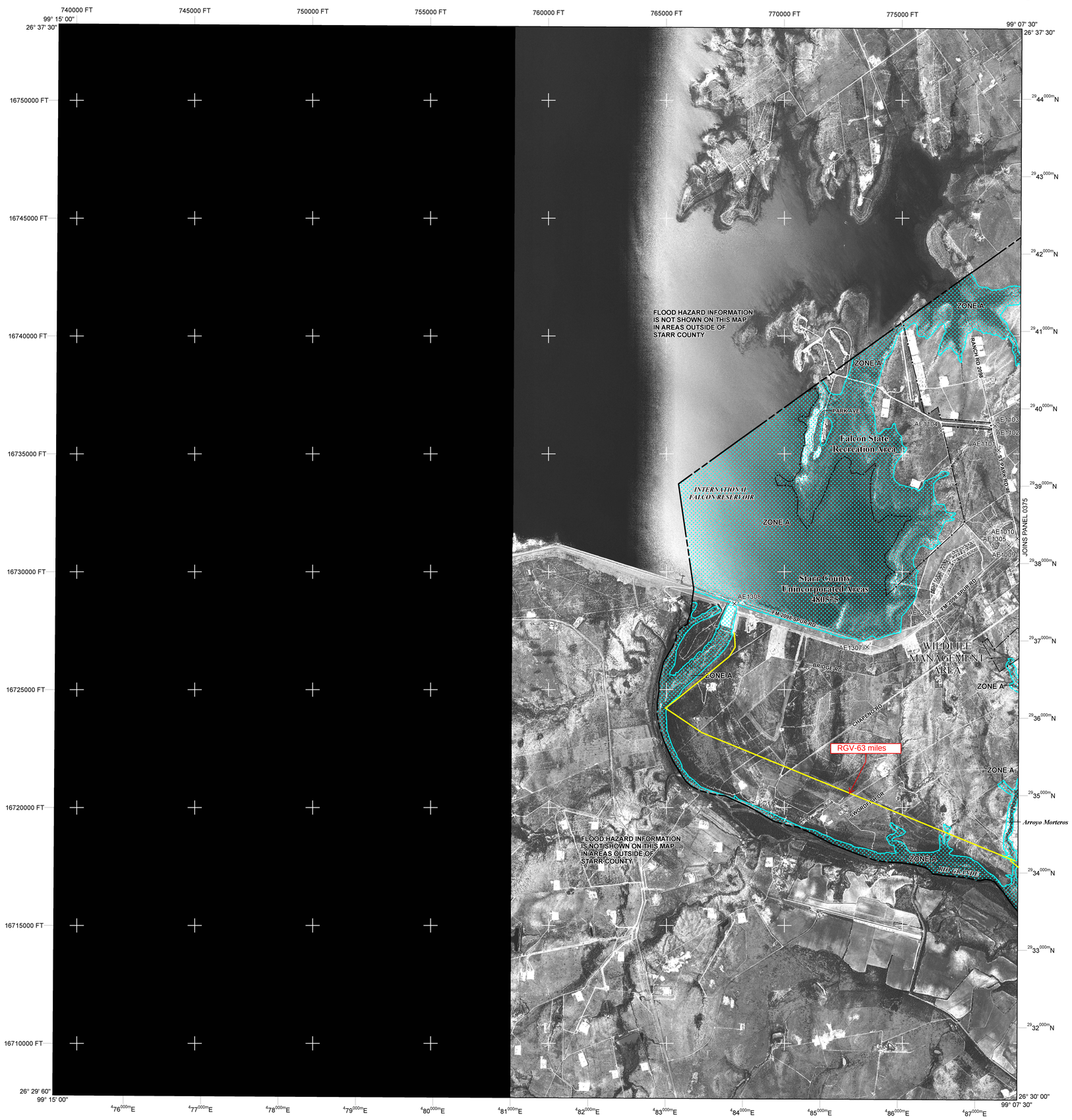
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

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If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1- 877- FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

Figure A3-1



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Texas State Plane South Zone (FIPS Zone 4205), Lambert Conformal Conic projection
4 89 000m N	1000-meter Universal Transverse Mercator grid values, zone 14N
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
April 19, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0350C

FIRM

FLOOD INSURANCE RATE MAP

STARR COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 350 OF 800
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
STARR COUNTY, UNINCORPORATED AREAS	480575	0350	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48427C0350C
EFFECTIVE DATE
APRIL 19, 2010

Federal Emergency Management Agency

Figure A3-2

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane South Zone (FIPS zone 4205). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey **at (301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

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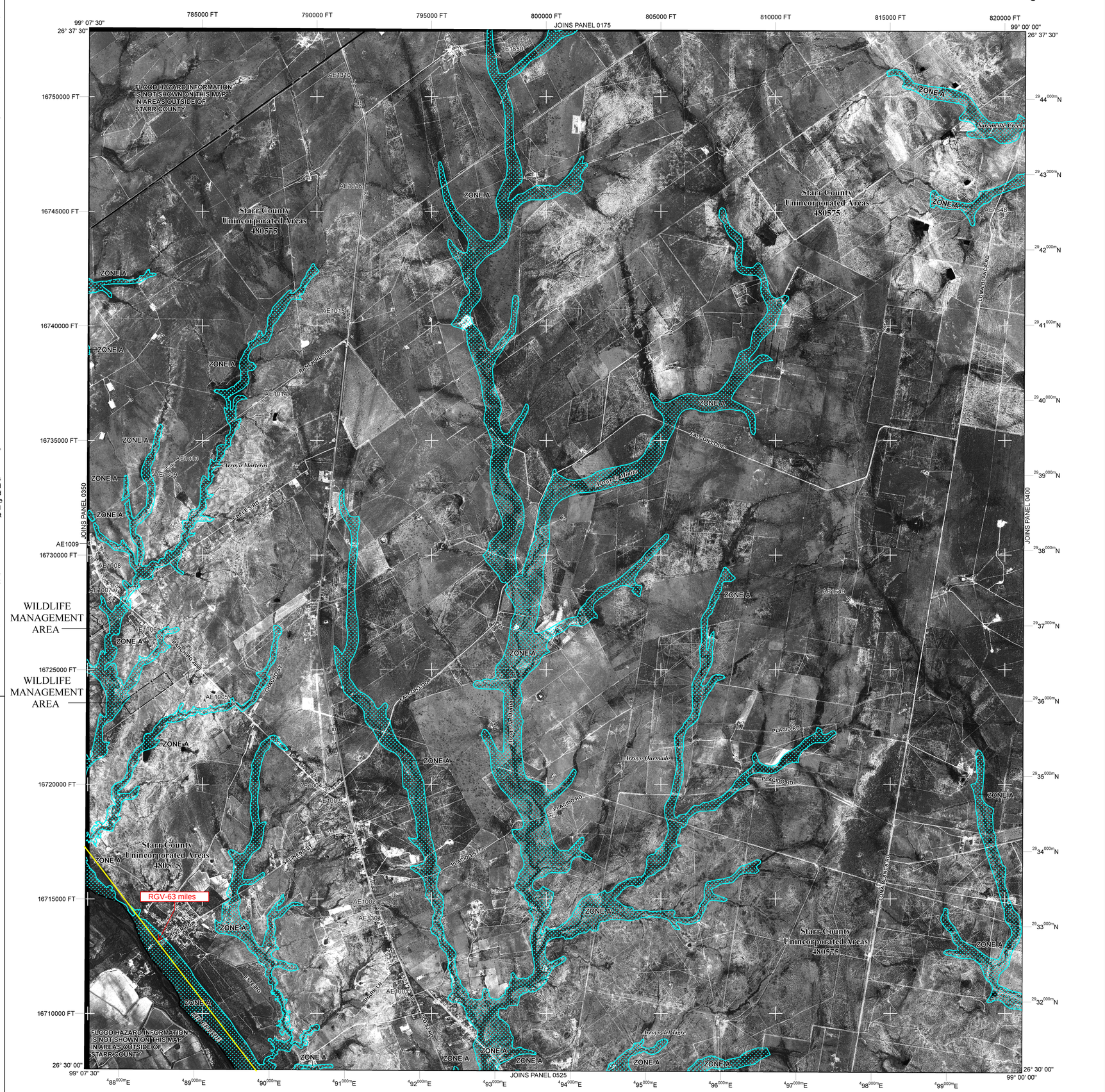
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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Texas State Plane South Zone (FIPS Zone 4205), Lambert Conformal Conic projection
4 89 000m N	1000-meter Universal Transverse Mercator grid values, zone 14N
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
April 19, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0375C

FIRM

FLOOD INSURANCE RATE MAP

STARR COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 375 OF 800
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
STARR COUNTY, UNINCORPORATED AREAS	480575	0375	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48427C0375C

EFFECTIVE DATE
APRIL 19, 2010

Federal Emergency Management Agency

Figure A3-3

NOTES TO USERS

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane South Zone (FIPS zone 4205). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

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NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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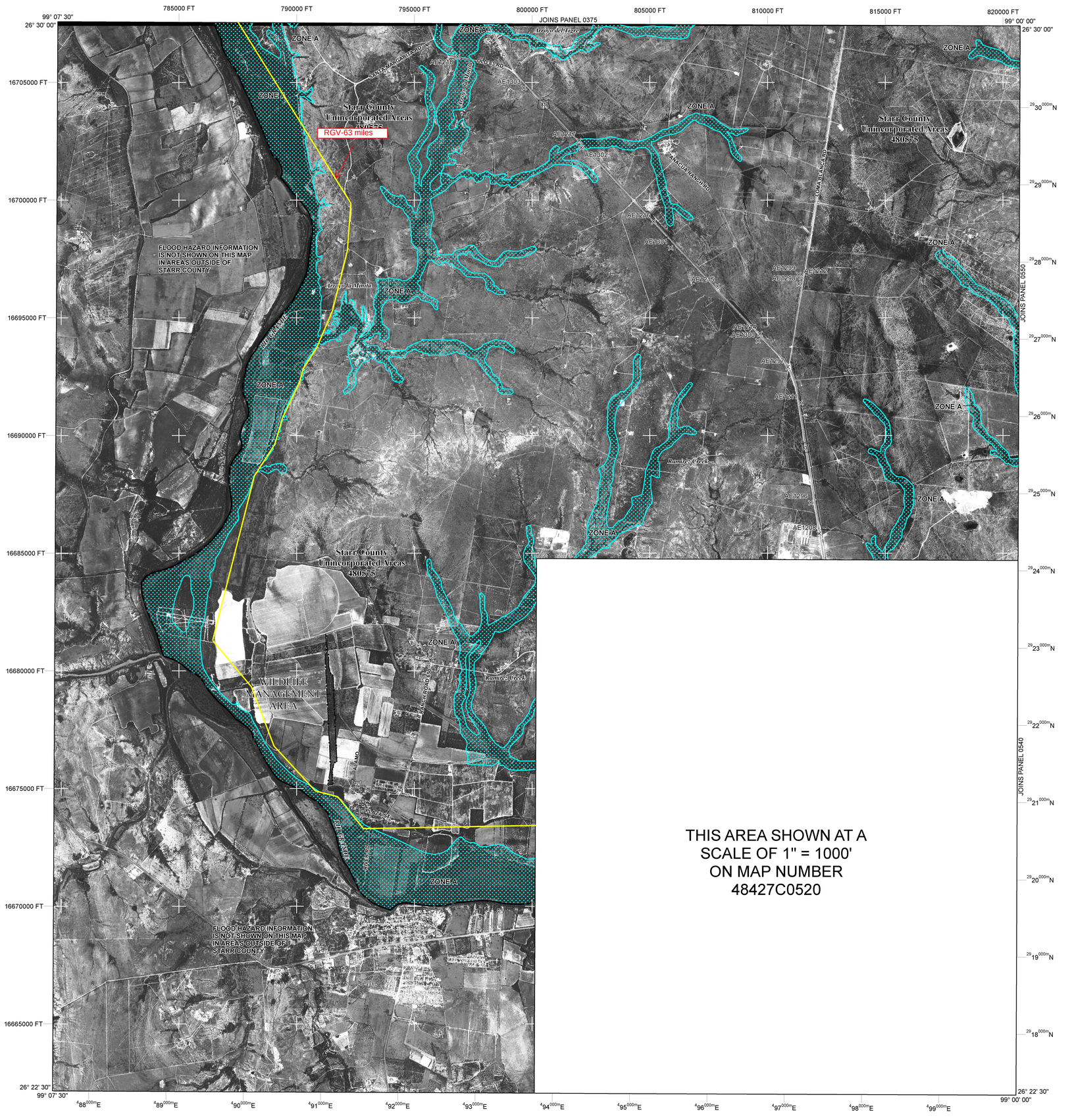
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THIS AREA SHOWN AT A SCALE OF 1" = 1000' ON MAP NUMBER 48427C0520

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

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CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Texas State Plane South Zone (FIPS Zone 4205), Lambert Conformal Conic projection
4890000m N	1000-meter Universal Transverse Mercator grid values, zone 14N
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
April 19, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0525C

FIRM

FLOOD INSURANCE RATE MAP

STARR COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 525 OF 800
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
STARR COUNTY, UNINCORPORATED AREAS	480575	0525	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 48427C0525C

EFFECTIVE DATE APRIL 19, 2010

Federal Emergency Management Agency

NOTES TO USERS

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Figure A3-4

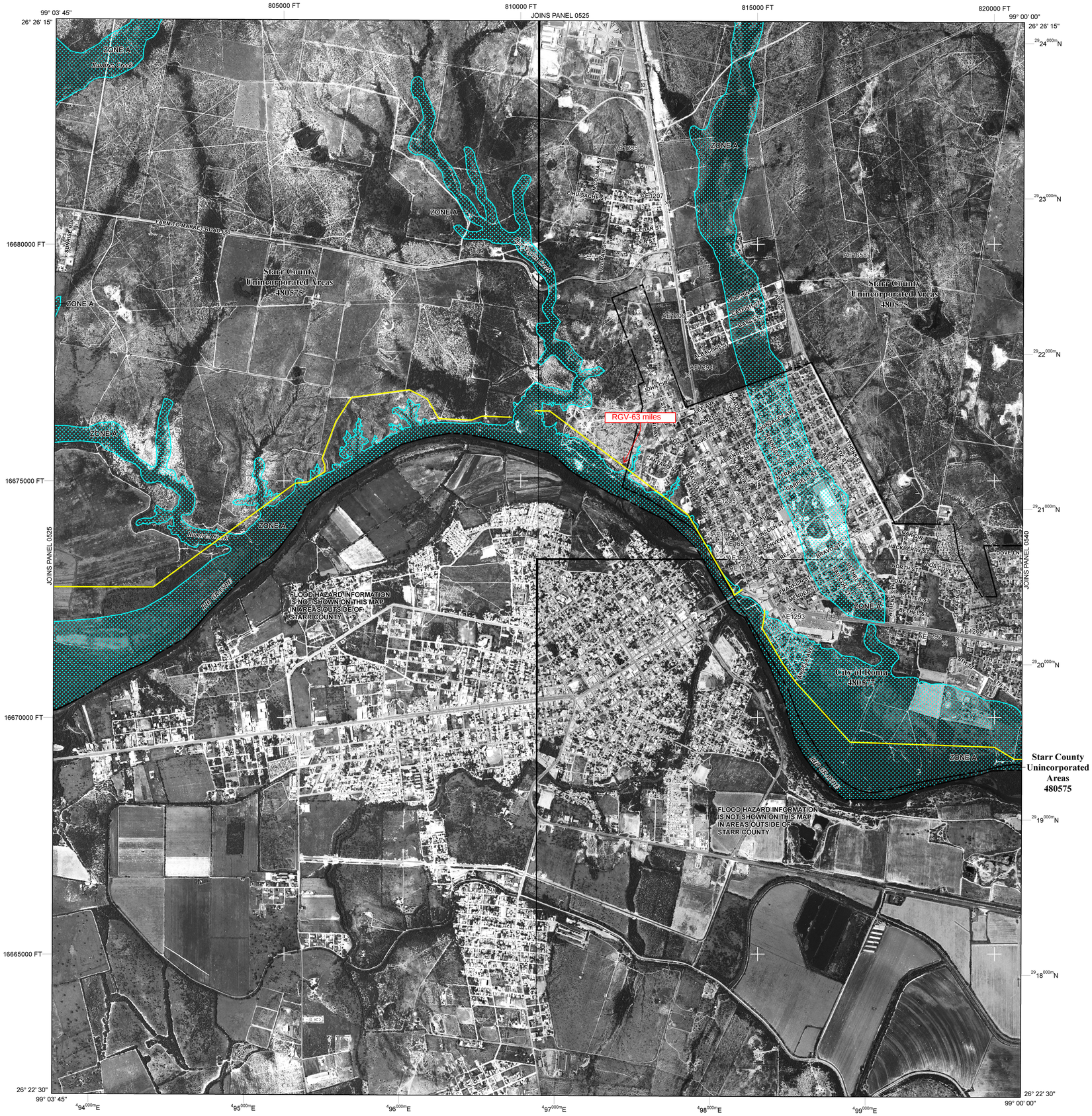


Figure A3-5

NOTES TO USERS

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane South Zone (FIPS zone 4205). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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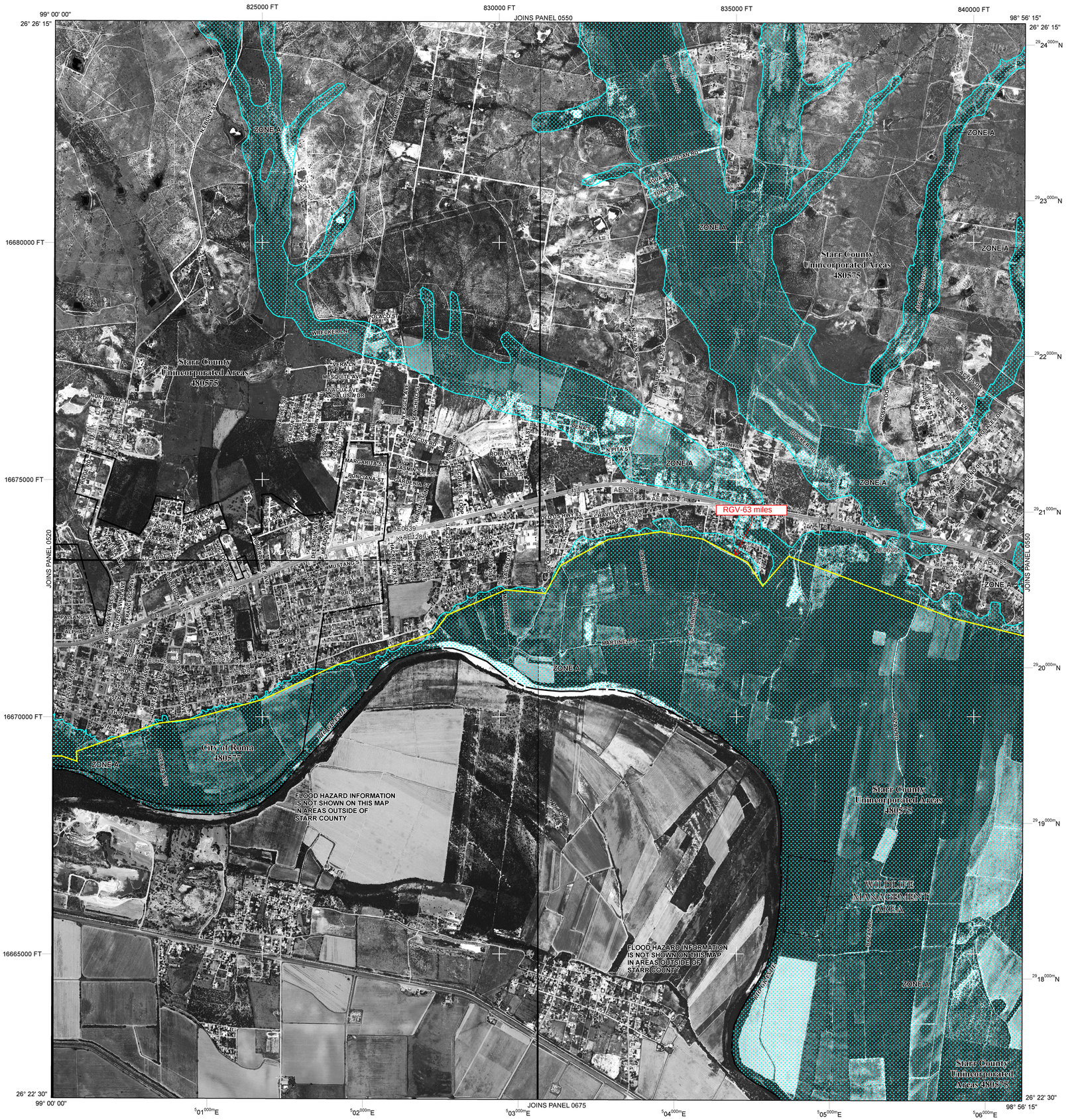


Figure A3-6

NOTES TO USERS

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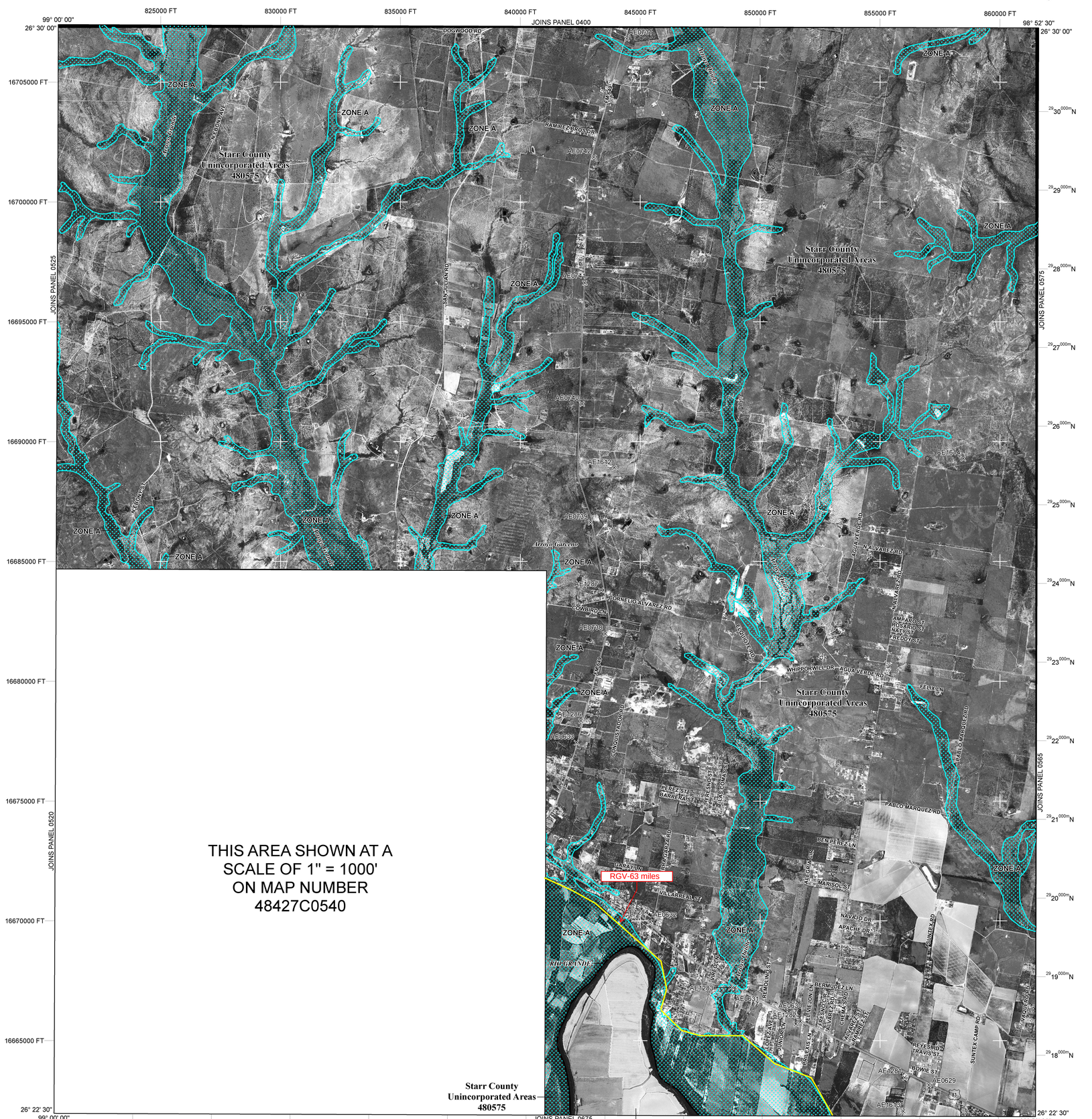
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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Texas State Plane South Zone (FIPS Zone 4205), Lambert Conformal Conic projection
$^{49}89^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 14N
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
April 19, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0550C

FIRM

FLOOD INSURANCE RATE MAP

STARR COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 550 OF 800
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
STARR COUNTY, UNINCORPORATED AREAS	480575	0550	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 48427C0550C

EFFECTIVE DATE APRIL 19, 2010

Federal Emergency Management Agency

Figure A3-7

NOTES TO USERS

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

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(301) 713-3242

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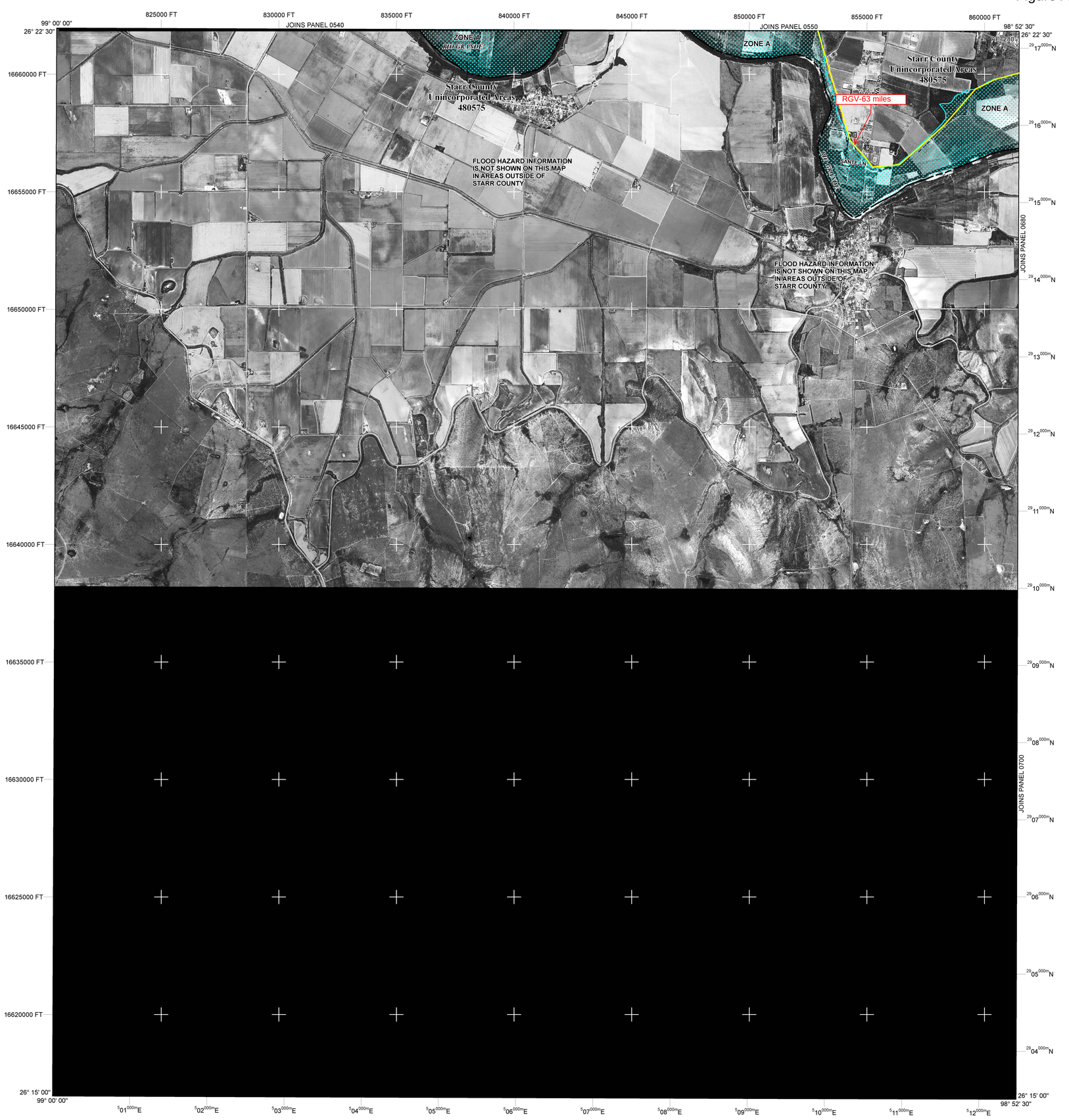
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LEGEND

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The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A Cross section line

23 — 23 Transect line

45° 02' 08", 93° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

3100000 FT 5000-foot ticks: Texas State Plane South Zone (FIPS Zone 4205), Lambert Conformal Conic projection

^{4989000m}N 1000-meter Universal Transverse Mercator grid values, zone 14N

DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 River Mile

MAP REPOSITORIES
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EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
April 19, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

600 0 600 1200 METERS

NFIP

PANEL 0675C

FIRM

FLOOD INSURANCE RATE MAP

STARR COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 675 OF 800

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
STARR COUNTY, UNINCORPORATED AREAS	480575	0675	C

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MAP NUMBER
48427C0675C

EFFECTIVE DATE
APRIL 19, 2010

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

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Figure A3-8



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 3100000 FT — 5000-foot ticks: Texas State Plane South Zone (FIPS Zone 4205), Lambert Conformal Conic projection
- 4989 000m N — 1000-meter Universal Transverse Mercator grid values, zone 14N
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
April 19, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP

PANEL 0680C

FIRM

FLOOD INSURANCE RATE MAP

STARR COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 680 OF 800
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RIO GRANDE CITY, CITY OF	481678	0680	C
STARR COUNTY, UNINCORPORATED AREAS	480575	0680	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48427C0680C
EFFECTIVE DATE
APRIL 19, 2010

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane South Zone (FIPS zone 4205). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
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National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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Base map information shown on this FIRM was derived from USDA-FSA-APFO Aerial Photography Field Office at a scale of 1:12,000 from photography dated 2004 or later.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

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Figure A3-9


865000 FT
870000 FT
875000 FT
880000 FT
98° 52' 30"
98° 48' 45"
26° 26' 15"
26° 22' 30"
JOINS PANEL 0575
JOINS PANEL 0550
JOINS PANEL 0570
JOINS PANEL 0680
16680000 FT
16675000 FT
16670000 FT
16665000 FT
29 24 000m N
29 23 000m N
29 22 000m N
29 21 000m N
29 20 000m N
29 19 000m N
29 18 000m N
5 13 000m E
5 14 000m E
5 15 000m E
5 16 000m E
5 17 000m E
5 18 000m E
ZONE A
AE0725
AE 1665
AB3787
AE 1664
AE0720
AE1278
AE0620
AE1610
AE1606
AE0614
AE0613
Starr County Unincorporated Areas 480575
City of Rio Grande City 481678
City of Rio Grande City 481679
RGV-63 miles
RIO GRANDE
N FM 3167
MT RANCHITO DR
EL MIRADOR
EISENHOWER RD
LA GRANDE RD
EL SOMBRERO RD
EL PARAISO RD
SENDERO RD
CORRALES RD
HERNANDEZ RD
CHAPOTE ST
OLMITOS ST
LA MESA ST
BARRETT AVE
CASA BLANCA RD
ANACUA DR
DATE PALM DR
SABLE PALM DR
PALMETTO DR
MIMOSA DR
PLAINVIEW ST
HOSPITAL ST
AUSTIN ST
BEAUMONT ST
CENIZO DR
BRAZIL ST
W RETAMA ST
W PALMA ST
HUISACHE
CASA
JASPER ST
HOUSTON
GALVESTON ST
W CARR ST
LA GRANDE DR
LA GRANDE RD
CAMILLE LN
LUCIEN LN
W RAMIREZ ST
W GUERRA ST
W ROOSEVELT ST
W FAIRVIEW AVE
W BLUE BONNET ST
W BIRCH ST
W WASH ST
E MONTE CRISTO ST
E SAN BENITO ST
E RINGGOLD ST
E 6TH ST
E 5TH ST
E 4TH ST
E BROAD ST
W MAPLE ST
W ELM ST
W WIMPY ST
E HINOJOSA AVE
E MAPLE ST
E ELM ST
E

NOTES TO USERS

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

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Figure A3-10



Figure A3-11

NOTES TO USERS

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

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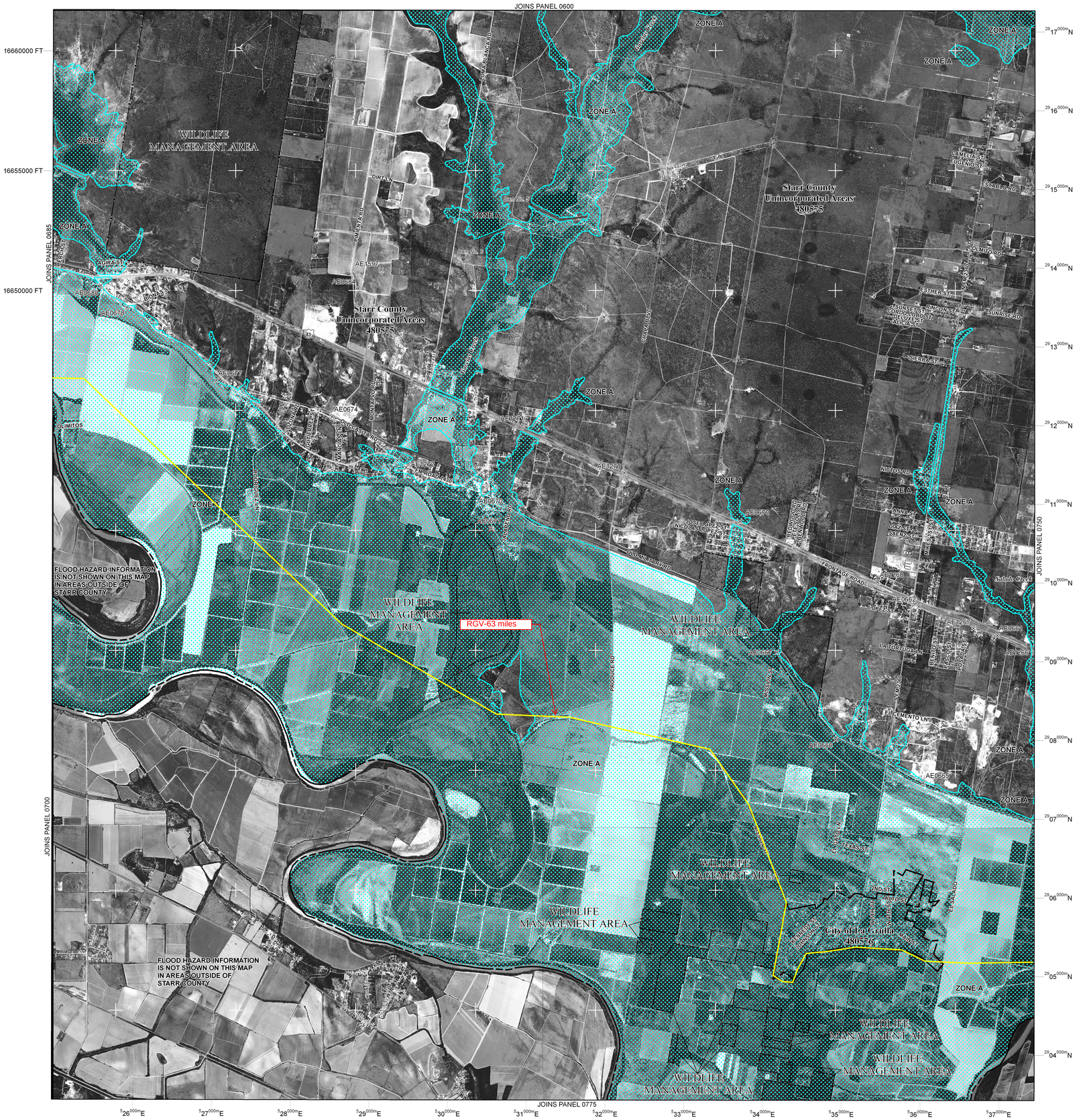
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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A ⟷ A	Cross section line
23 ⟷ 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Texas State Plane South Zone (FIPS Zone 4205), Lambert Conformal Conic projection
$^{49}89^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 14N
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
April 19, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

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MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0725C

FIRM

FLOOD INSURANCE RATE MAP

STARR COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 725 OF 800
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LA GRULLA, CITY OF	480576	0725	C
STARR COUNTY, UNINCORPORATED AREAS	480575	0725	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48427C0725C
EFFECTIVE DATE
APRIL 19, 2010

Federal Emergency Management Agency

NOTES TO USERS

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Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

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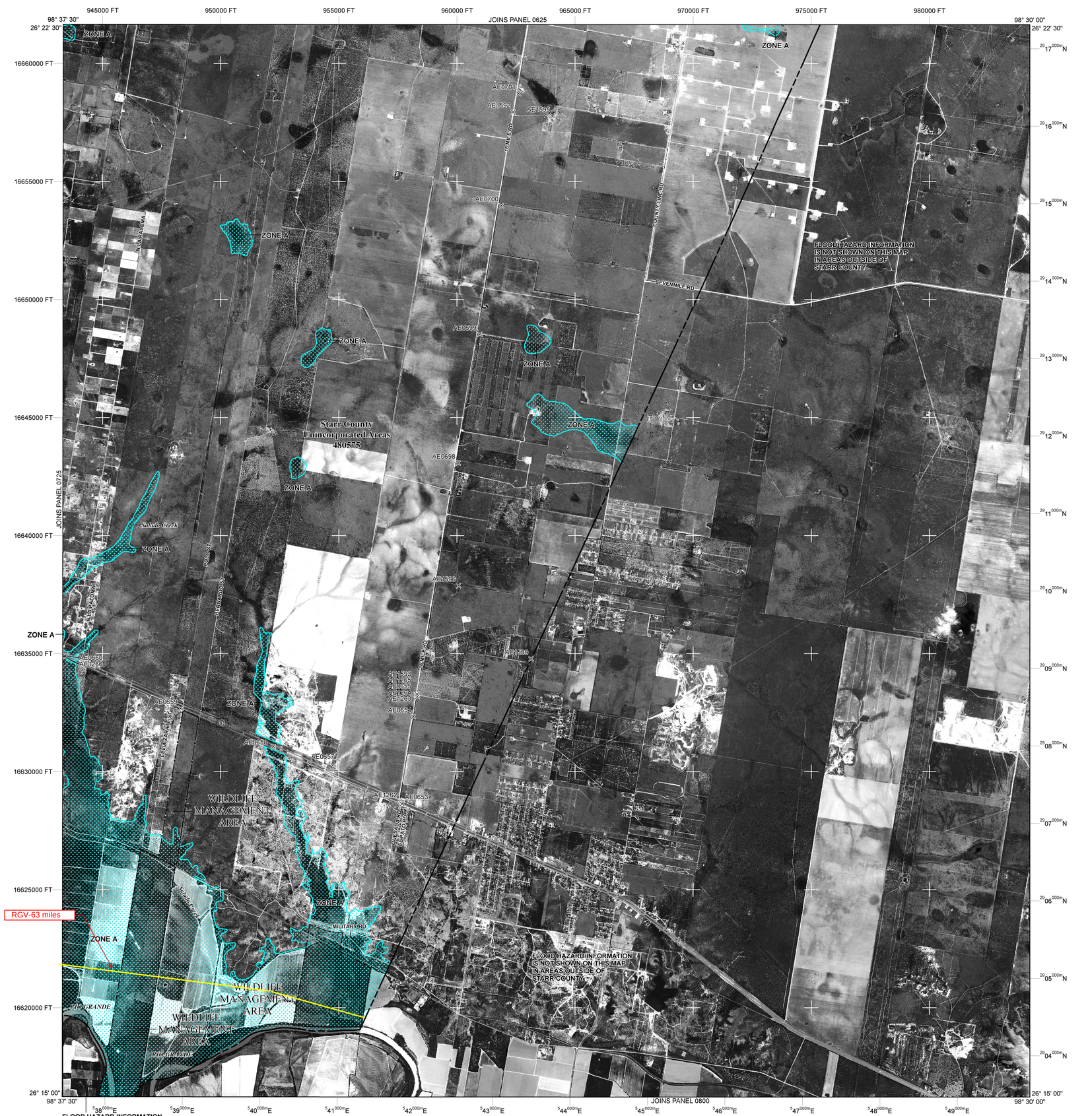
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Figure A3-12



FLOOD HAZARD INFORMATION IS NOT SHOWN ON THIS MAP IN AREAS OUTSIDE OF STARR COUNTY

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Texas State Plane South Zone (FIPS Zone 4205), Lambert Conformal Conic projection
4989000m N	1000-meter Universal Transverse Mercator grid values, zone 14N
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
April 19, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0750C

FIRM

FLOOD INSURANCE RATE MAP

STARR COUNTY, TEXAS AND INCORPORATED AREAS

PANEL 750 OF 800
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
STARR COUNTY, UNINCORPORATED AREAS	480575	0750	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 48427C0750C

EFFECTIVE DATE APRIL 19, 2010

Federal Emergency Management Agency

Figure A



KEY TO MAP

500-Year Flood Boundary	ZONE B
100-Year Flood Boundary	ZONE A2 DATE
Zone Designations* With Date of Identification e.g., 12/2/74	ZONE A1 DATE
100-Year Flood Boundary	ZONE B
500-Year Flood Boundary	
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7 ×
River Mile	• M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
MAY 23, 1978

FLOOD HAZARD BOUNDARY MAP REVISIONS

FLOOD INSURANCE RATE MAP EFFECTIVE:
JANUARY 2, 1981

FLOOD INSURANCE RATE MAP REVISIONS

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620, or (800) 424-8872.

APPROXIMATE SCALE
2000 0 2000 FEET

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
RM 12	125.47	U.S.G.C. BM "125 1975 1913" 1.6 miles west of Penitas Station along the Missouri Pacific Railroad.
RM 13	155.01	A cotton pin spindle in a power pole on the southwest corner of the intersection of gravel roads 0.1 mile north of Missouri Pacific Railroad Station at Sam Fordyce.
RM 14	133.14	A cotton pin spindle in power pole on the southeast corner of the intersection of Farm Market 88 and Missouri Pacific Railroad, 1.5 miles north Sam Fordyce.

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

HIDALGO COUNTY, TEXAS
(UNINCORPORATED AREAS)

PANEL 375 OF 525

COMMUNITY-PANEL NUMBER
480334 0375 B

EFFECTIVE DATE:
JANUARY 2, 1981

federal emergency management agency
federal insurance administration



KEY TO MAP

500-Year Flood Boundary
100-Year Flood Boundary
Zone Designations* With Date of Identification e.g., 12/2/74
100-Year Flood Boundary
500-Year Flood Boundary

ZONE B
ZONE A2 DATE / ZONE A1 DATE
ZONE B

Base Flood Elevation Line With Elevation In Feet** — 513

Base Flood Elevation in Feet Where Uniform Within Zone** (EL 987)

Elevation Reference Mark RM7 ×

River Mile • M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
MAY 23, 1978

FLOOD INSURANCE RATE MAP EFFECTIVE:
JANUARY 2, 1981

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620, or (800) 424-8872.

N

APPROXIMATE SCALE
2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

HIDALGO COUNTY, TEXAS
(UNINCORPORATED AREAS)

PANEL 475 OF 525

COMMUNITY-PANEL NUMBER
480334 0475 B

EFFECTIVE DATE:
JANUARY 2, 1981

federal emergency management agency
federal insurance administration

Figure A3-15

JOINS PANEL 425

JOINS PANEL 476

JOINS PANEL 525

ZONE A
Levee
ZONE AH (EL 85)
LIMIT OF DETAILED STUDY
City of Pharr (AREA NOT INCLUDED)
ZONE B
ZONE C
Pharr San Juan Main Canal
F.M. 3072
F.M. 2061
RM 45
LAS MILPAS
FAYS CORNER
U.S. ROUTE 281
RGV-04
RGV-01
RGV-02
TAMAULIPAS MEXICO
RIO GRANDE
SANTA ANA NATIONAL WILDLIFE REFUGE AREA NOT INCLUDED
HIDALGO COUNTY, TEXAS
TAMAULIPAS, MEXICO
ZONE AH (EL 58)
ZONE B
Donna Reservoirs
Donna Main Canal
La Cruz Resaca
SCISSORS
F.M. 493
Lasara Str.
COUNTY ROAD
RM44
RM43
ZONE AH (EL 70)
Main Floodway
RUN
UNITED STATES MEXICO
RIO GRANDE

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
RM 43	77.59	About 5 miles south along Farm Market 493 from the junction with U.S. Business Highway 83 at Donna, Hidalgo County, thence east along a county road about 0.6 mile to a junction with a road leading north and south, a cotton pin spindle on a power pole located on the southwest corner.
RM 44	70.42	About 4.5 miles south along Farm Market 493 from the junction with U.S. Business Highway 83 at Donna, Hidalgo County, thence east along a county road about 0.6 mile to a junction with a road leading north and south, a cotton pin spindle on a power pole located on the southeast corner.
RM 45	85.76	A cotton pin spindle in a power pole on the southeast side of a drain ditch crossing U.S. Highway 281, 5.3 miles south of U.S. Business Highway 83 in Pharr.

KEY TO MAP

- 500-Year Flood Boundary
- 100-Year Flood Boundary
- Zone Designations* With Date of Identification e.g., 12/2/74
- 100-Year Flood Boundary
- 500-Year Flood Boundary
- Base Flood Elevation Line With Elevation In Feet** — 513
- Base Flood Elevation In Feet Where Uniform Within Zone** — (EL 987)
- Elevation Reference Mark — RM7 ×
- River Mile — • M1.5

ZONE B | ZONE A2 DATE | ZONE A1 DATE | ZONE B

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
MAY 23, 1978

FLOOD INSURANCE RATE MAP EFFECTIVE:
JANUARY 2, 1981

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620, or (800) 424-8872.

APPROXIMATE SCALE
2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

HIDALGO COUNTY, TEXAS
(UNINCORPORATED AREAS)

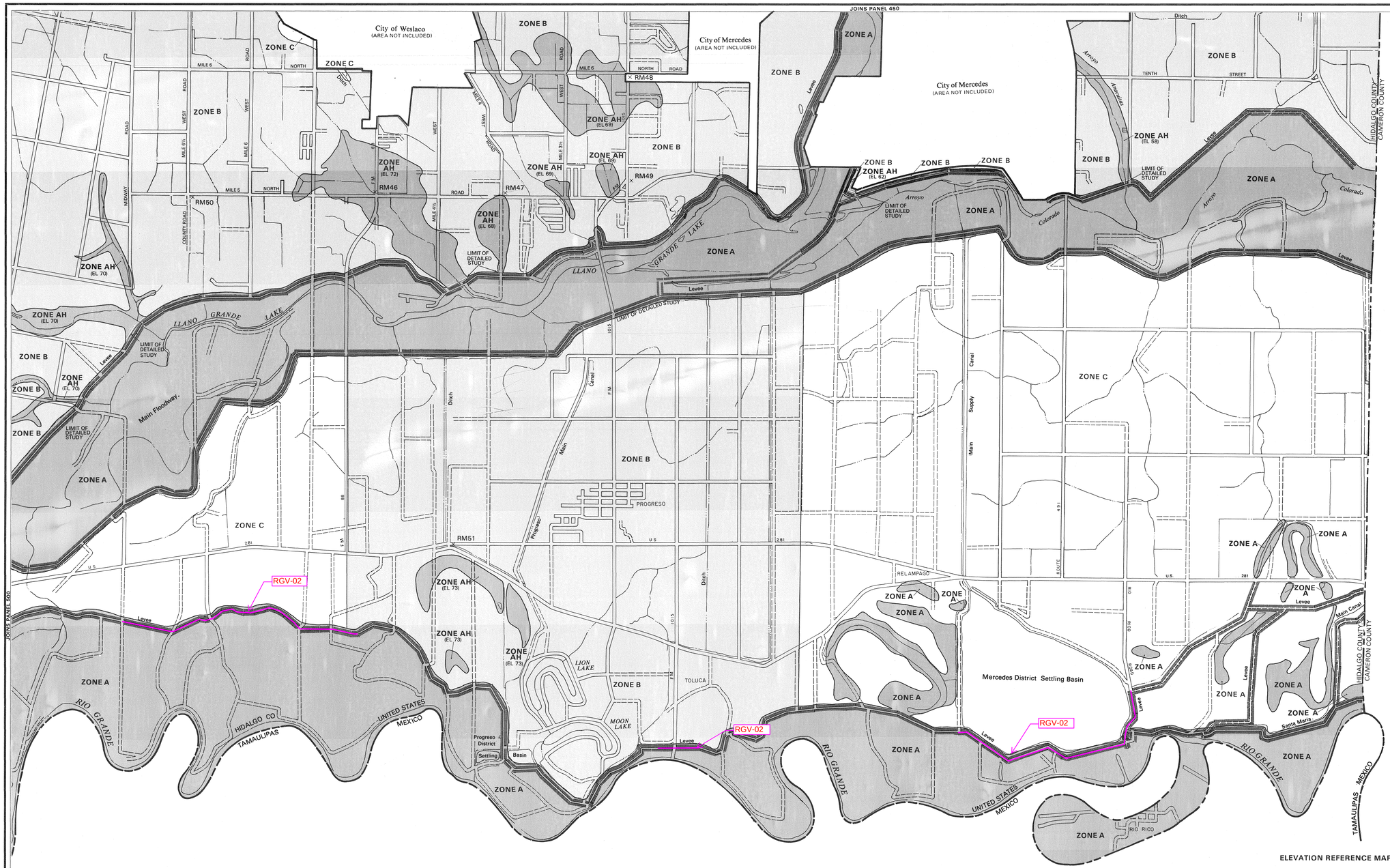
PANEL 500 OF 525

COMMUNITY-PANEL NUMBER
480334 0500 B

EFFECTIVE DATE:
JANUARY 2, 1981

federal emergency management agency
federal insurance administration

Figure A3-16



KEY TO MAP

- 500-Year Flood Boundary
- 100-Year Flood Boundary
- Zone Designations* With Date of Identification e.g., 12/2/74
- 100-Year Flood Boundary
- 500-Year Flood Boundary
- Base Flood Elevation Line With Elevation In Feet**
- Base Flood Elevation in Feet Where Uniform Within Zone** (EL 987)
- Elevation Reference Mark RM7 ×
- River Mile ●M1.5

ZONE B
ZONE A2 DATE
ZONE A1 DATE
ZONE B
513

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
MAY 23, 1976

FLOOD INSURANCE RATE MAP EFFECTIVE:
JANUARY 2, 1981

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620, or (800) 424-8872.

APPROXIMATE SCALE
2000 0 2000 FEET

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FT. NGVD)	DESCRIPTION OF LOCATION
RM 46	68.52	A square cut into the northwest corner of the headwall at the intersection of Farm Market 88 and Mile 5 North Road.
RM 47	67.26	A cotton pin spindle in a "power pole on the northeast corner of the intersection of Mile 5 North Road and Mile 4 West Road.
RM 48*	67.40	A cotton pin spindle in a power pole on the southeast corner of the intersection of Farm Market 1015 and Mile 6 North Road.
RM 49	69.42	A cotton pin spindle in a power pole on the east side of the road at the fork where Farm Market 1015 and Mile 3 West splits.
RM 50	74.13	Railroad spike in a power pole on the southeast corner of the intersection of Mile 5 North and a County Road, 1.5 miles west of Farm Market 88.
RM 51	75.35	A cotton pin spindle in a power pole on the south side of U.S. 281, 1.35 miles west of Farm Market 1015.

*Located in Area Not Included

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

HIDALGO COUNTY, TEXAS
(UNINCORPORATED AREAS)

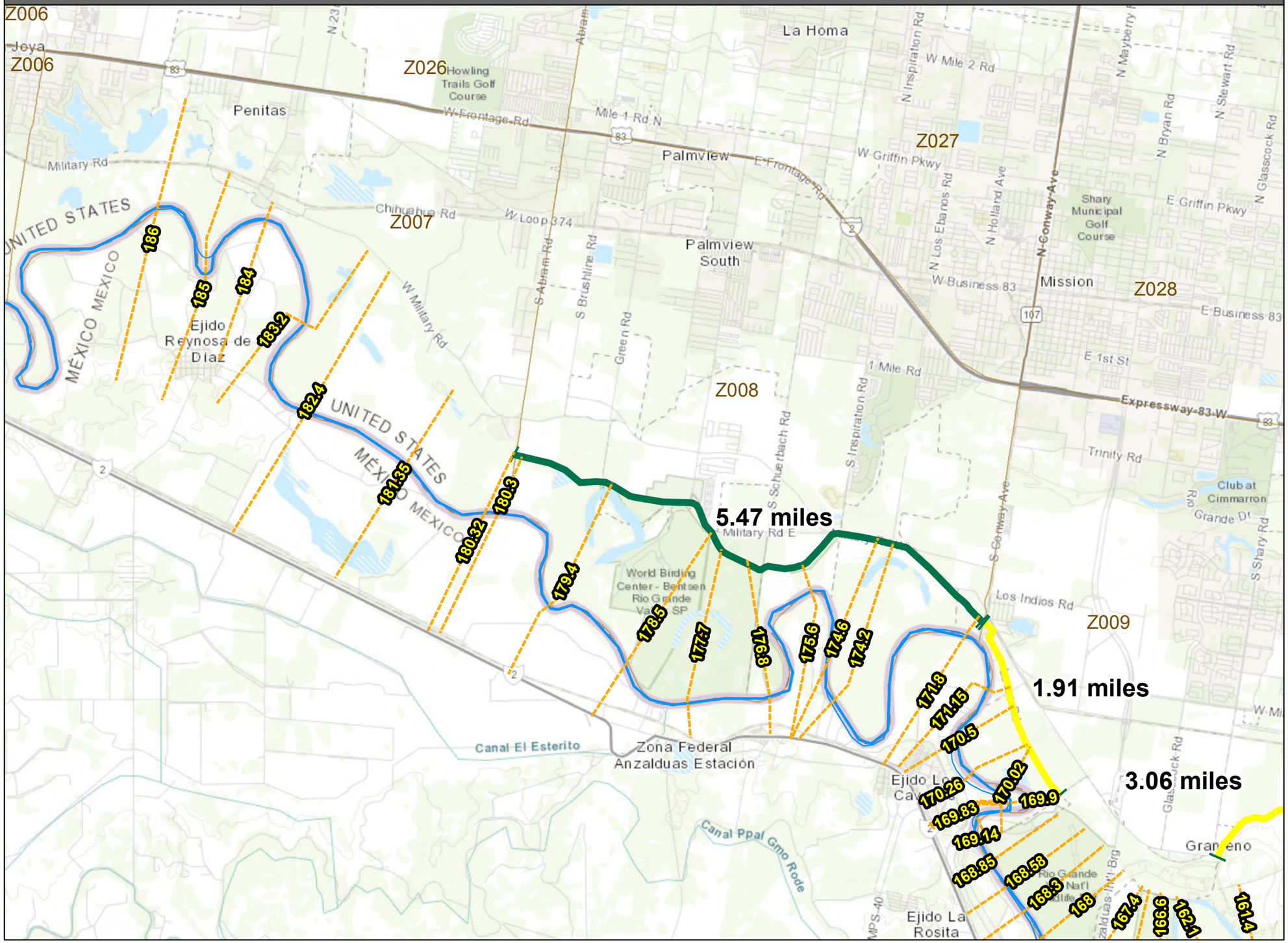
PANEL 525 OF 525

COMMUNITY-PANEL NUMBER
480334 0525 B

EFFECTIVE DATE:
JANUARY 2, 1981

federal emergency management agency
federal insurance administration

Figure A4: Penitas to Hidalgo-Cameron County 1D Model Cross-Section Map



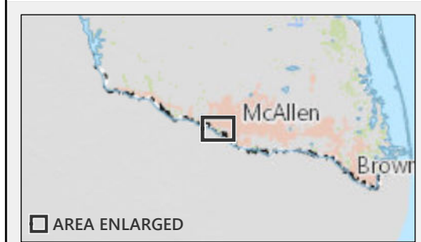
LEGEND

Rio Grande Valley (RGV) Projects

- RGV-03 (10.8 miles)
- RGV-04 (11.2 miles)
- RGV-01 (2.9 miles)
- RGV-02 (7.9 miles)
- Cross-sections
- USBP Station Zones
- Rio Grande

**If sheet measures less than 11x17" it is a reduced print. Reduce scale accordingly.*

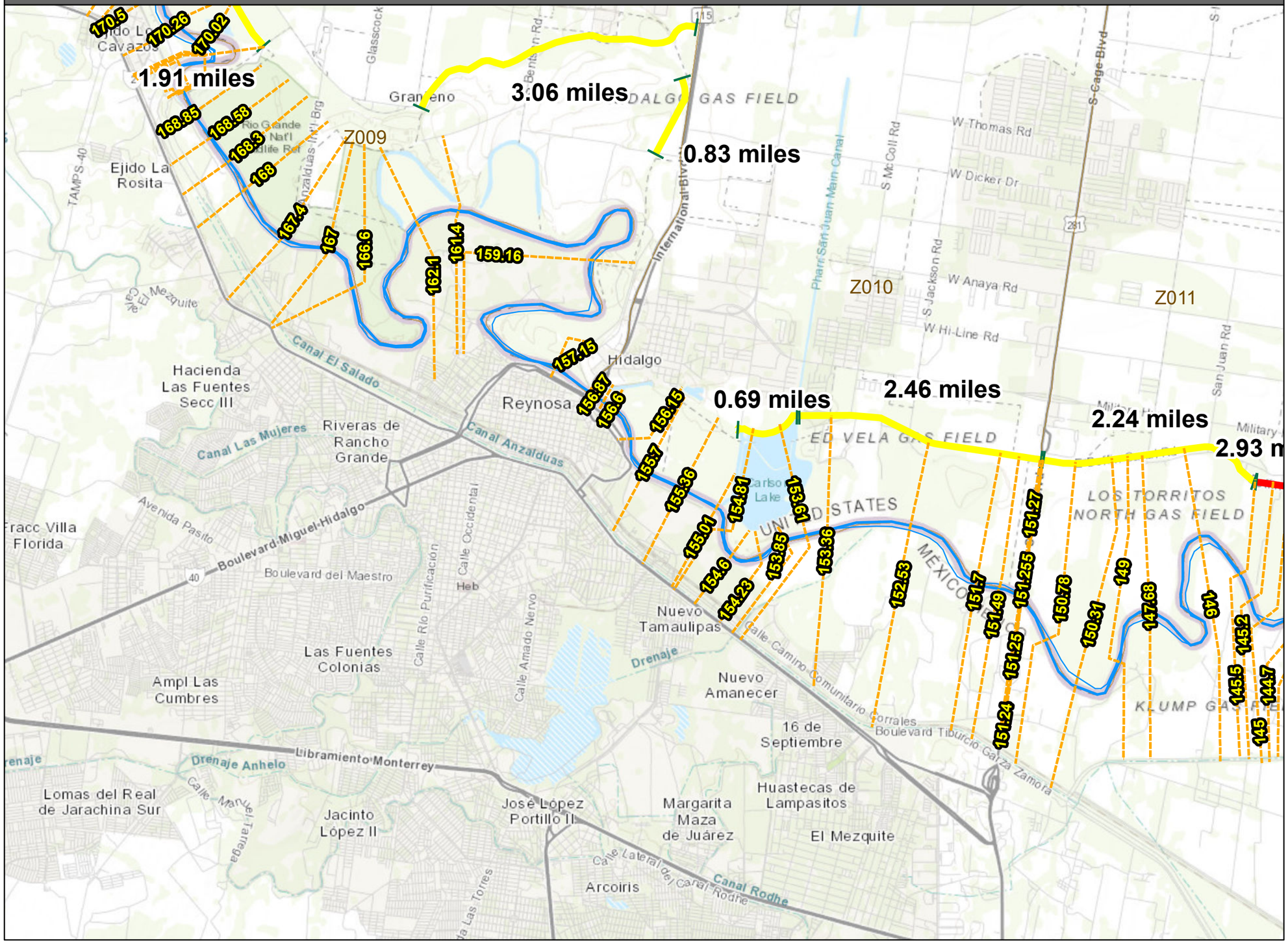
1 in = 5,000 feet 1:60,000



Michael Baker INTERNATIONAL

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Figure A4: Penitas to Hidalgo-Cameron County 1D Model Cross-Section Map



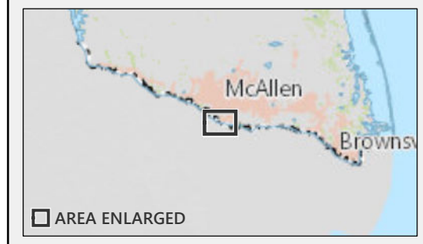
LEGEND

Rio Grande Valley (RGV) Projects

- RGV-03 (10.8 miles)
- RGV-04 (11.2 miles)
- RGV-01 (2.9 miles)
- RGV-02 (7.9 miles)
- Cross-sections
- USBP Station Zones
- Rio Grande

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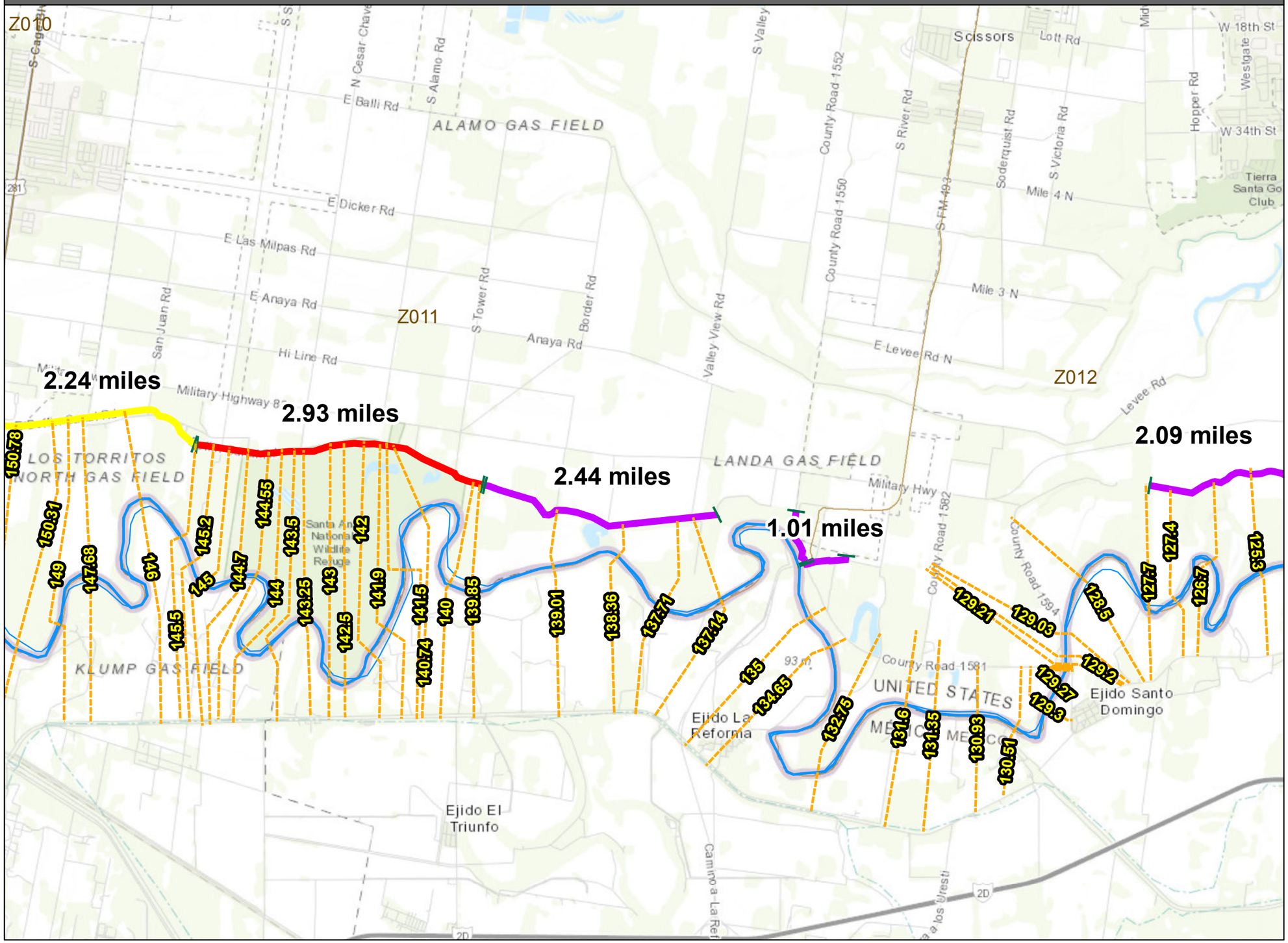
1 in = 5,000 feet 1:60,000



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Figure A4: Penitas to Hidalgo-Cameron County 1D Model Cross-Section Map



LEGEND

Rio Grande Valley (RGV) Projects

- RGV-03 (10.8 miles)
- RGV-04 (11.2 miles)
- RGV-01 (2.9 miles)
- RGV-02 (7.9 miles)
- Cross-sections
- USBP Station Zones
- Rio Grande

**If sheet measures less than 11x17" it is a reduced print. Reduce scale accordingly.*

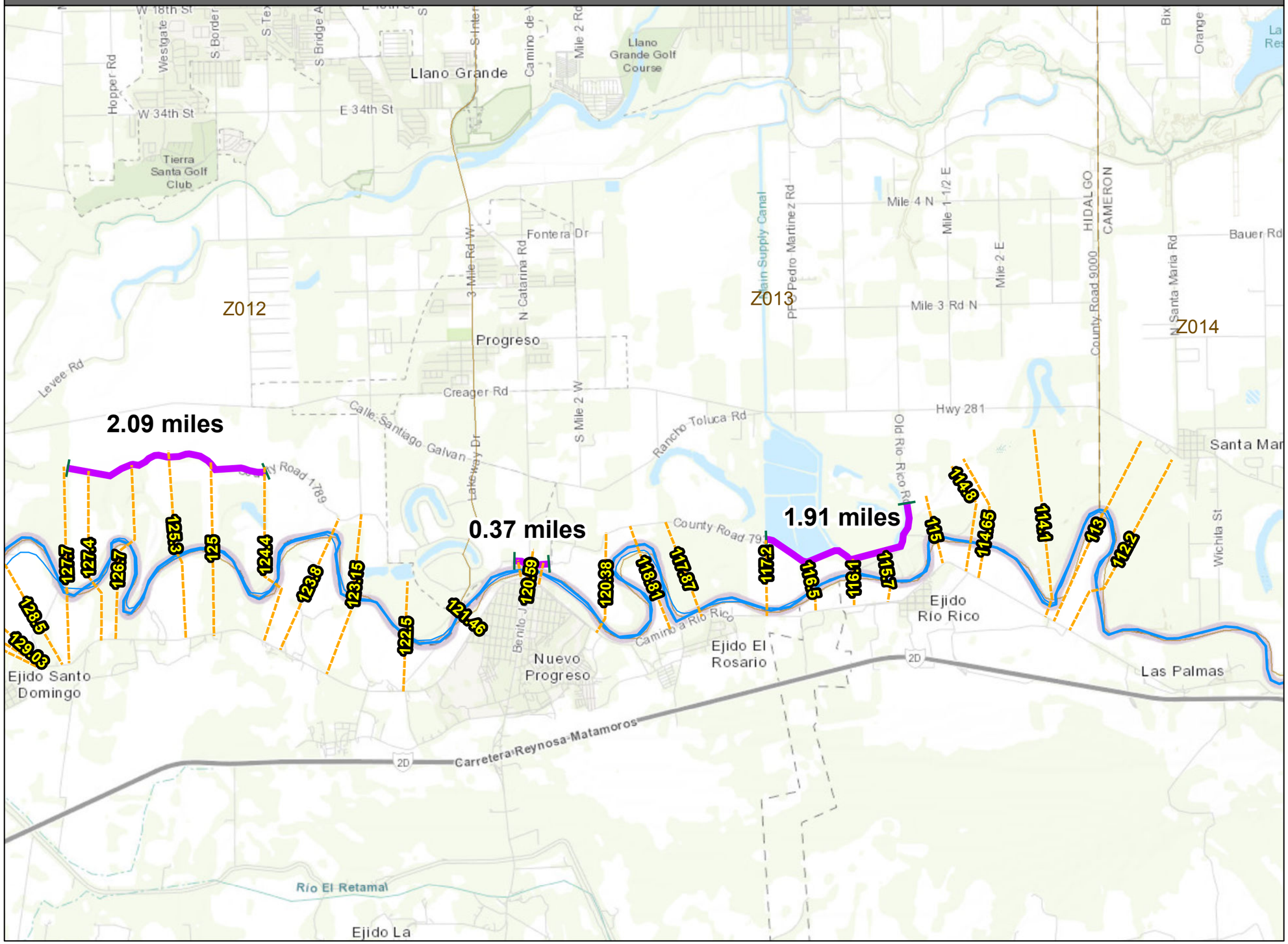
1 in = 5,000 feet 1:60,000



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Figure A4: Penitas to Hidalgo-Cameron County 1D Model Cross-Section Map



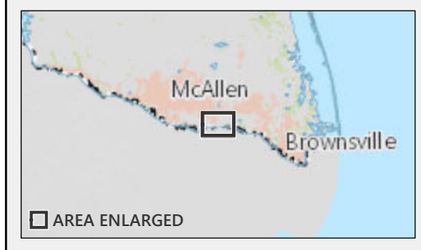
LEGEND

Rio Grande Valley (RGV) Projects

- RGV-03 (10.8 miles)
- RGV-04 (11.2 miles)
- RGV-01 (2.9 miles)
- RGV-02 (7.9 miles)
- Cross-sections
- USBP Station Zones
- Rio Grande

**If sheet measures less than 11x17" it is a reduced print. Reduce scale accordingly.*

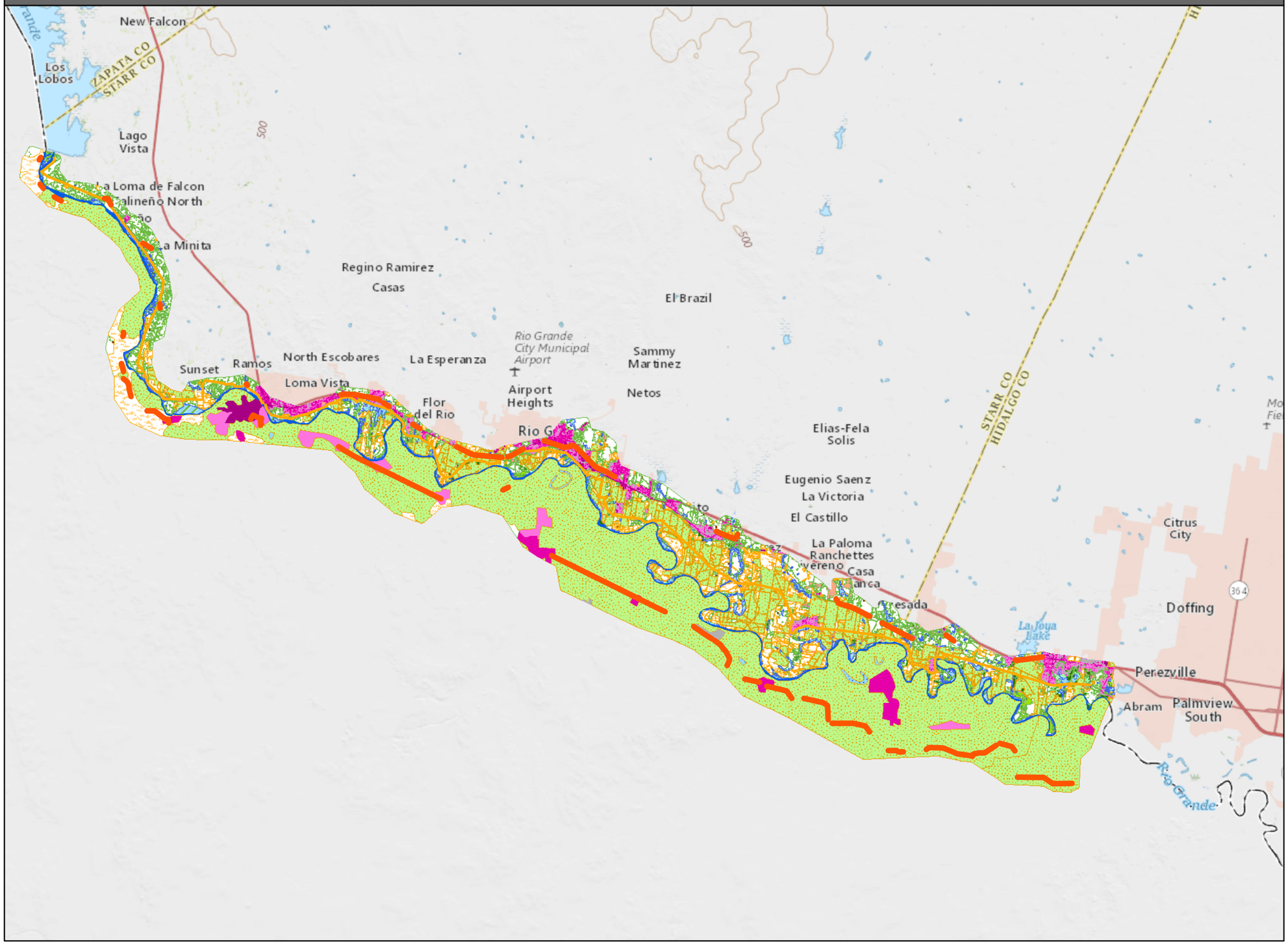
1 in = 5,000 feet 1:60,000



Michael Baker INTERNATIONAL

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Figure A5: Falcon Dam to Penitas Land Use Designations



LEGEND

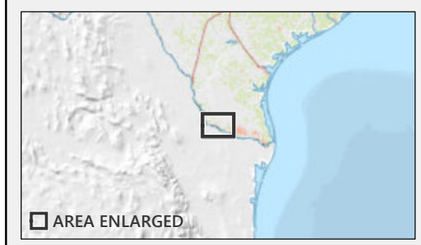
- Limits of Study
- RGV-63 miles

Land Use Designation

- Barren Land
- Cultivated Crops
- Deciduous Forest
- Developed, High Intensity
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, Open Space
- Emergent Herbaceuous Wetlands
- Evergreen Forest
- Hay/Pasture
- Herbaceuous
- Mixed Forest
- Open Water
- Rio Grande
- Shrub/Scrub
- Woody Wetlands

**If sheet measures less than 11x17" it is a reduced print. Reduce scale accordingly.*

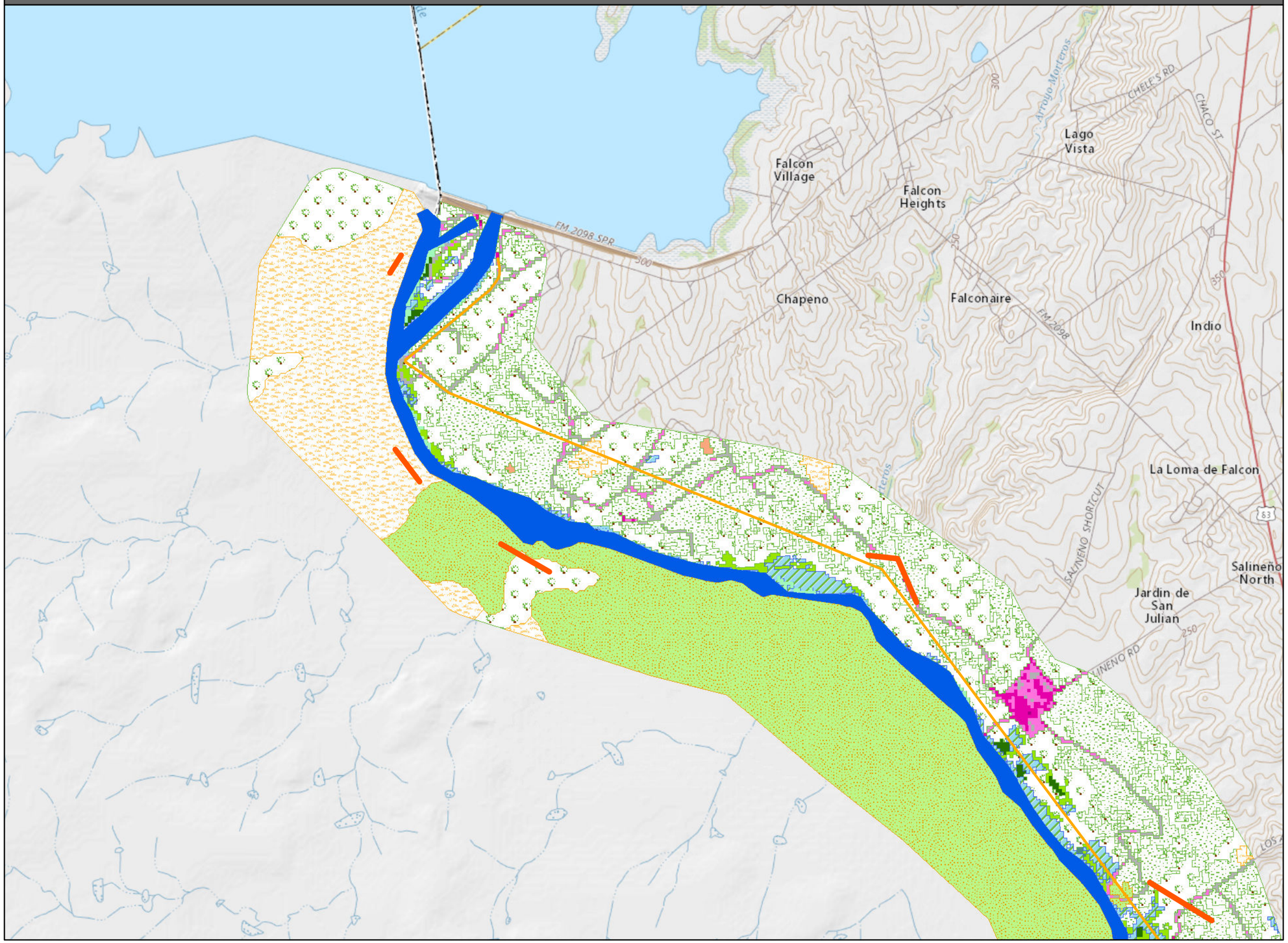
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Figure A5: Falcon Dam to Penitas Land Use Designations



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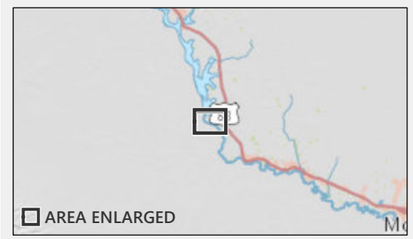
- Limits of Study
- RGV-63 miles

Land Use Designation

- Barren Land
- Cultivated Crops
- Deciduous Forest
- Developed, High Intensity
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, Open Space
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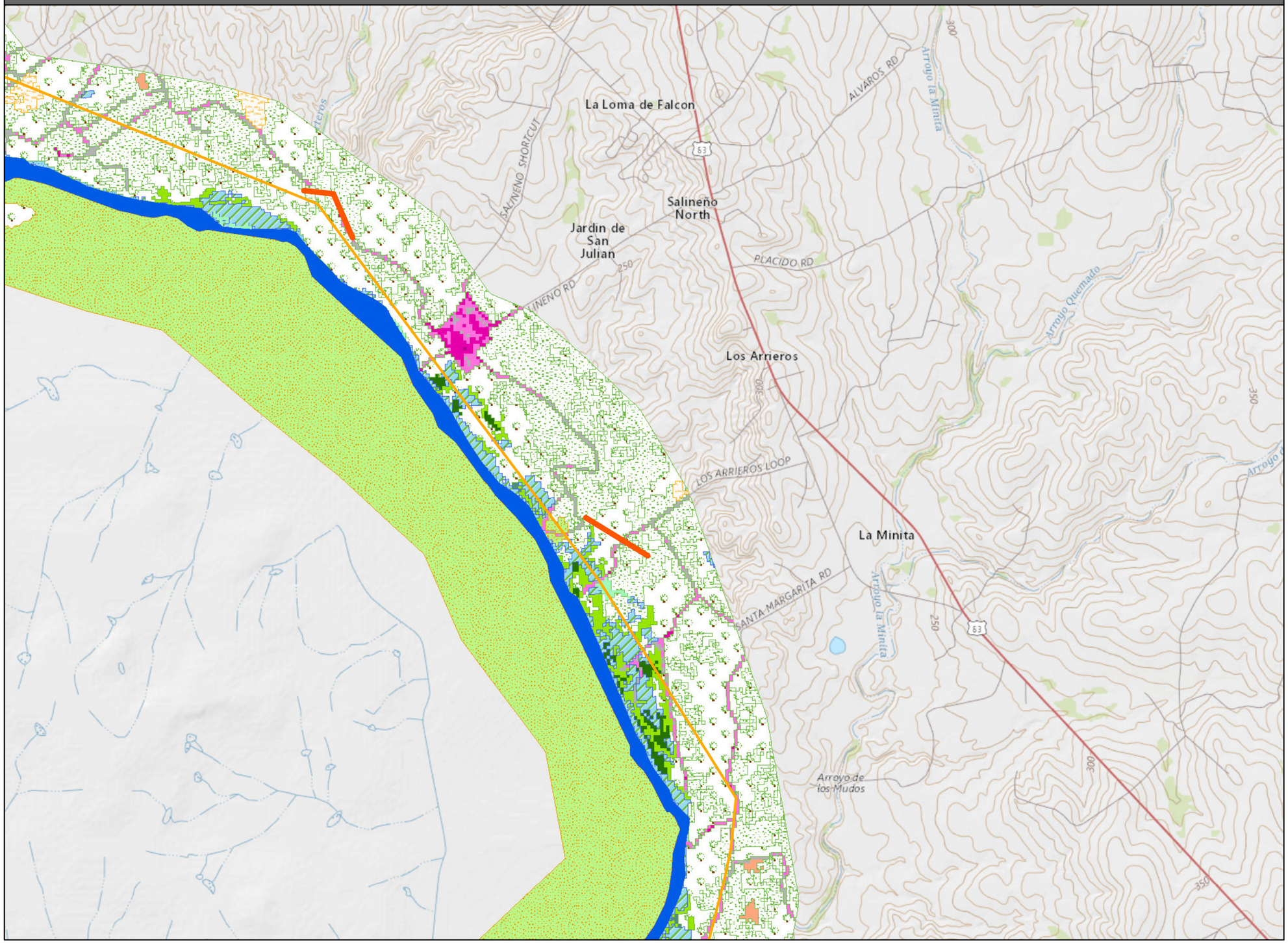
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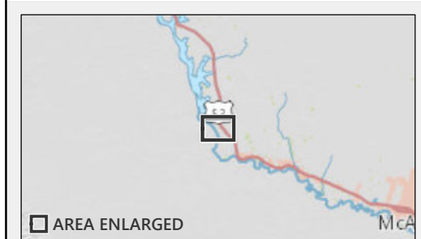
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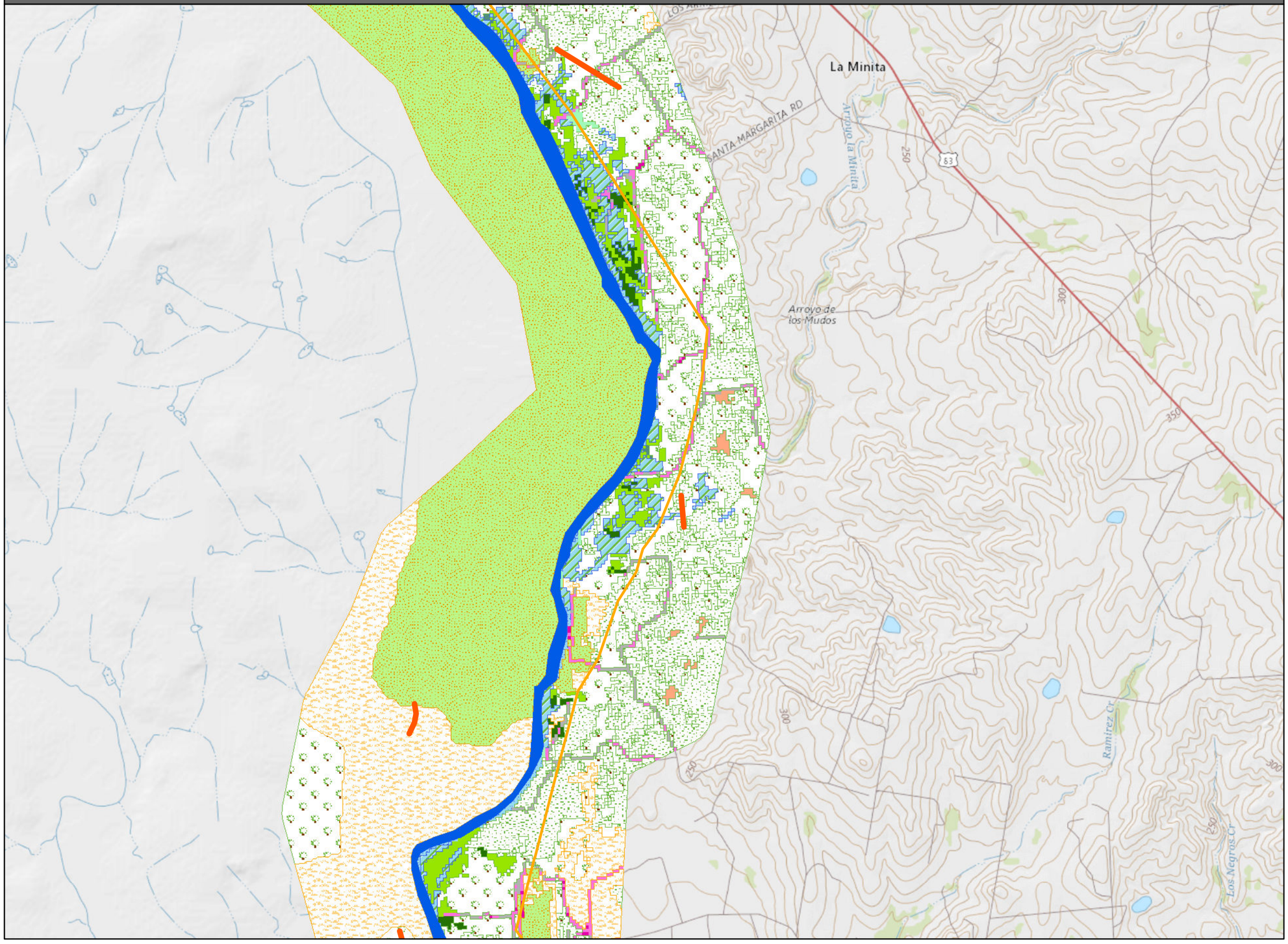
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Figure A5: Falcon Dam to Penitas Land Use Designations



LEGEND

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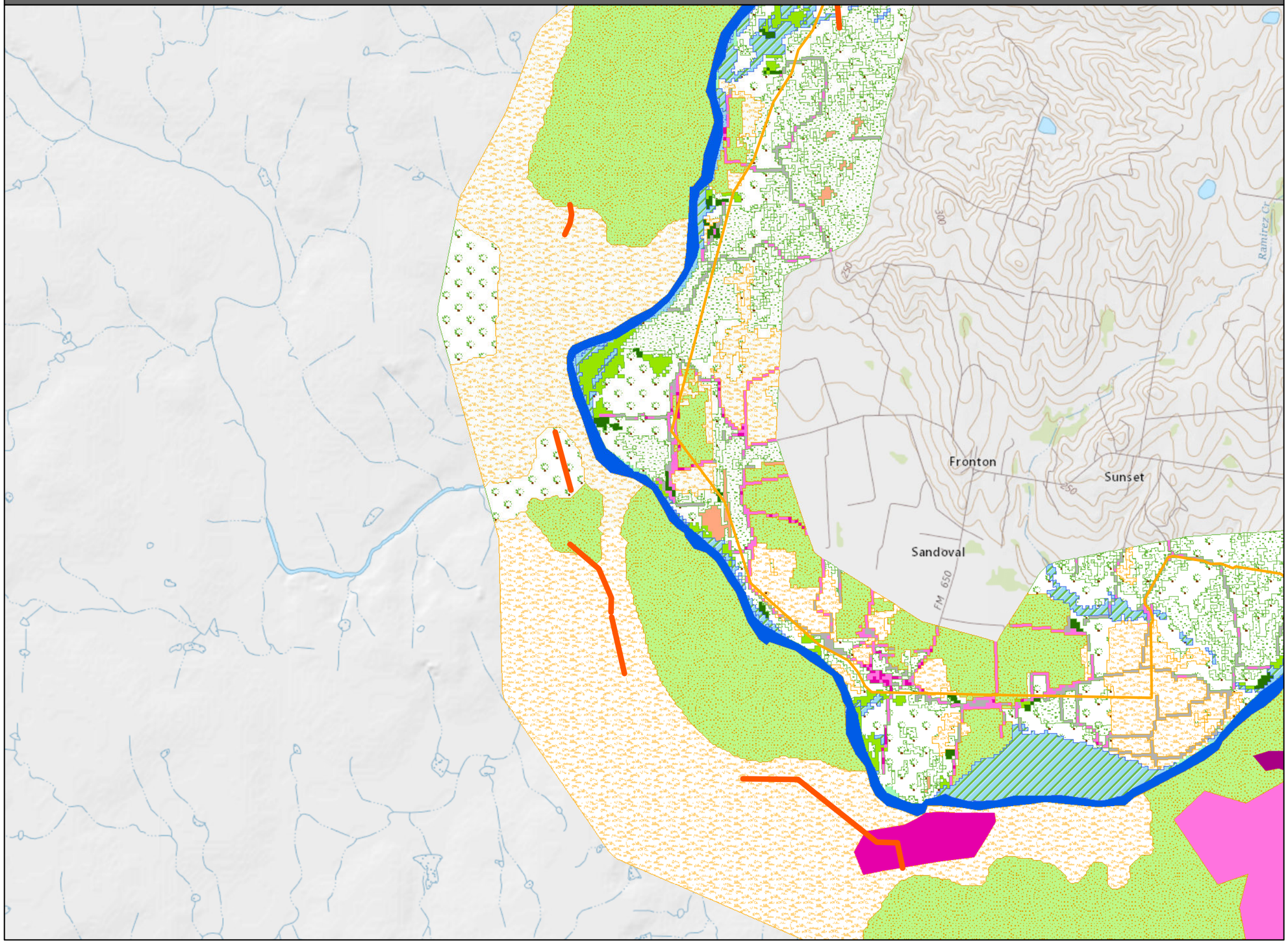
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Figure A5: Falcon Dam to Penitas Land Use Designations



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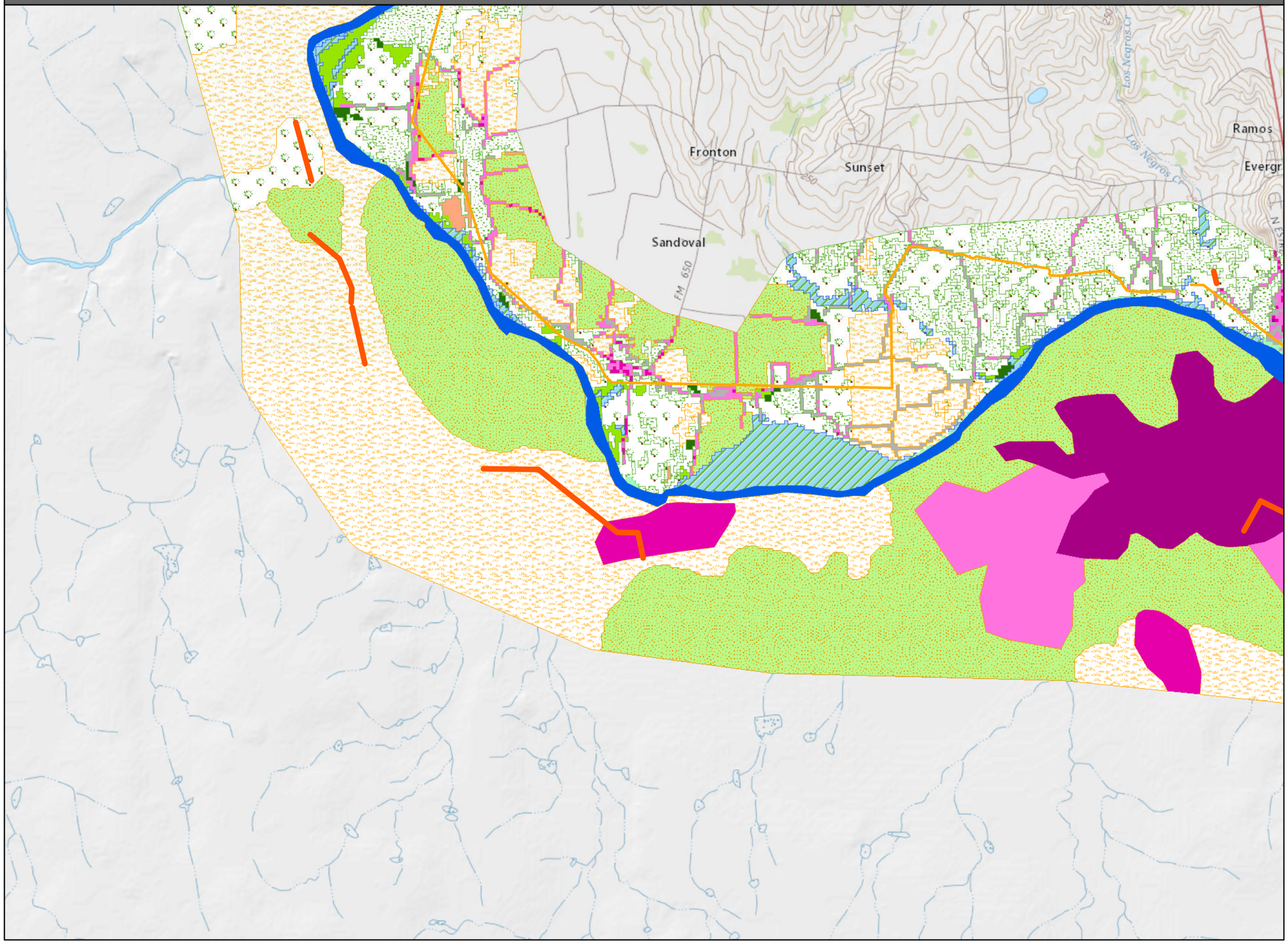


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Figure A5: Falcon Dam to Penitas Land Use Designations



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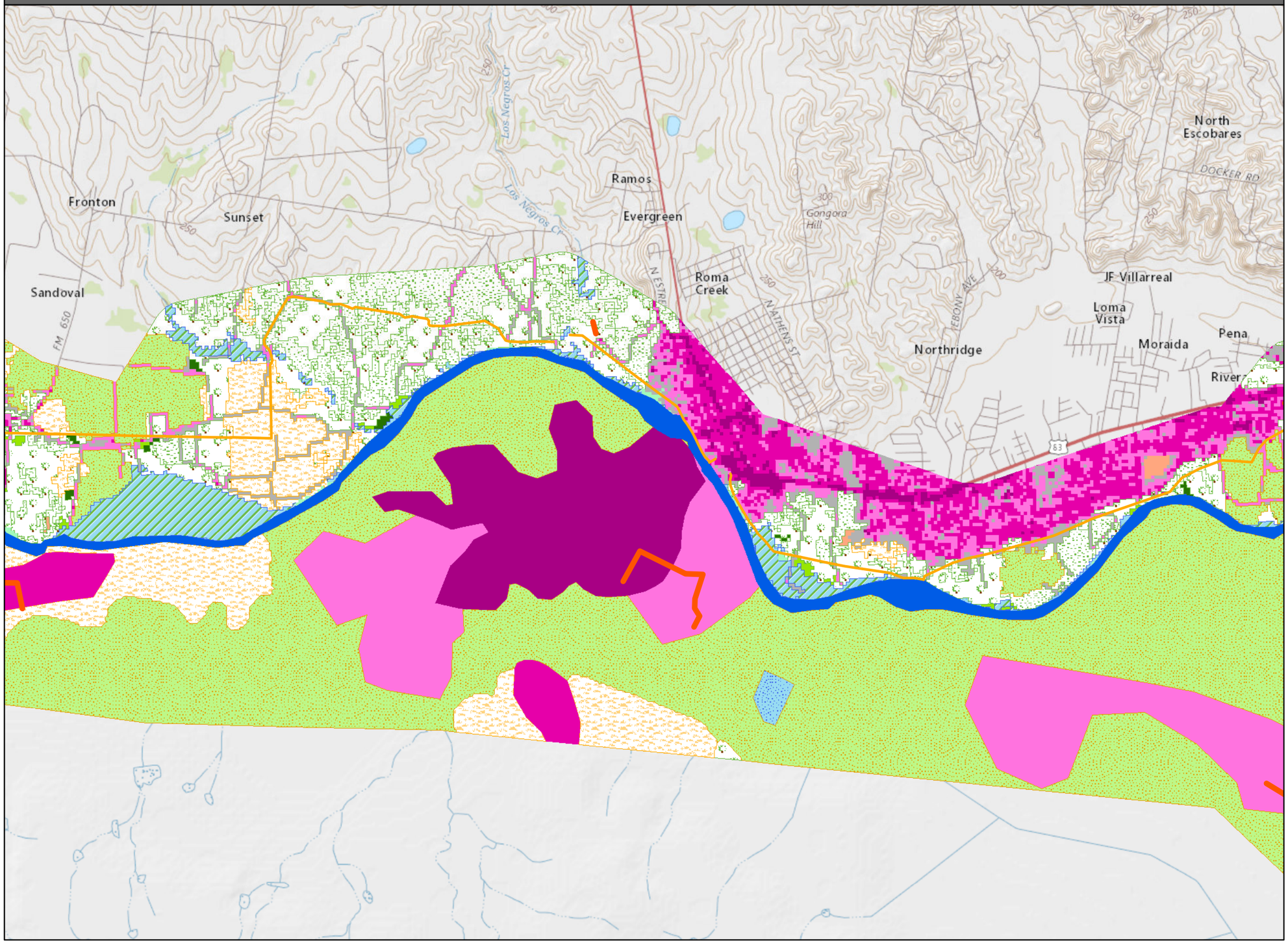
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Figure A5: Falcon Dam to Penitas Land Use Designations



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- Limits of Study
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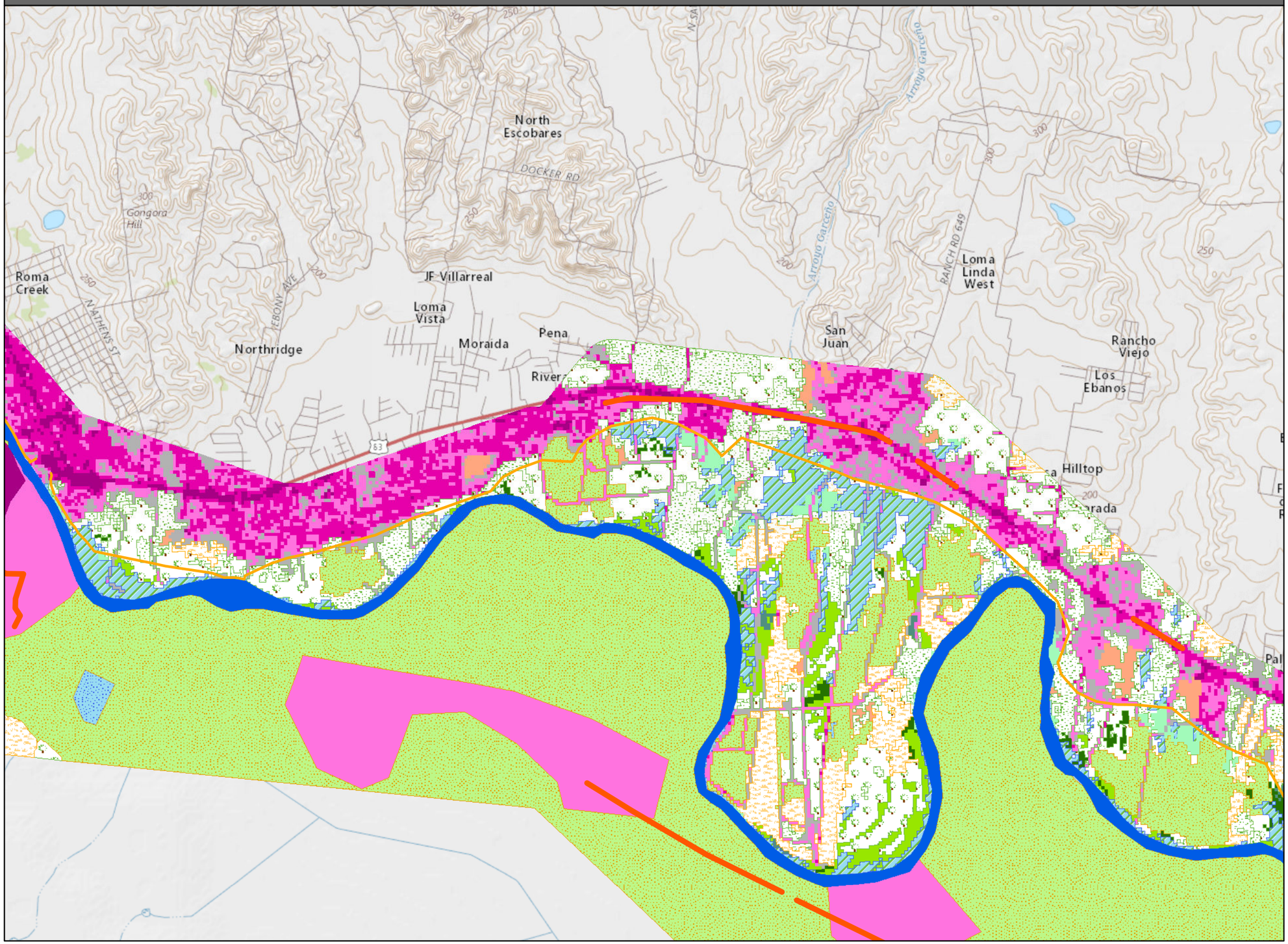
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Figure A5: Falcon Dam to Penitas Land Use Designations



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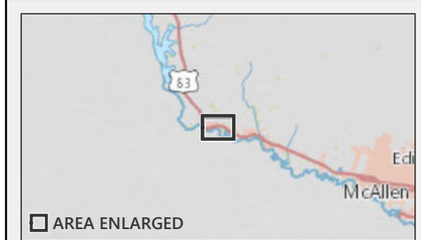
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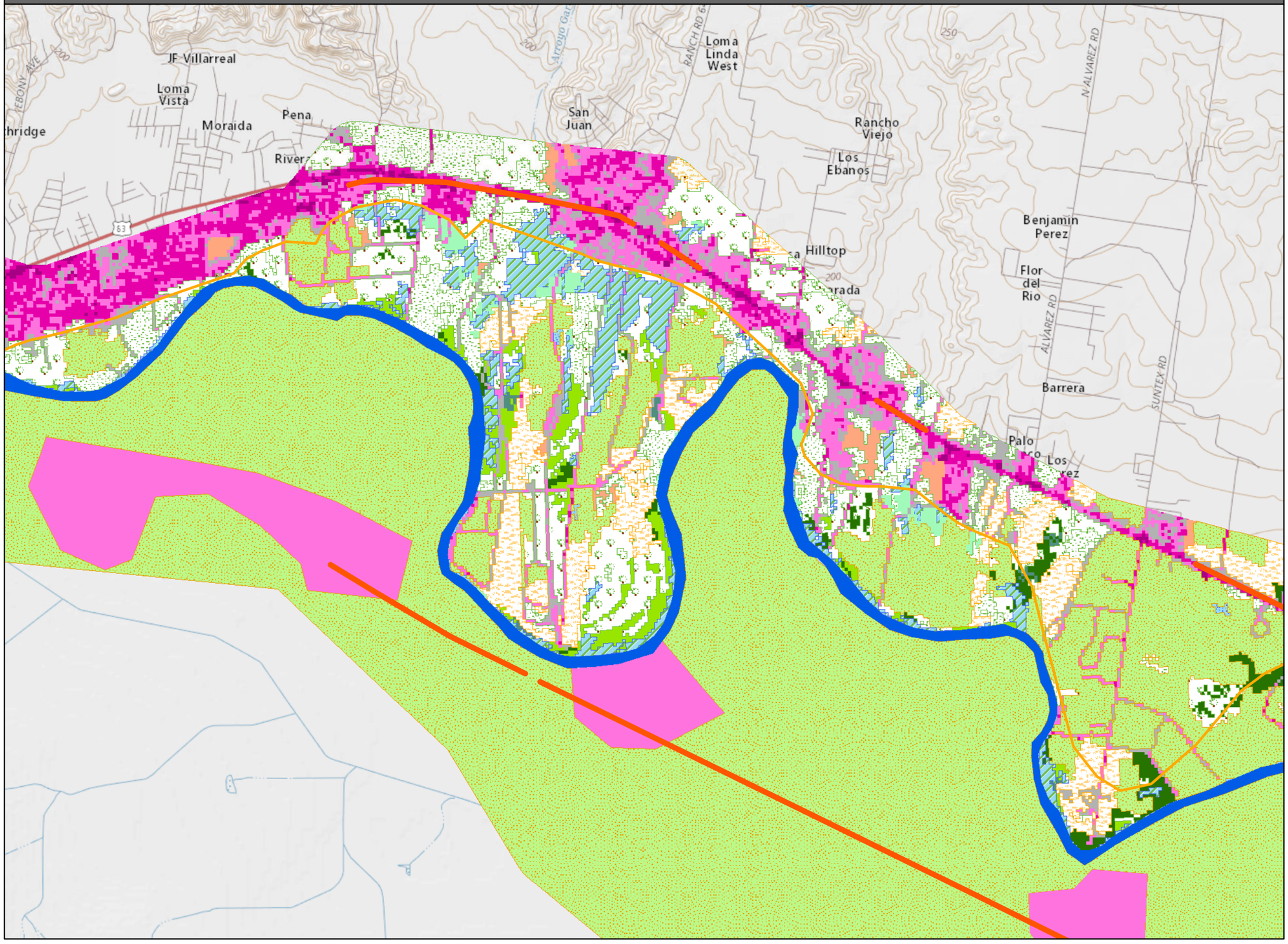
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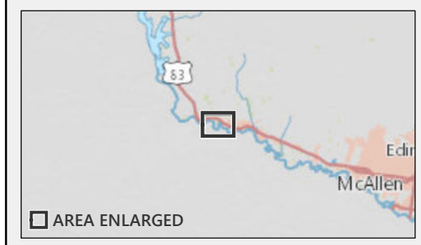
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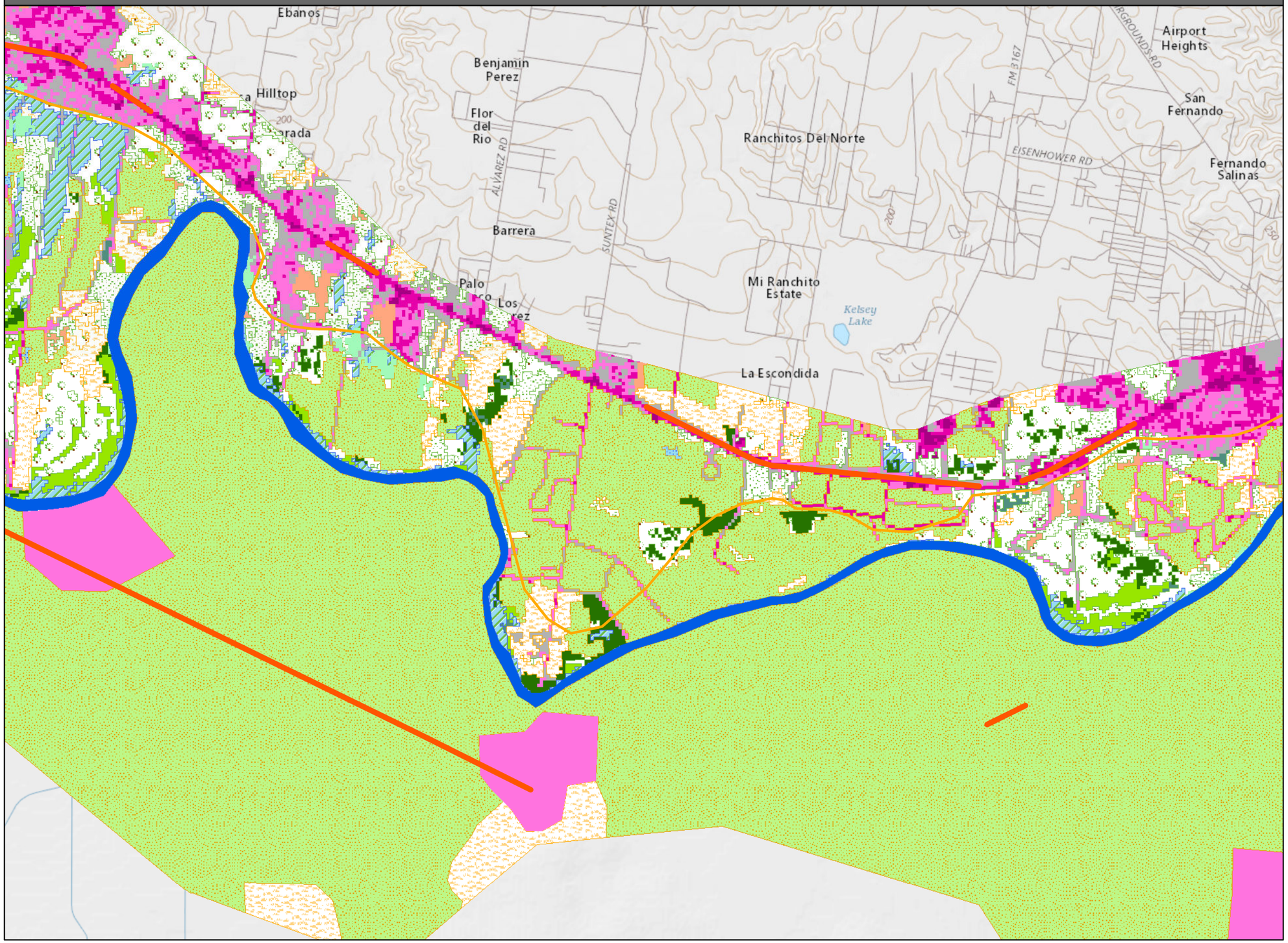
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Figure A5: Falcon Dam to Penitas Land Use Designations



LEGEND

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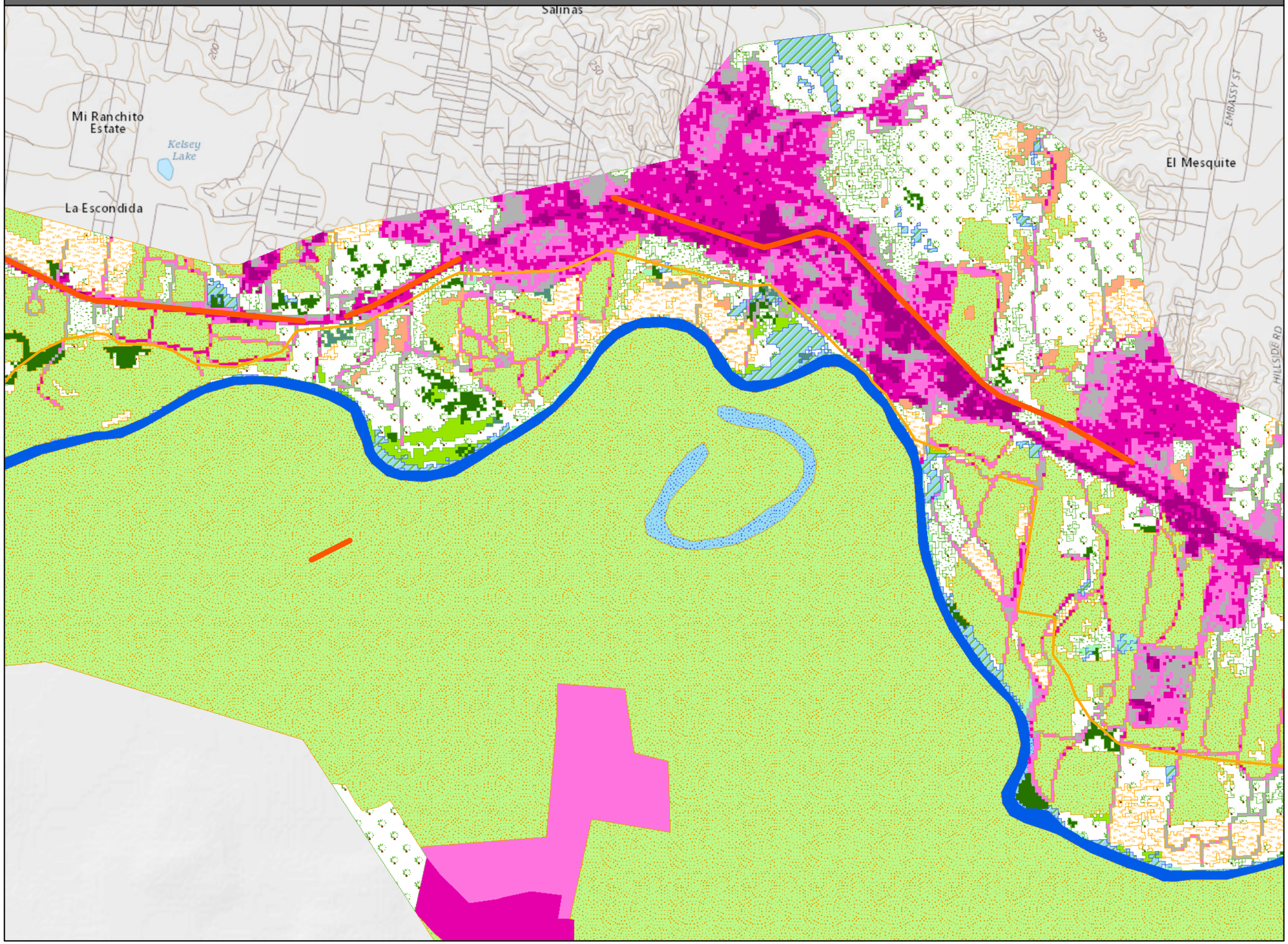
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Figure A5: Falcon Dam to Penitas Land Use Designations



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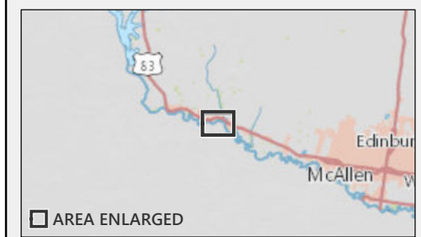
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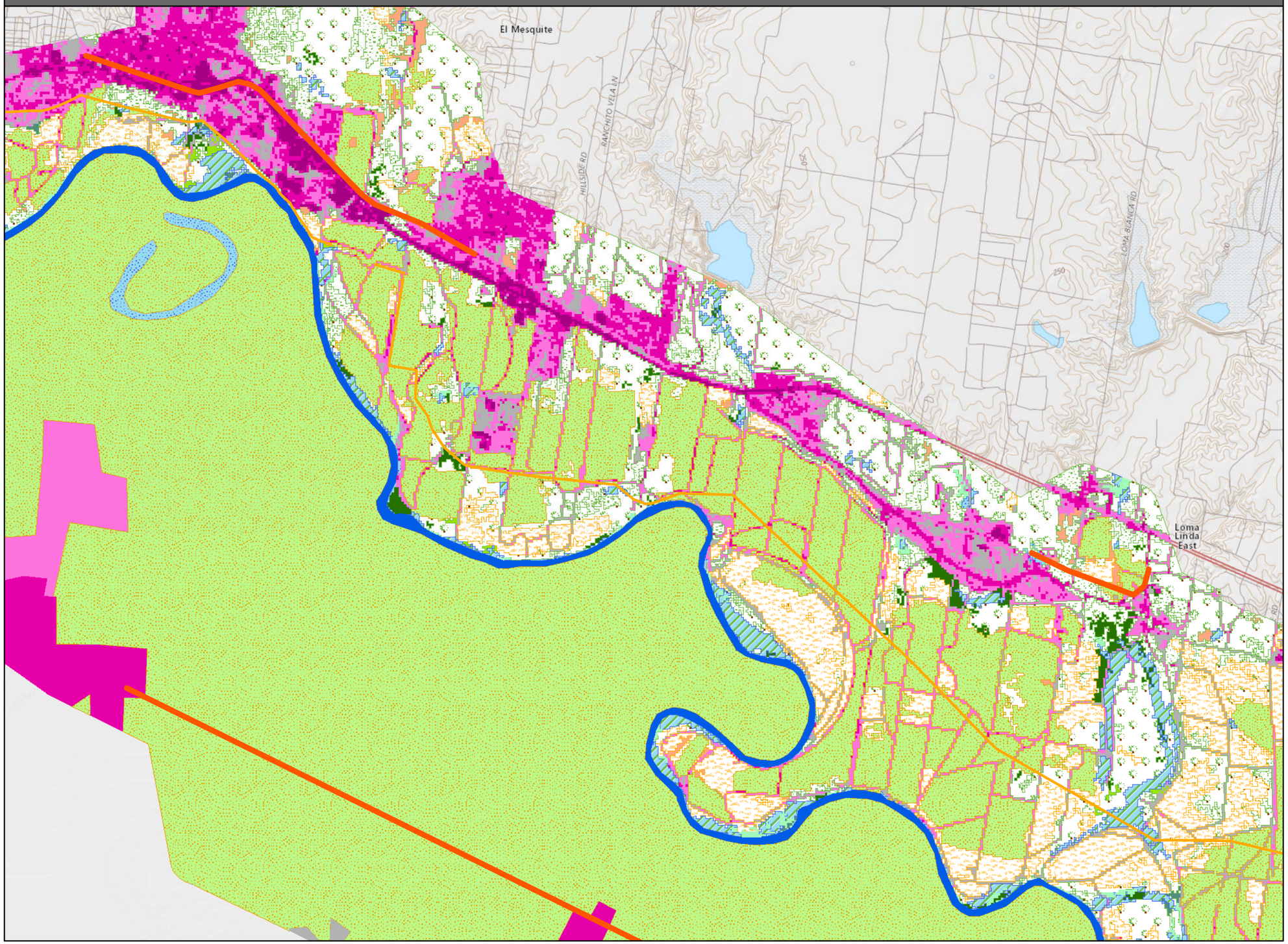
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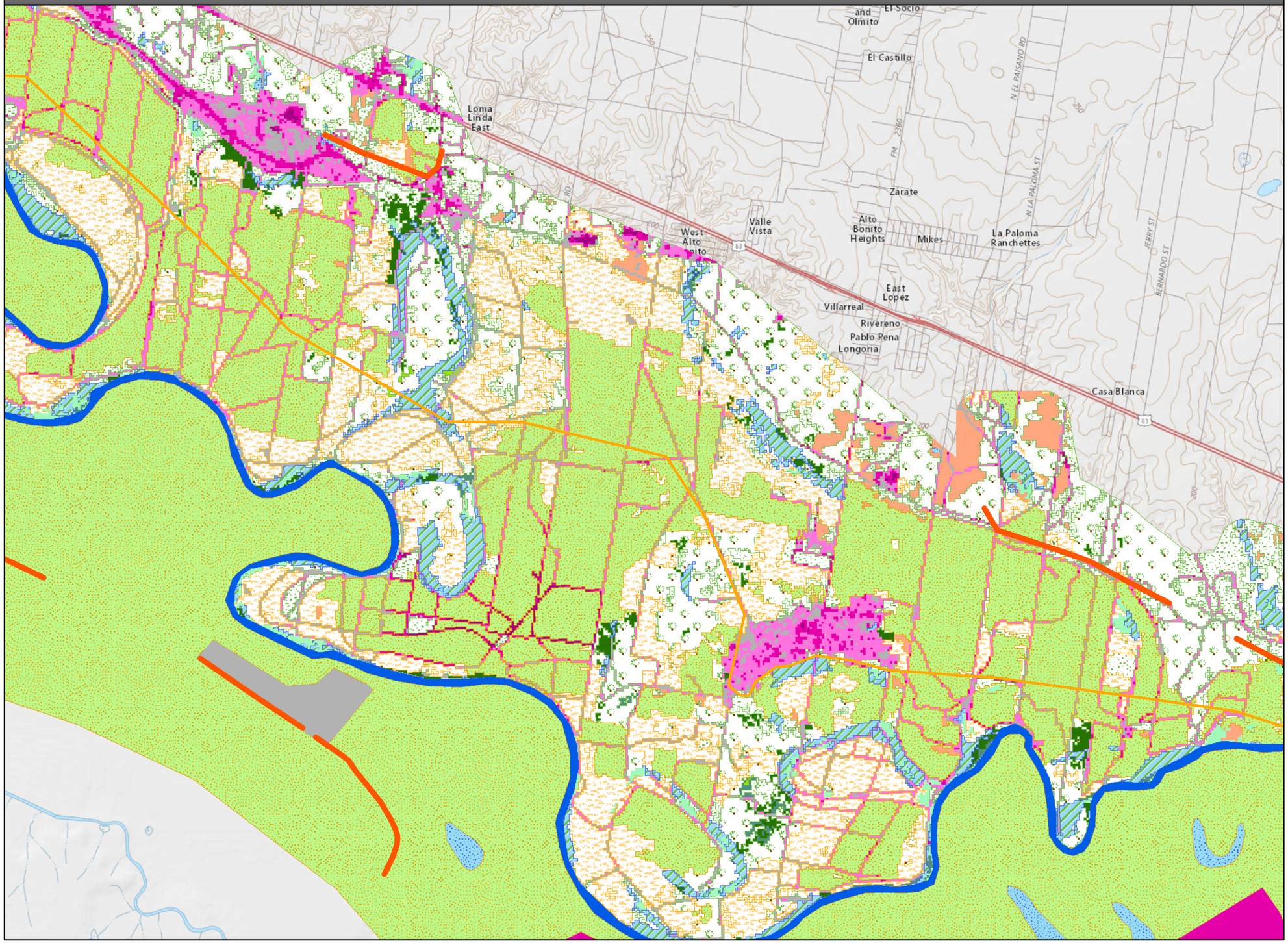
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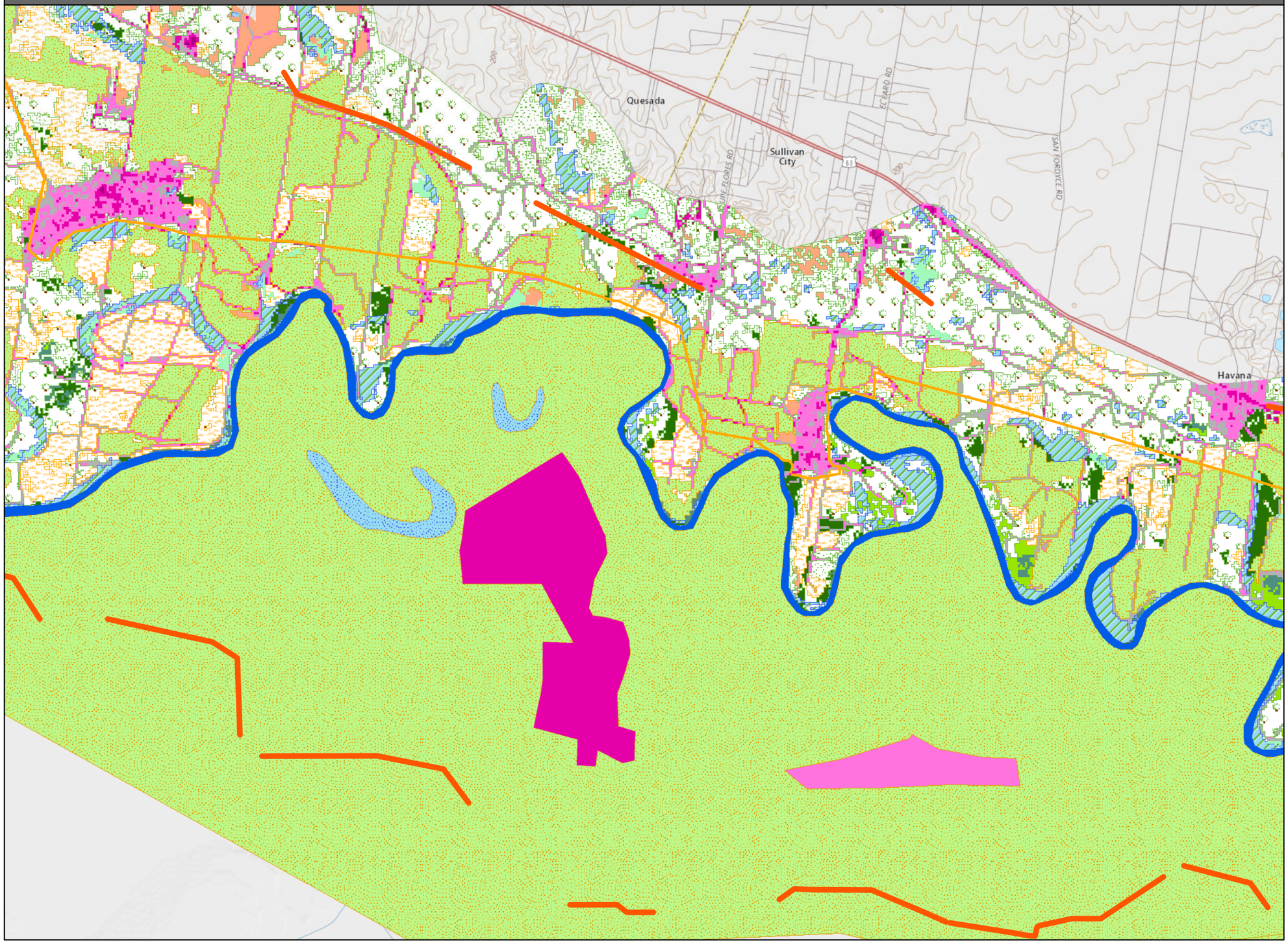
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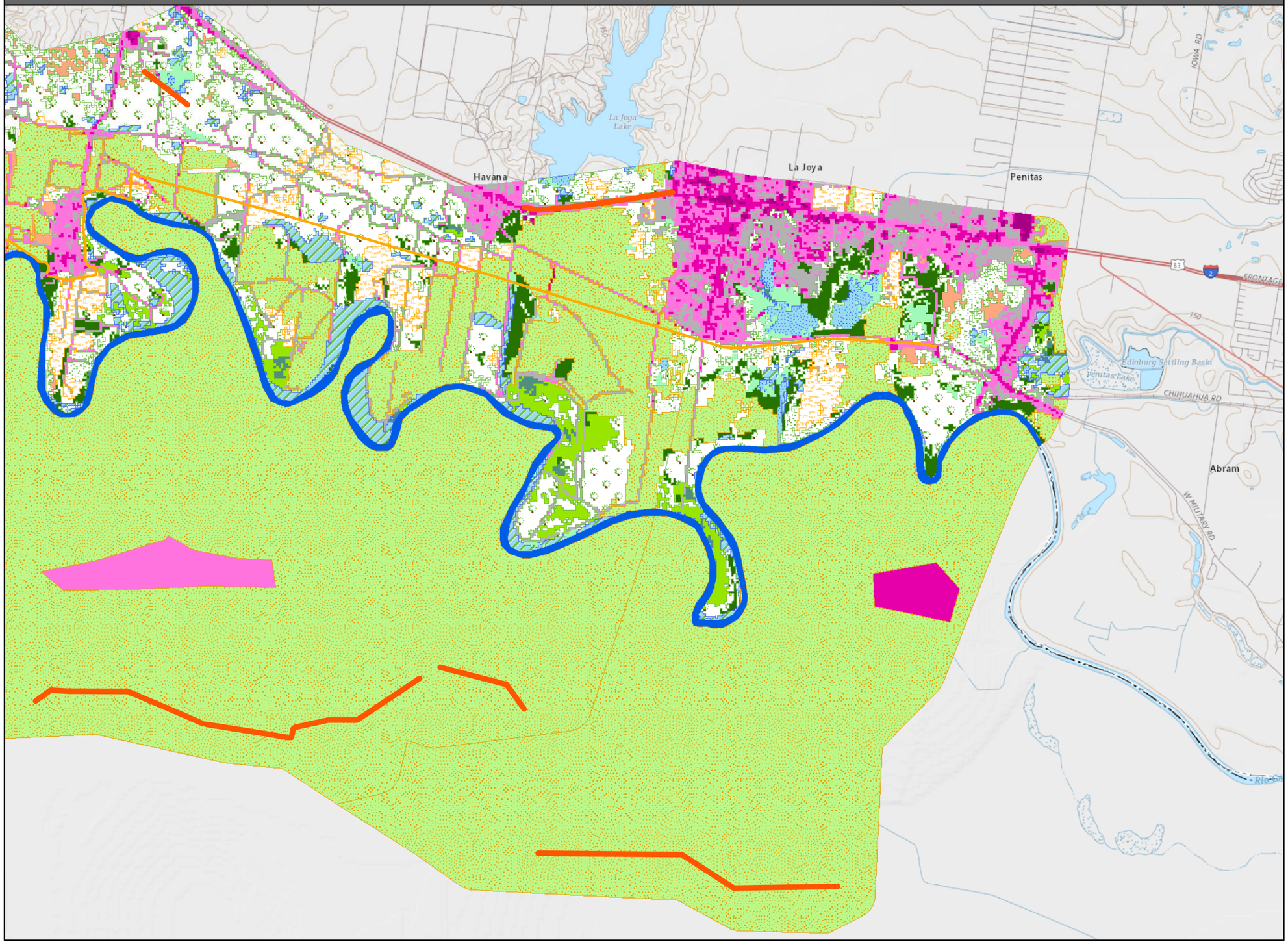
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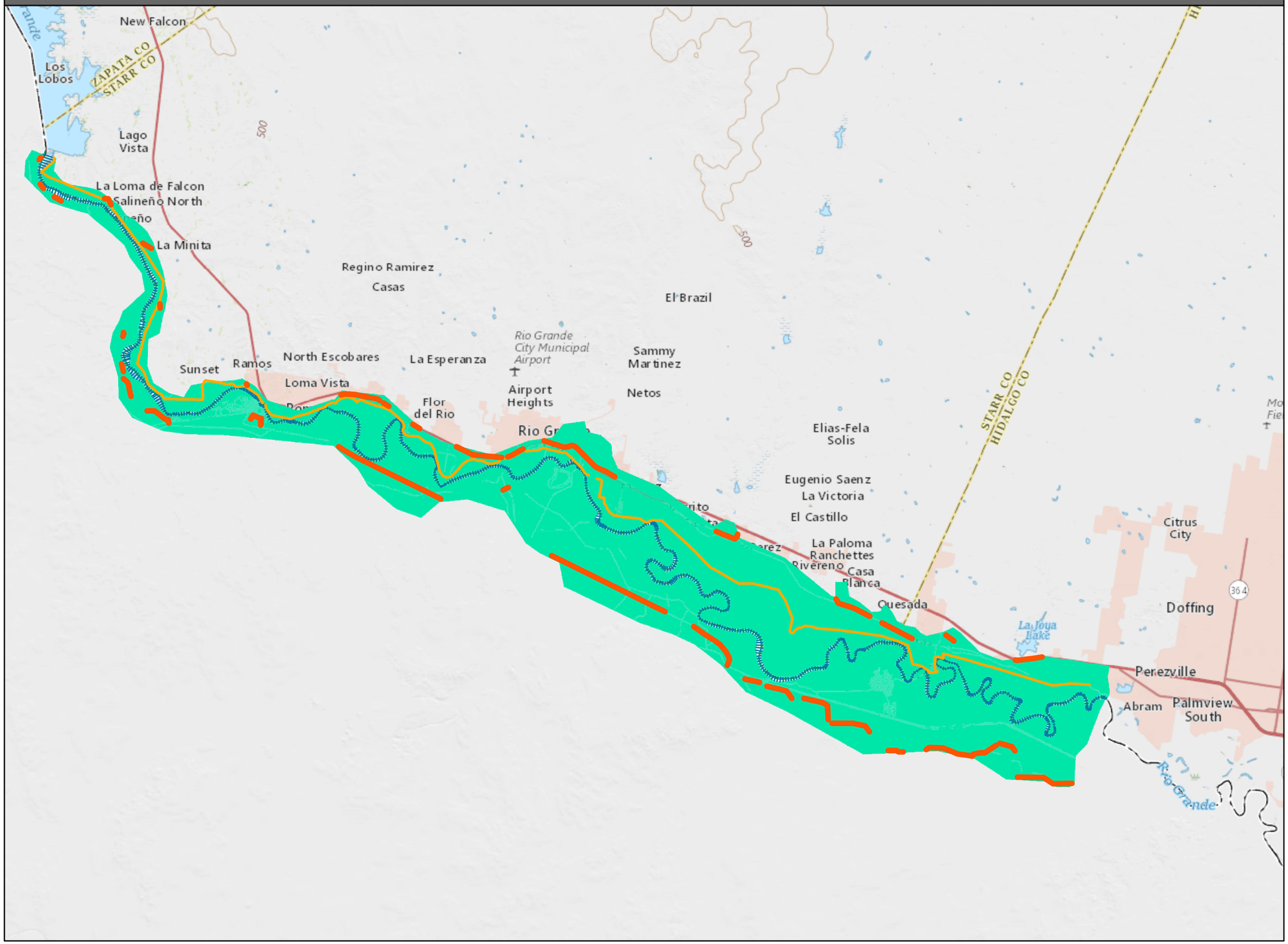
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Figure A6: Falcon Dam to Penitas 2-D Model Mesh and 1-D Cross-sections

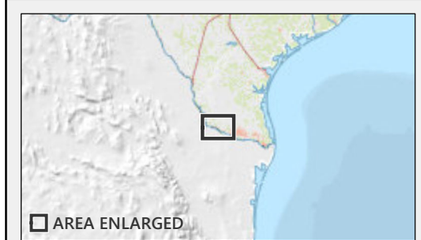


LEGEND

- 1-D Corss-sections
- 1-D River
- Limits of Study
- RGV-63 miles
- 2-D Mesh Extents

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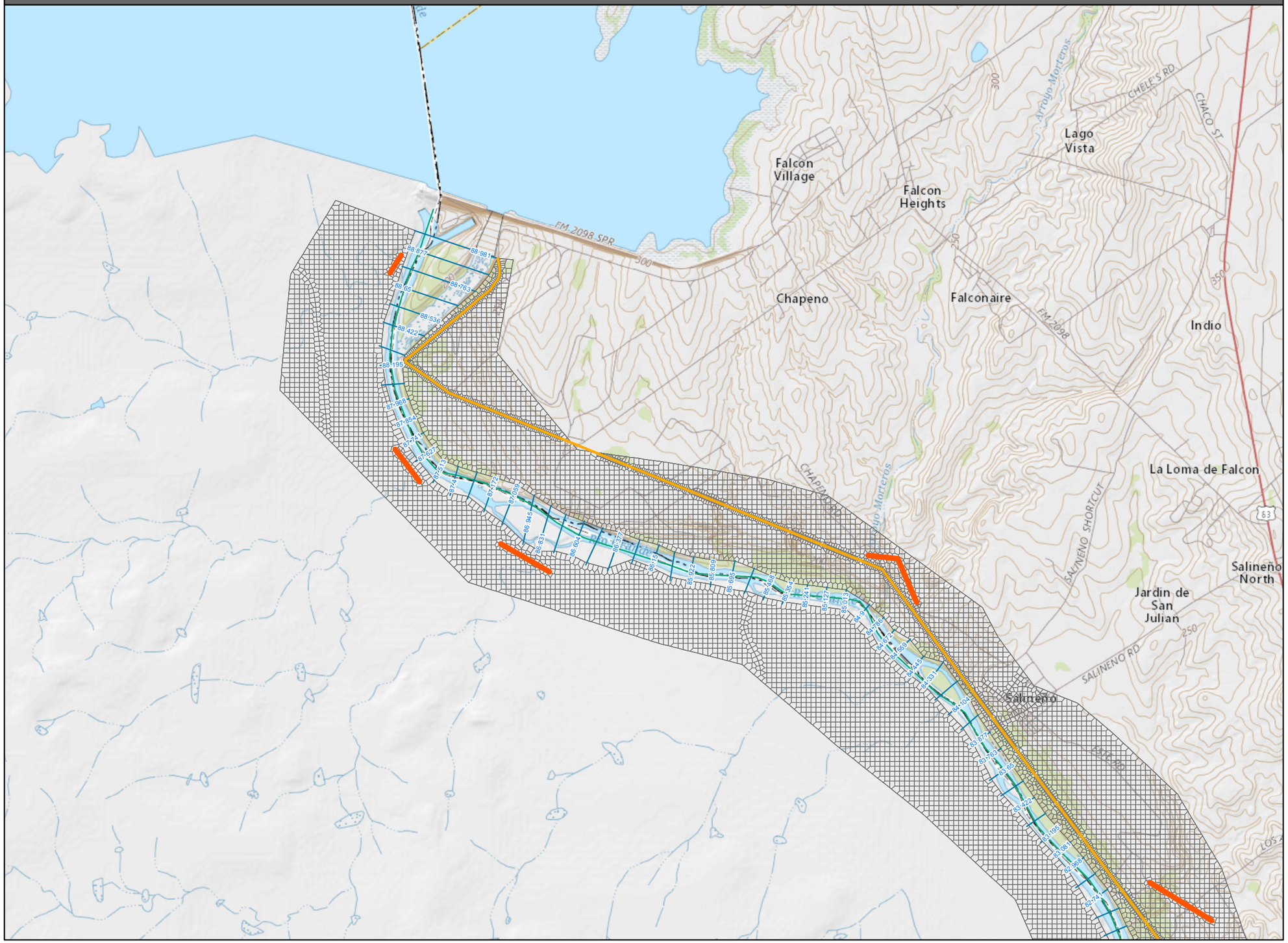
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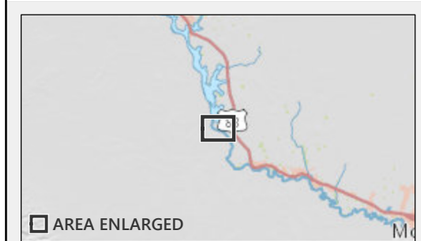


LEGEND

- 1-D Corss-sections
- 1-D River
- Limits of Study
- RGV-63 miles
- 2-D Mesh

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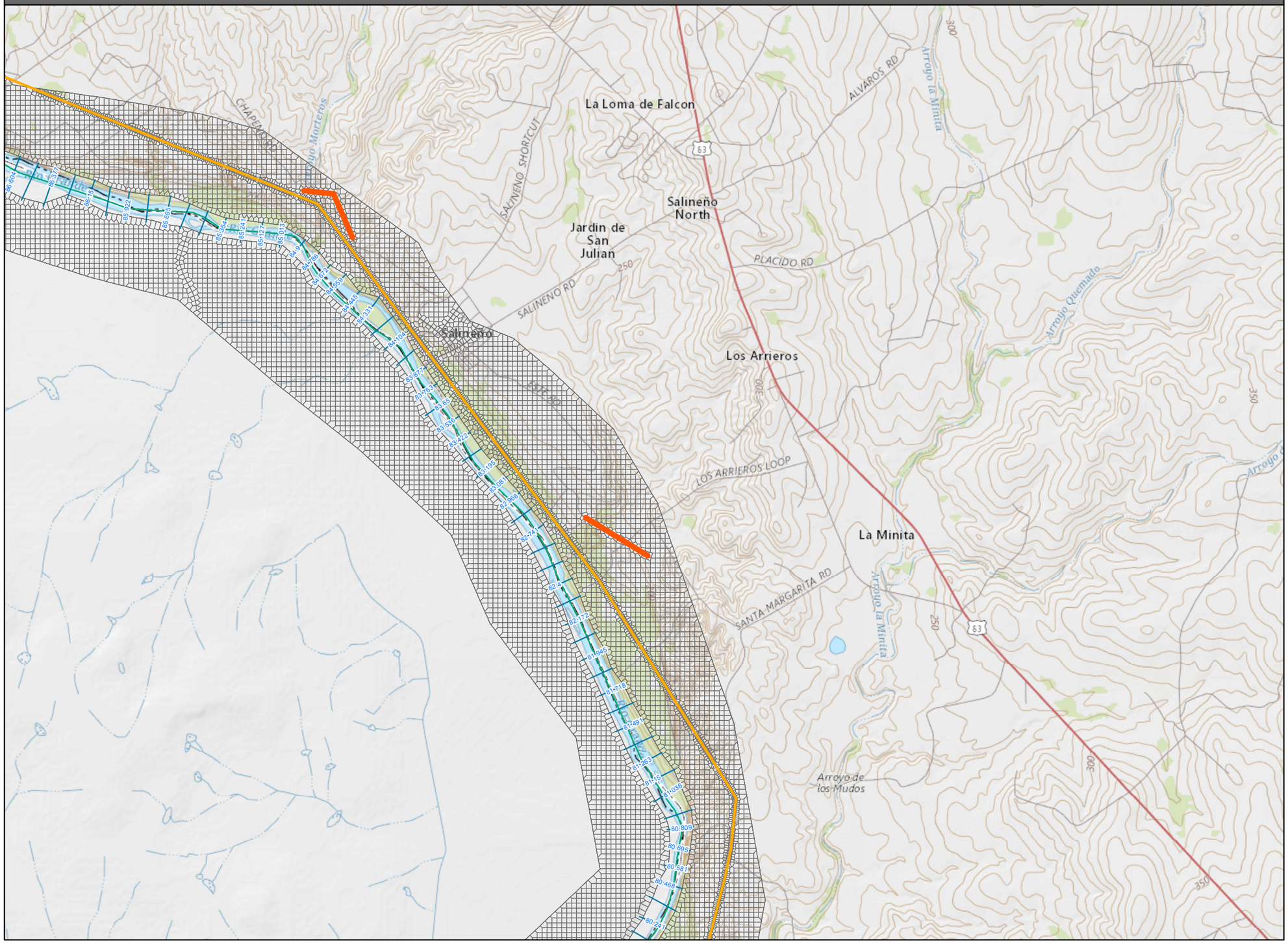
1 in = 3,000 feet 1:36,000



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Figure A6: Falcon Dam to Penitas 2-D Model Mesh and 1-D Cross-sections

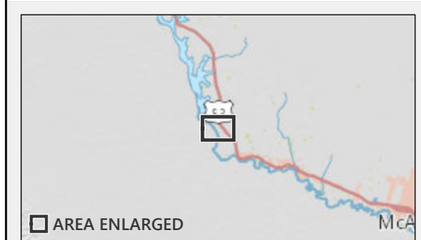


LEGEND

- 1-D Corss-sections
- 1-D River
- Limits of Study
- RGV-63 miles
- 2-D Mesh

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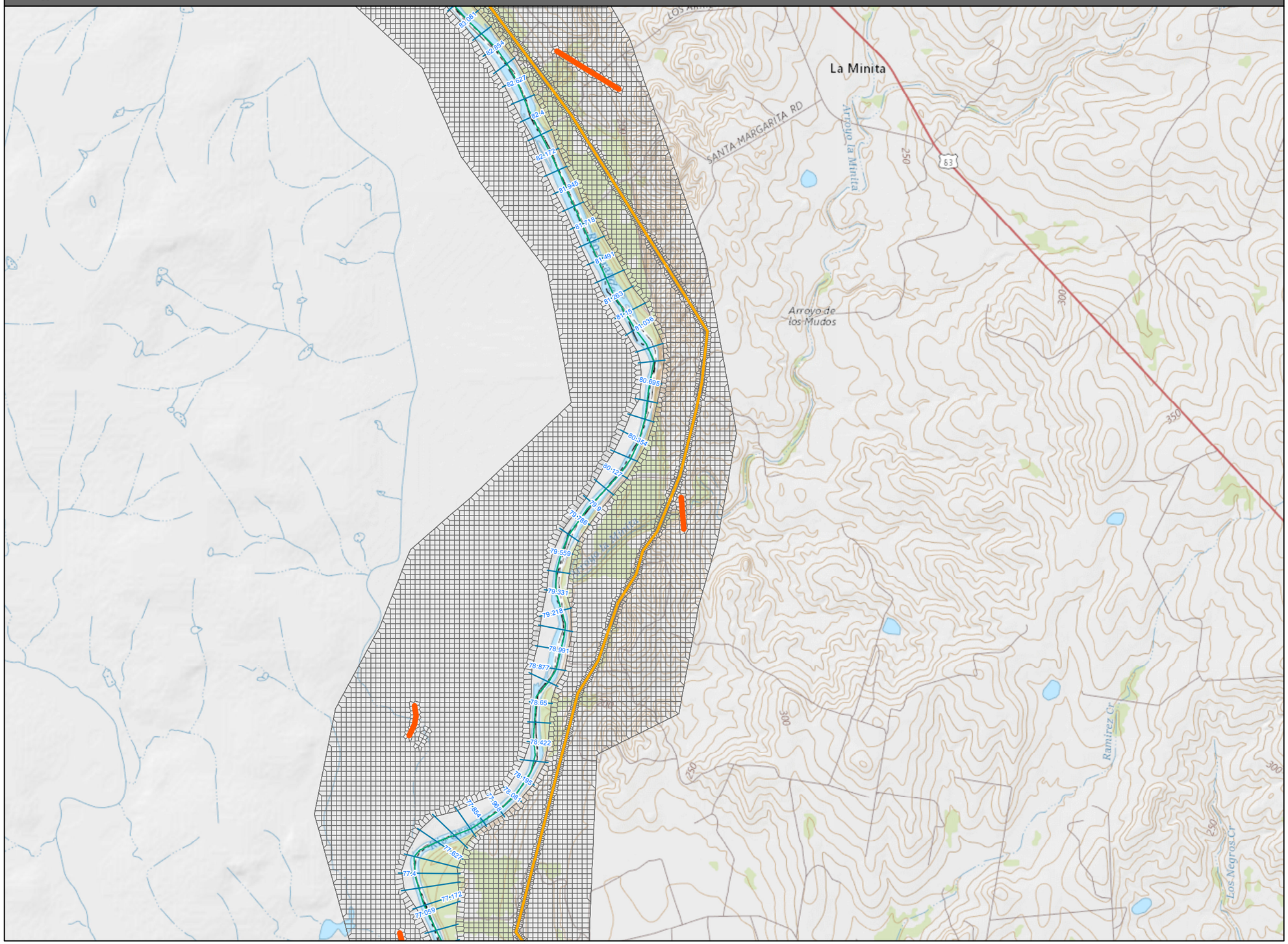
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Figure A6: Falcon Dam to Penitas 2-D Model Mesh and 1-D Cross-sections



LEGEND

- 1-D Corss-sections
- 1-D River
- Limits of Study
- RGV-63 miles
- 2-D Mesh

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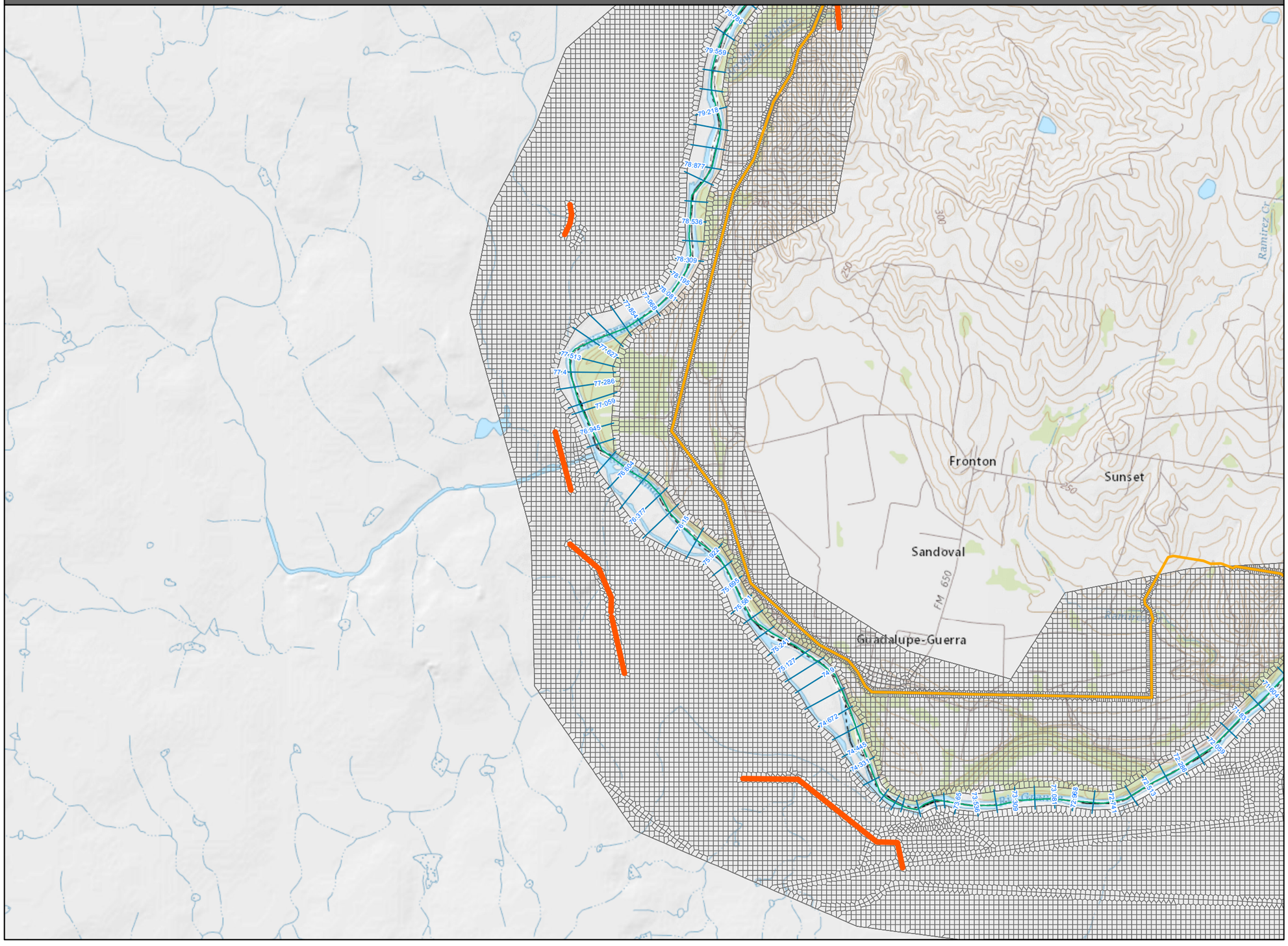
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Figure A6: Falcon Dam to Penitas 2-D Model Mesh and 1-D Cross-sections



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- 1-D Corss-sections
- 1-D River
- Limits of Study
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- 2-D Mesh

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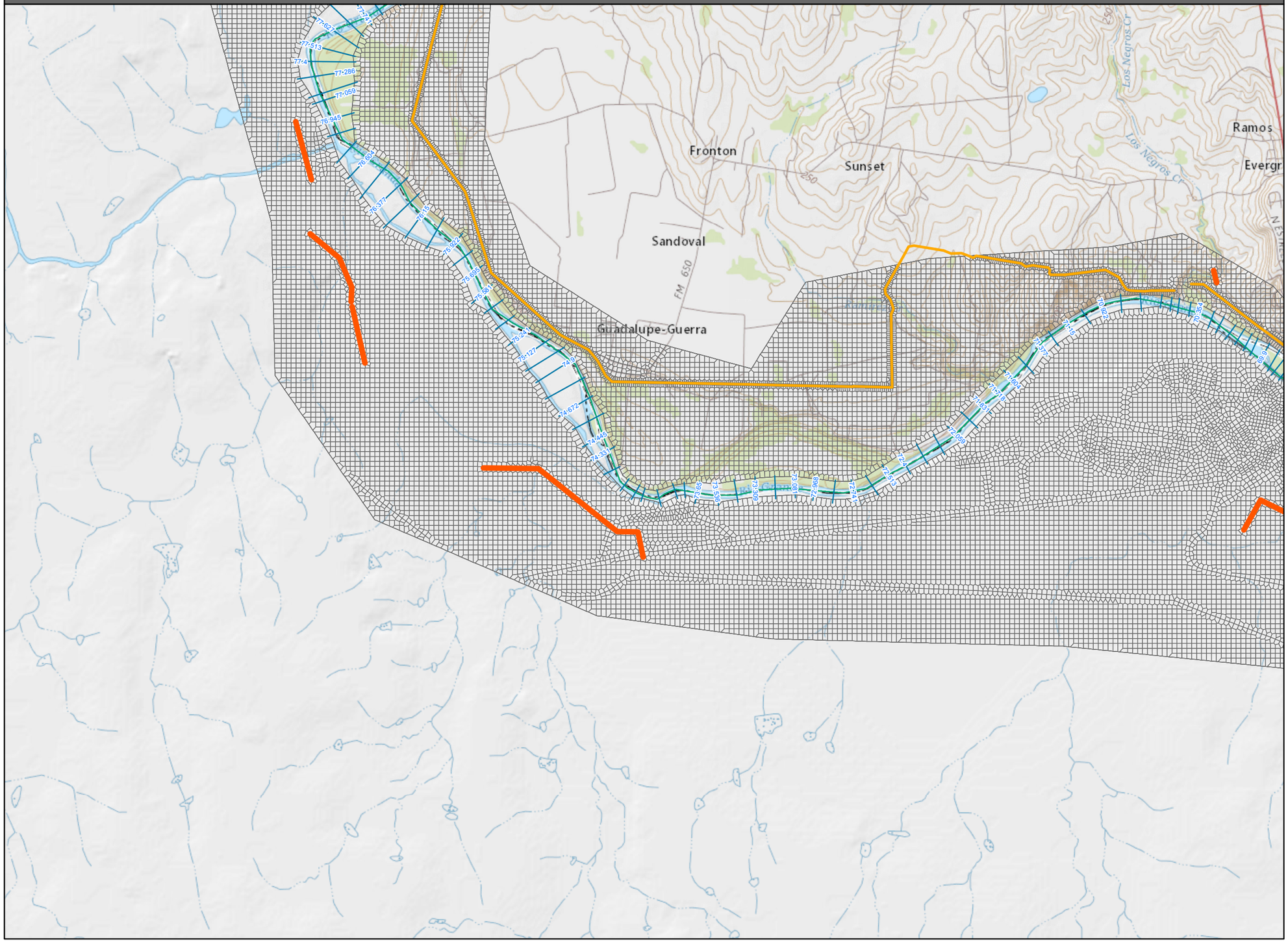
1 in = 3,000 feet 1:36,000

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LEGEND

- 1-D Corss-sections
- 1-D River
- Limits of Study
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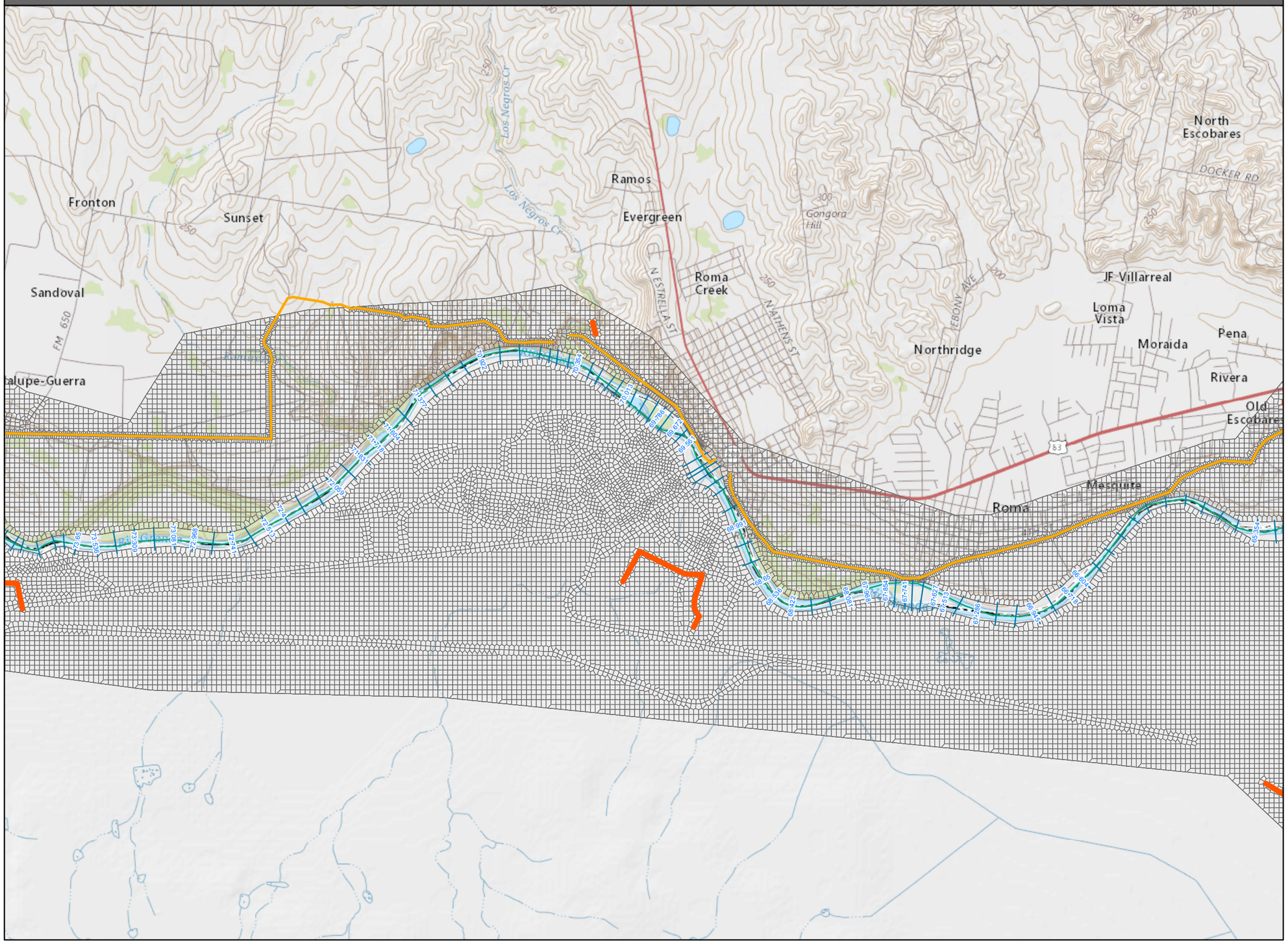
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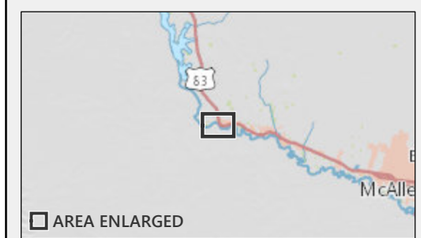


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- 1-D Corss-sections
- 1-D River
- Limits of Study
- RGV-63 miles
- 2-D Mesh

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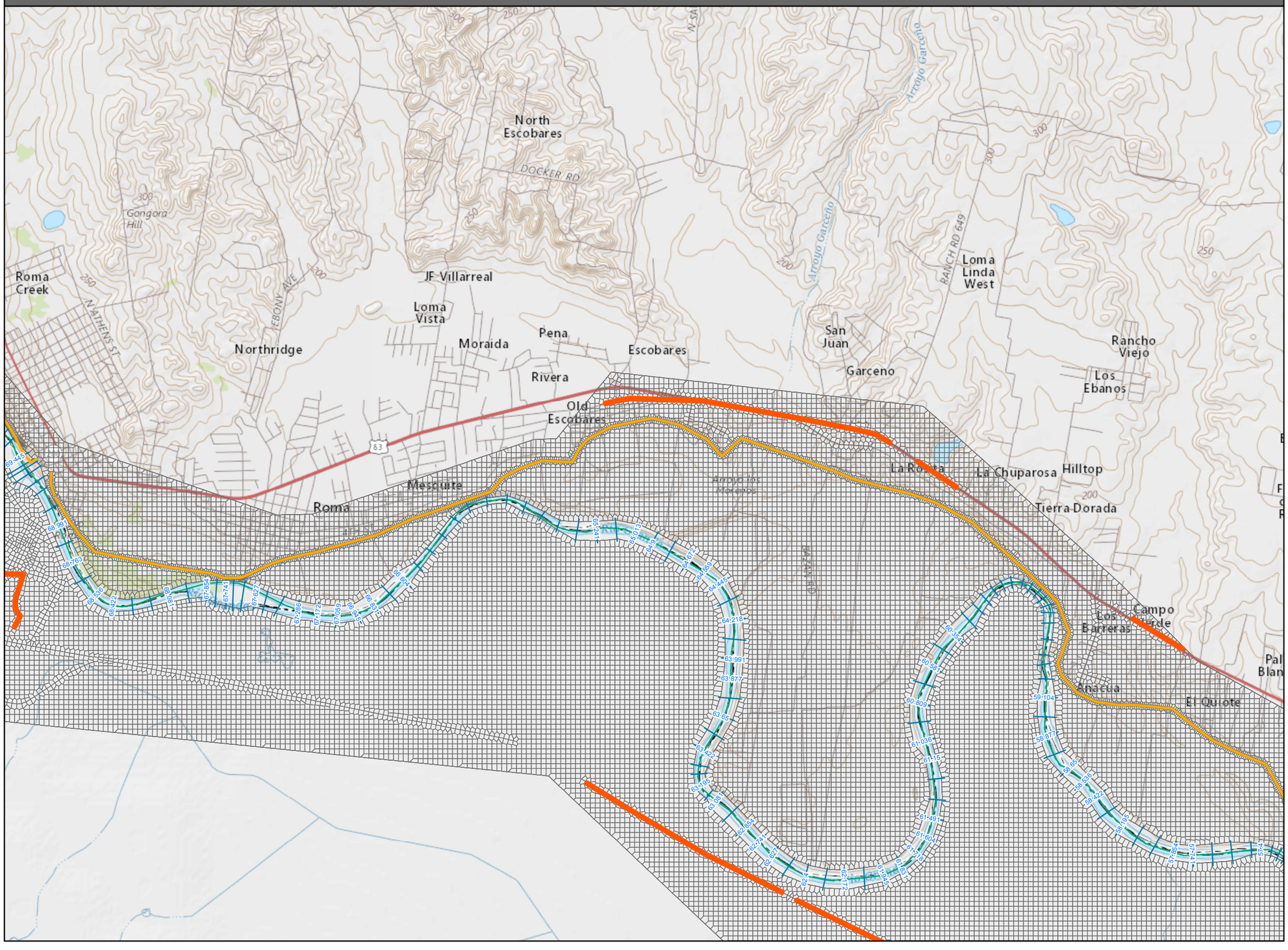
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Figure A6: Falcon Dam to Penitas 2-D Model Mesh and 1-D Cross-sections



LEGEND

- 1-D Corss-sections
- 1-D River
- Limits of Study
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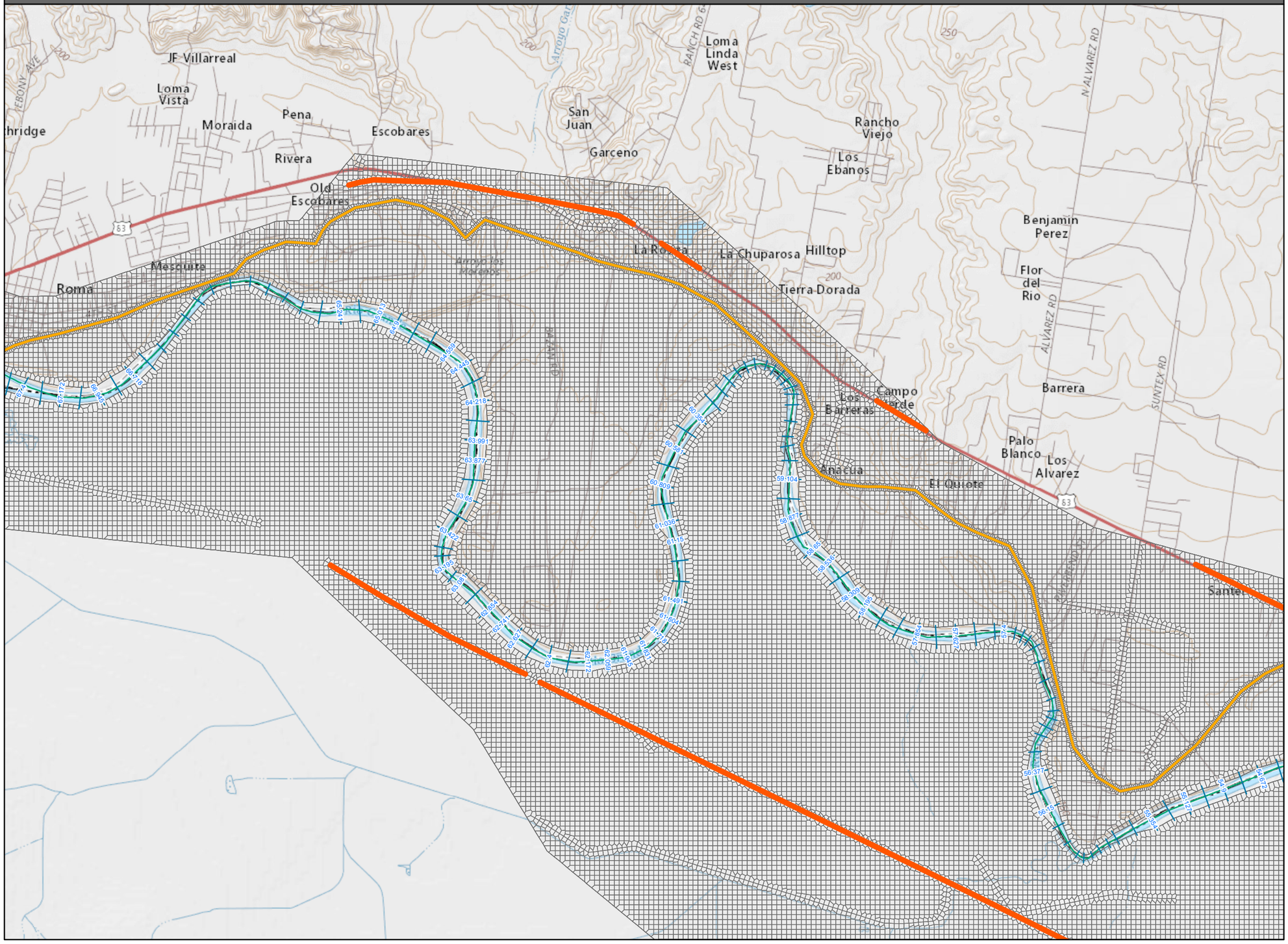
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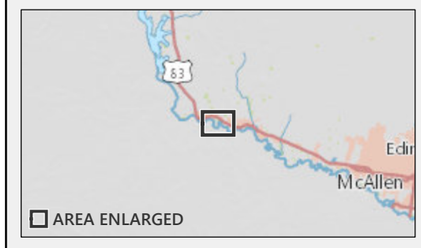


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- 1-D Corss-sections
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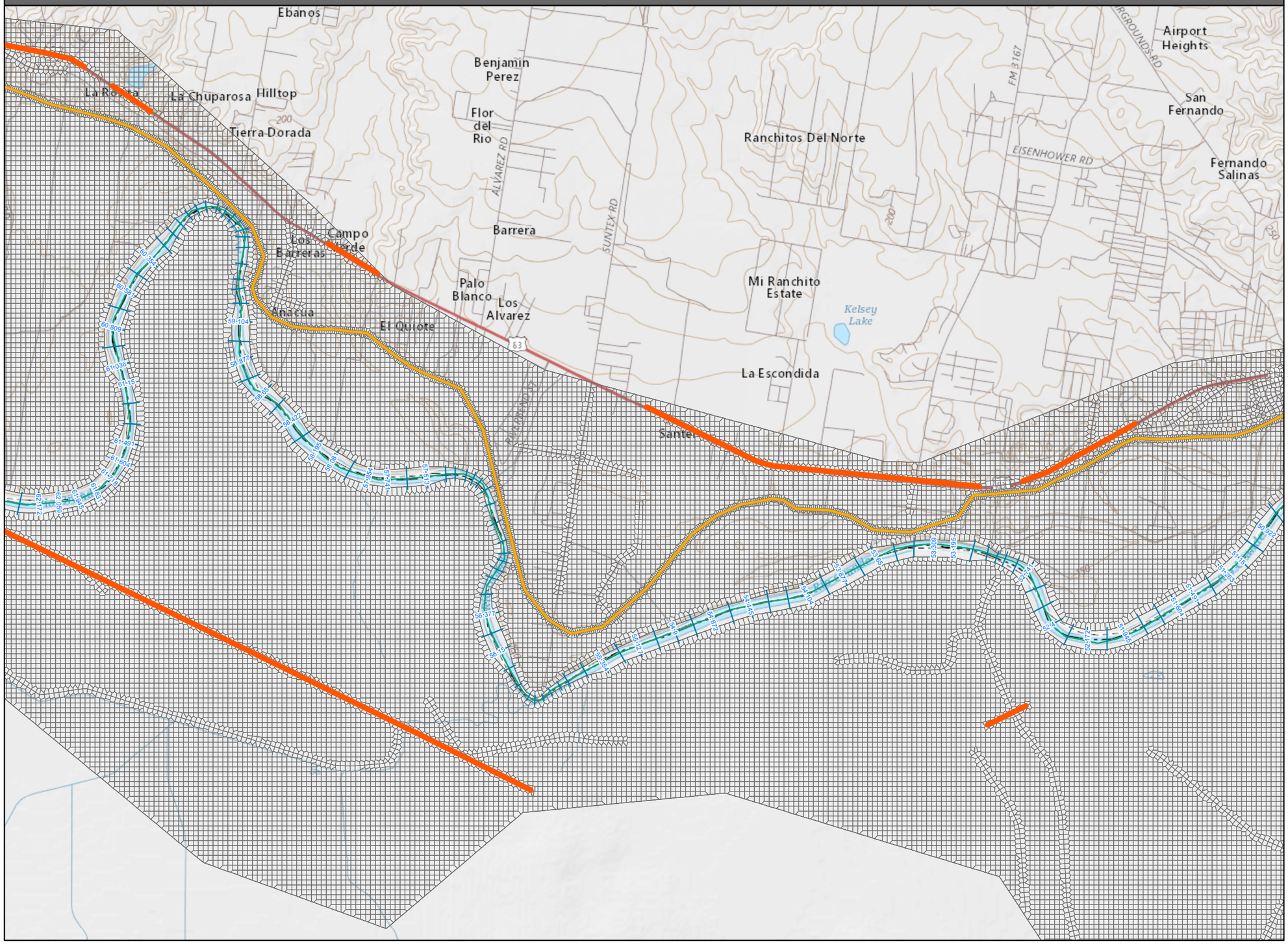
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Figure A6: Falcon Dam to Penitas 2-D Model Mesh and 1-D Cross-sections



LEGEND

- 1-D Corss-sections
- 1-D River
- Limits of Study
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- 2-D Mesh

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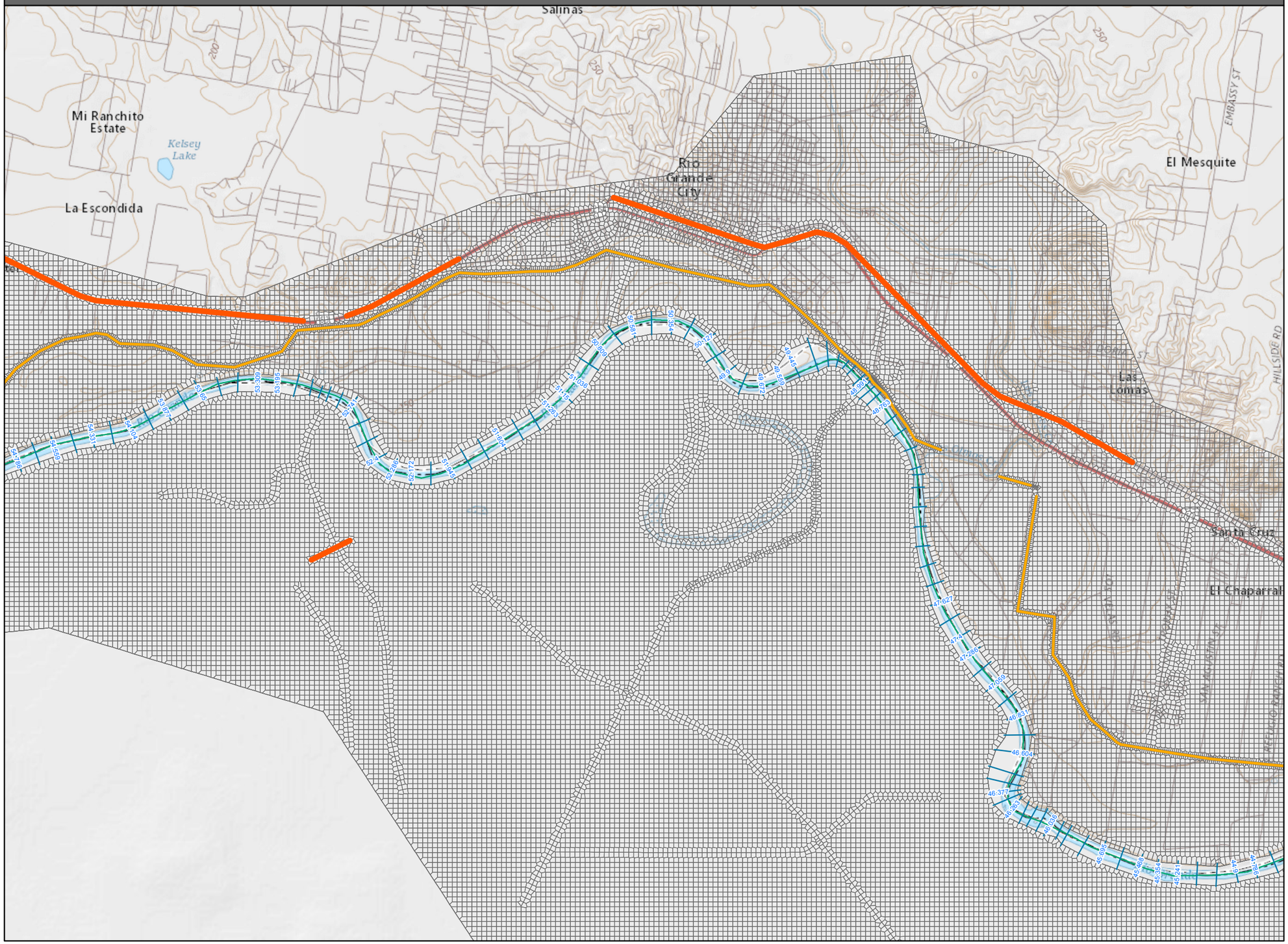
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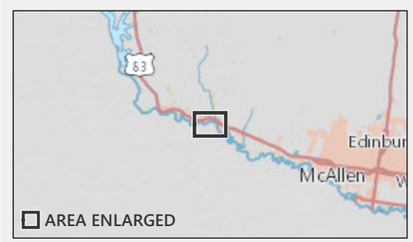


LEGEND

- 1-D Corss-sections
- 1-D River
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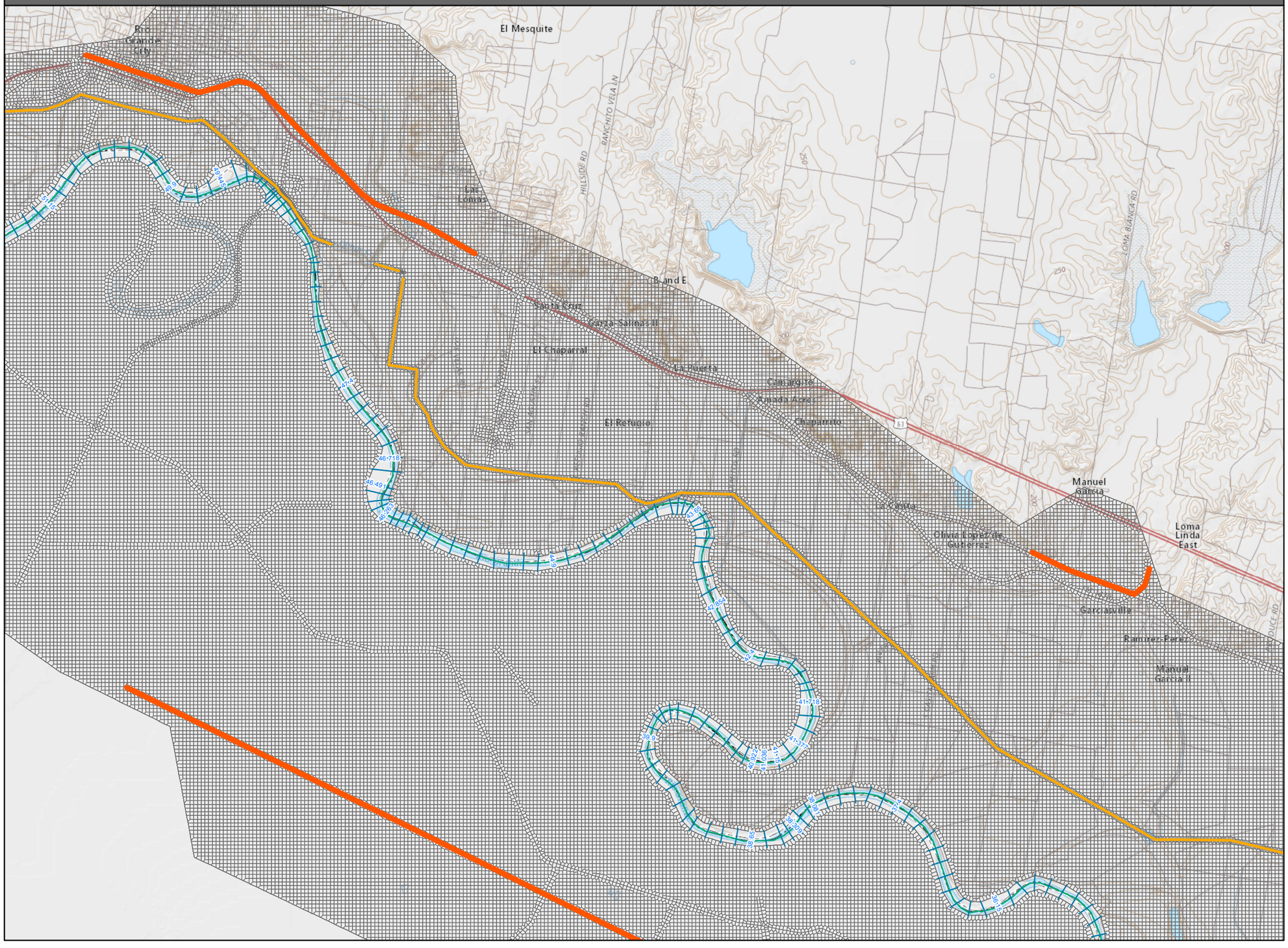
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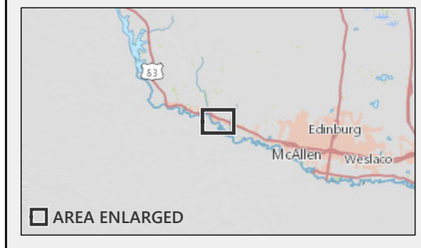


LEGEND

- 1-D Corss-sections
- 1-D River
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- 2-D Mesh

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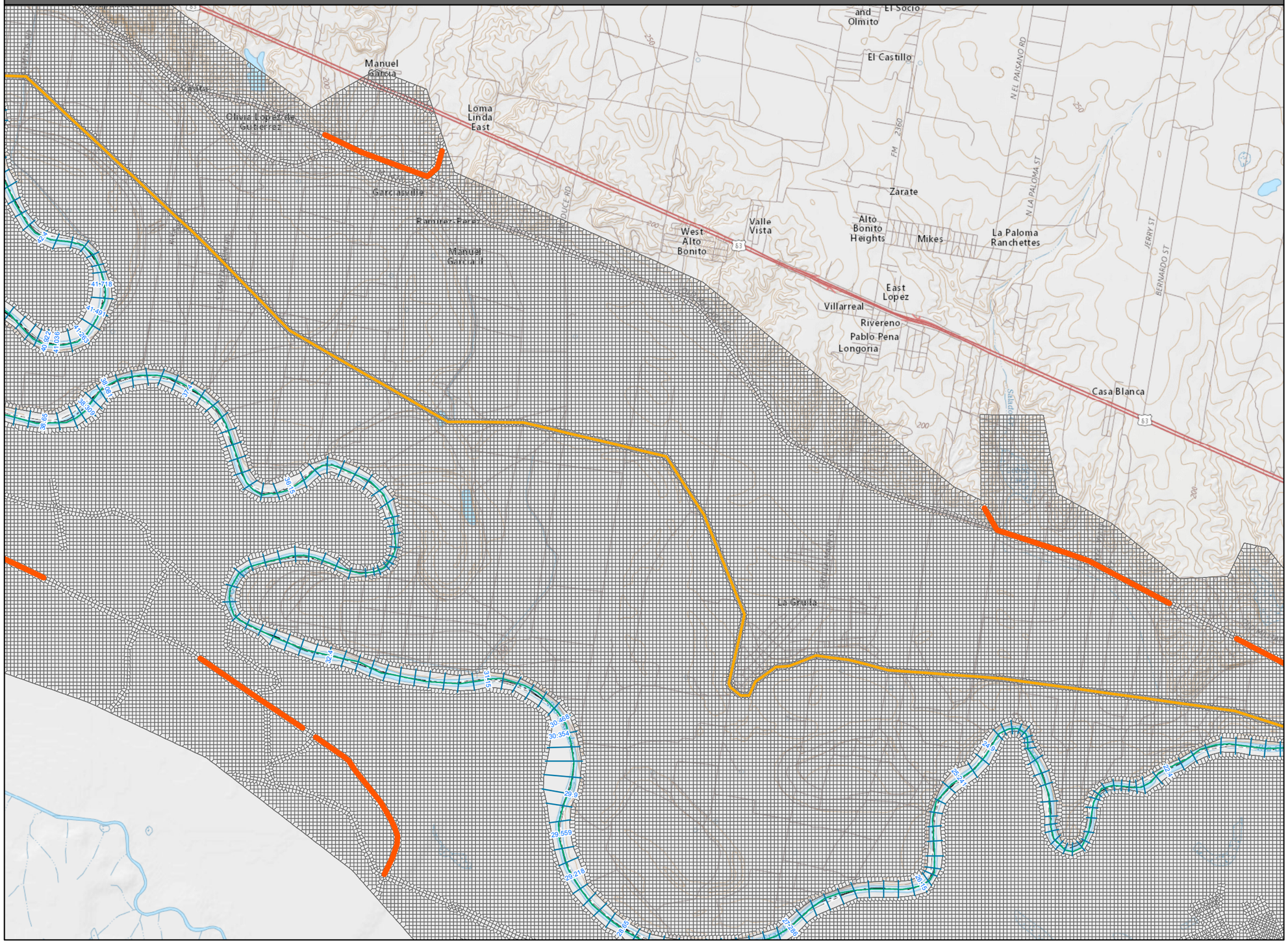
1 in = 4,000 feet — 1:48,000



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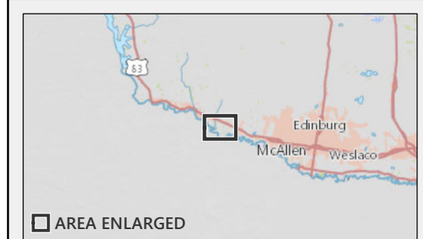


LEGEND

- 1-D Corss-sections
- 1-D River
- Limits of Study
- RGV-63 miles
- 2-D Mesh

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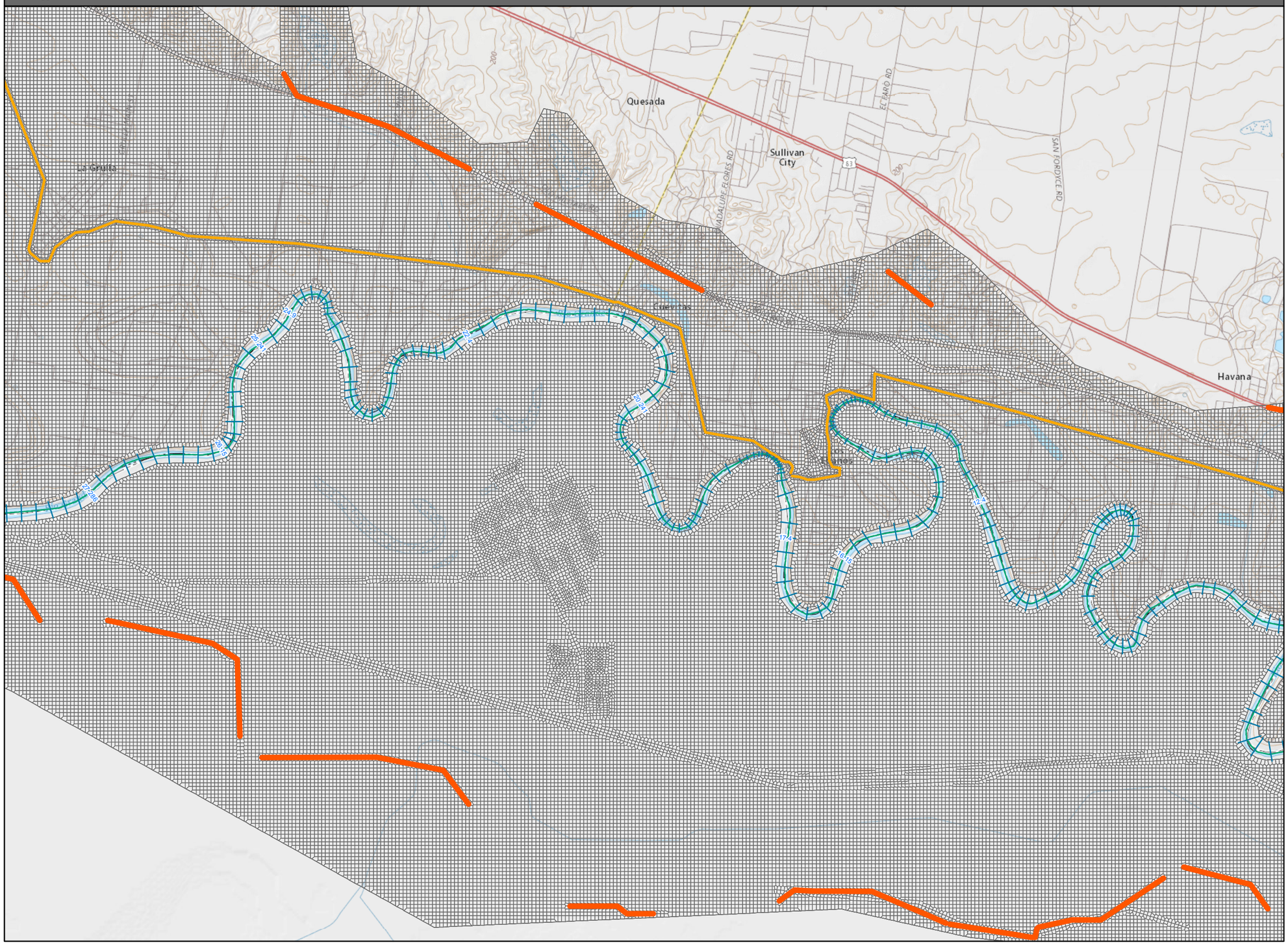
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Figure A6: Falcon Dam to Penitas 2-D Model Mesh and 1-D Cross-sections



LEGEND

- 1-D Corss-sections
- 1-D River
- Limits of Study
- RGV-63 miles
- 2-D Mesh

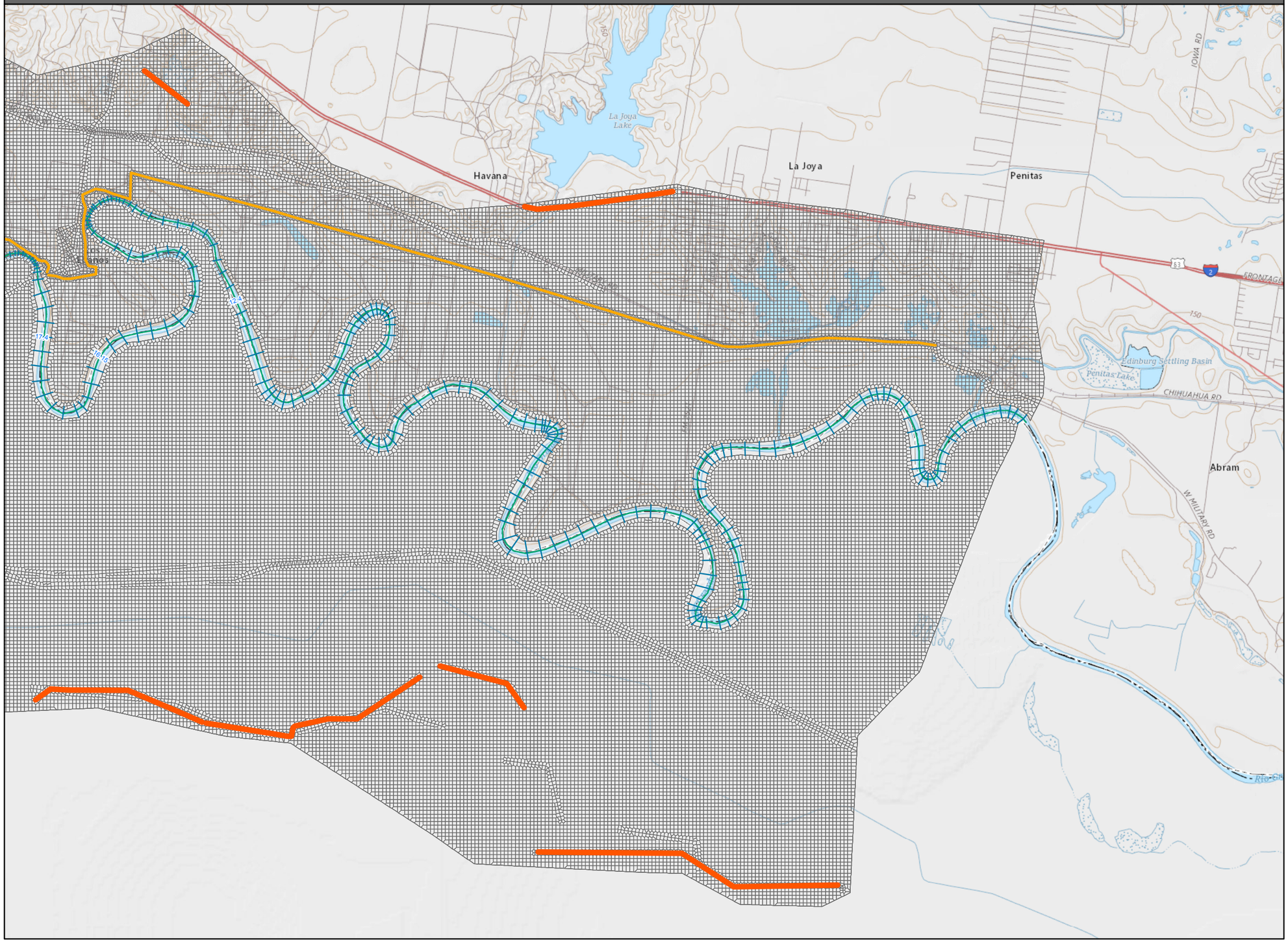
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- 1-D River
- Limits of Study
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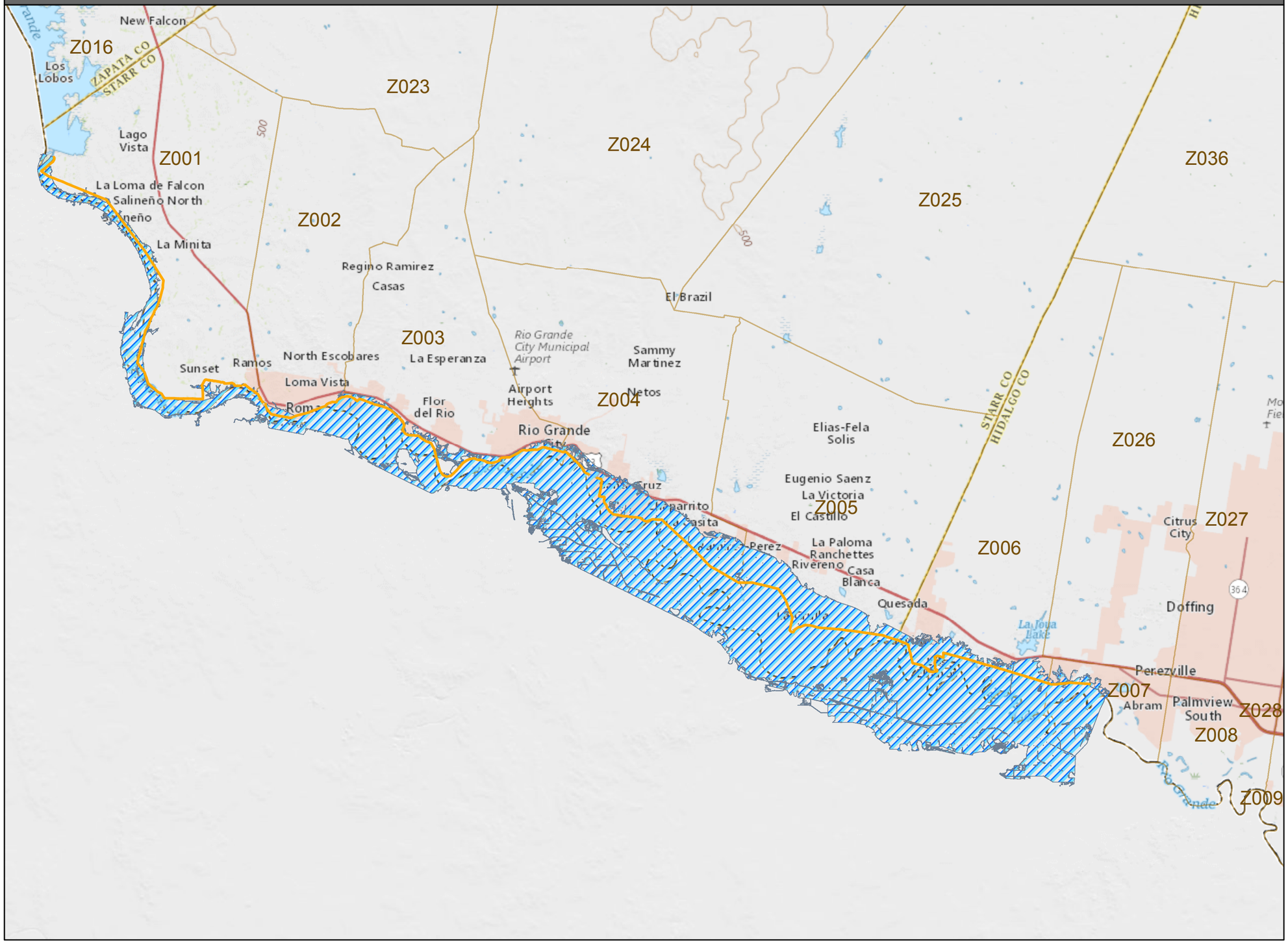
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Figure A7: Falcon Dam to Penitas Existing Conditions Floodplain Extents

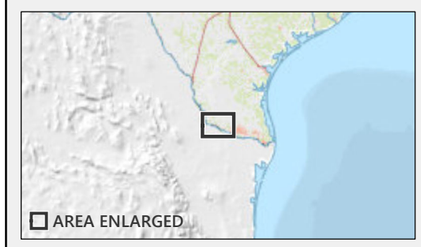


LEGEND

- Floodplain Extents
- RGV-63 miles
- USBP Station Zones

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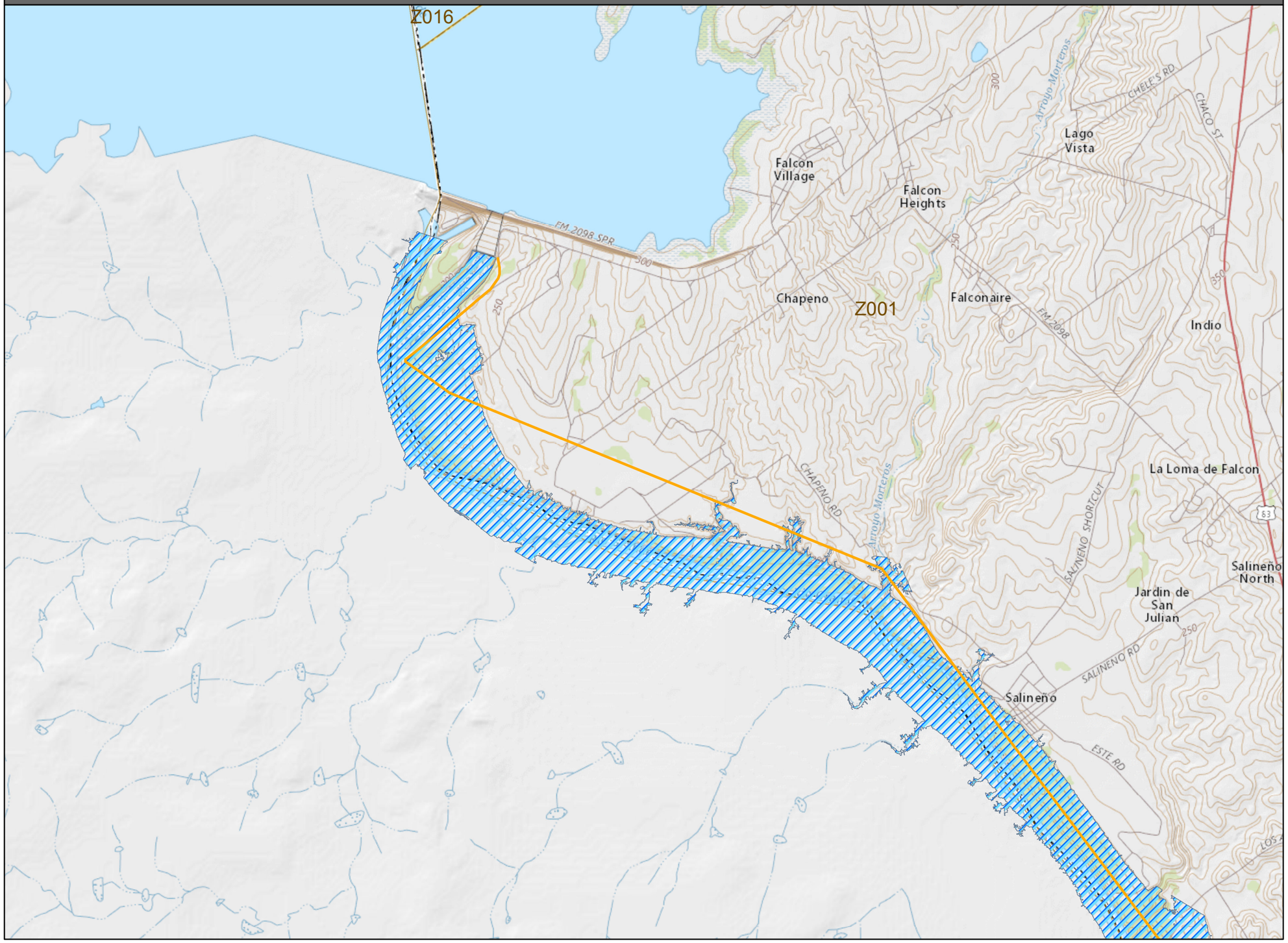
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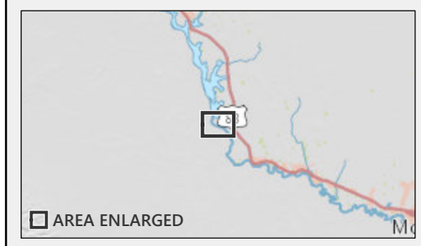


LEGEND

- Floodplain Extents
- RGV-63 miles
- USBP Station Zones

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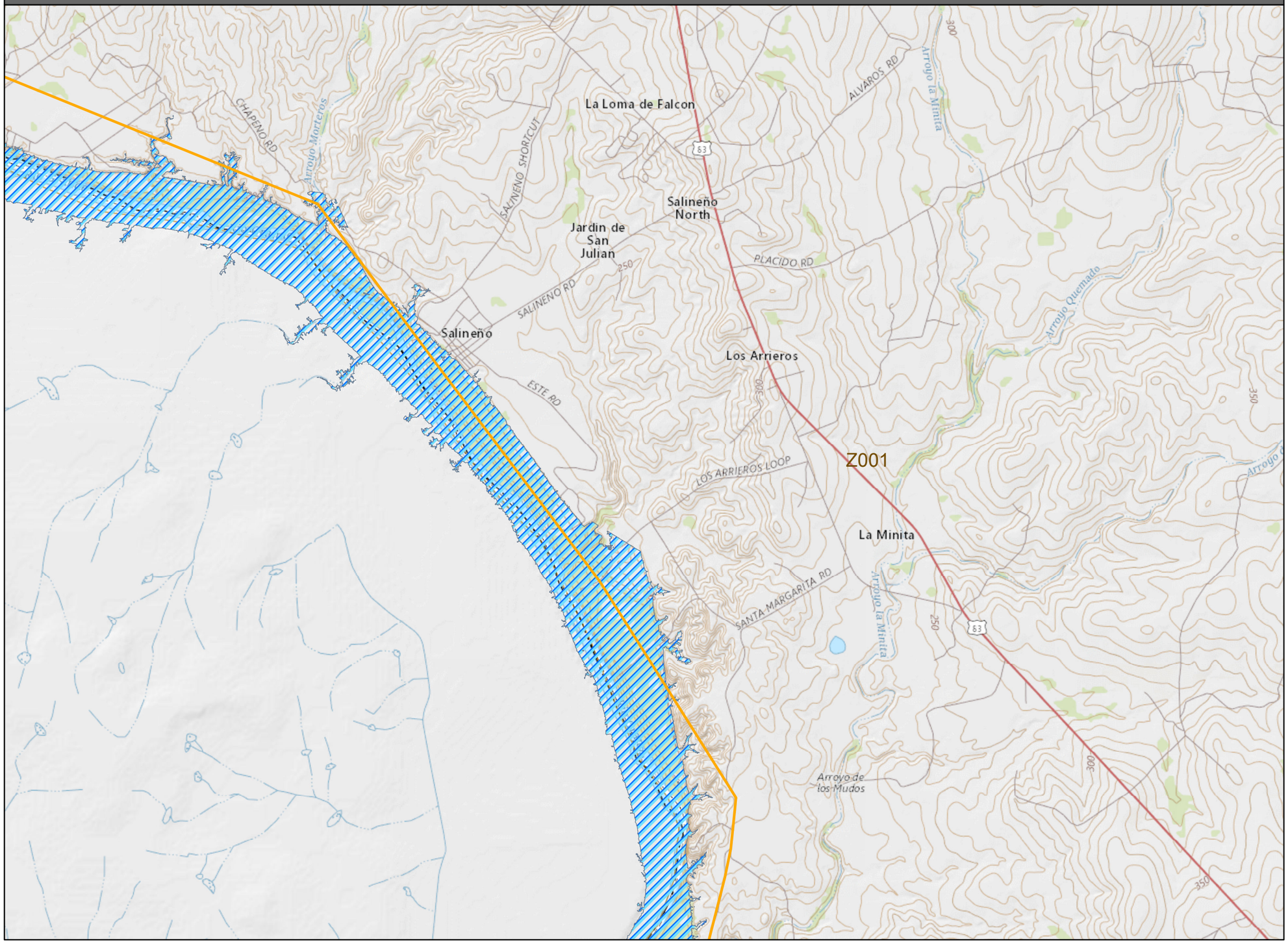
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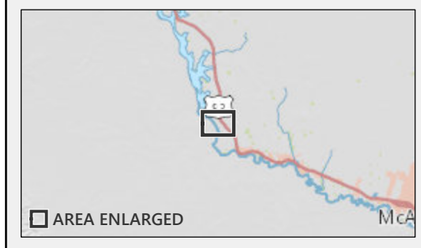


LEGEND

- Floodplain Extents
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- USBP Station Zones

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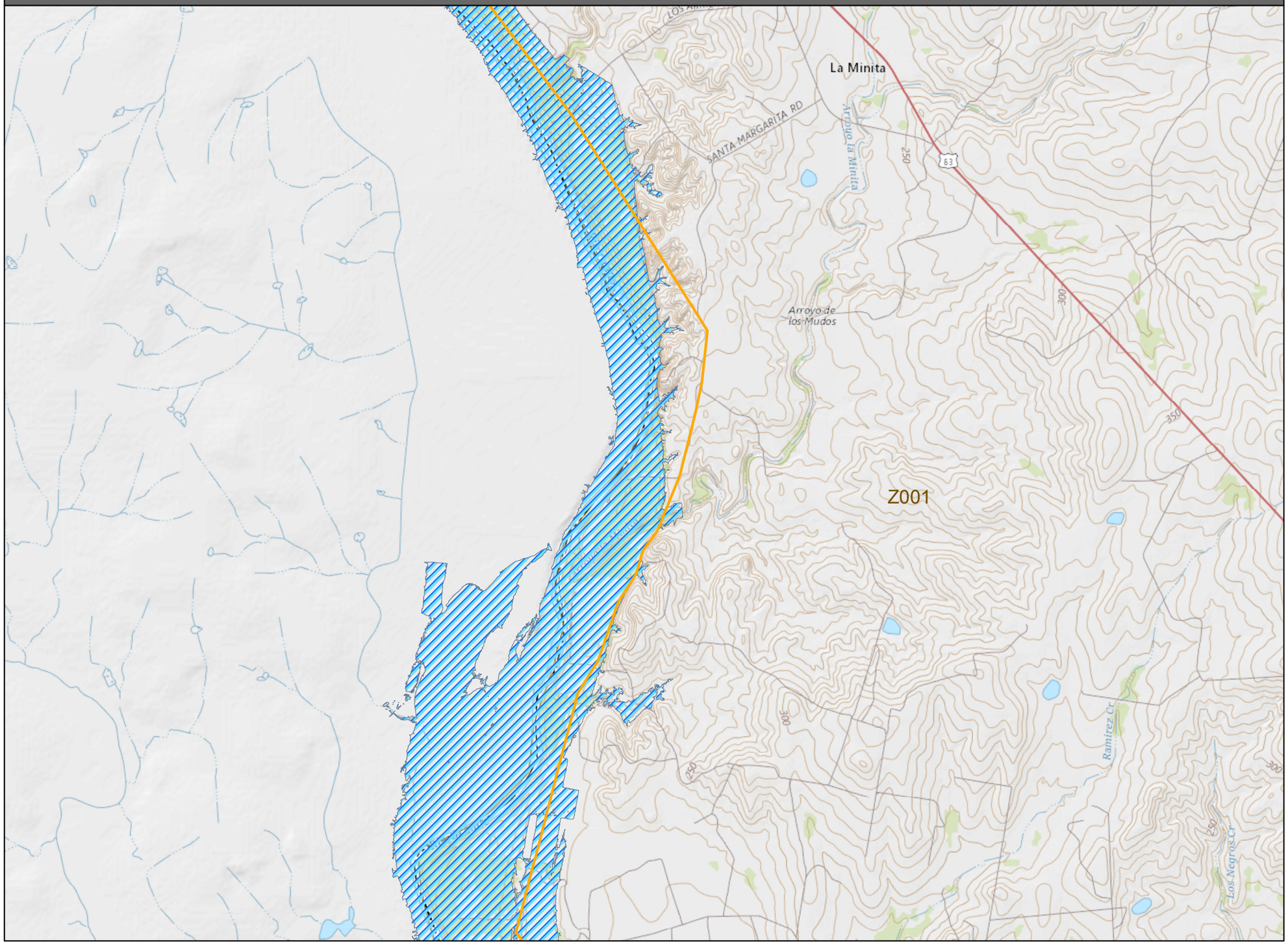
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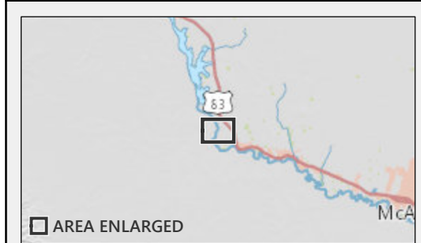


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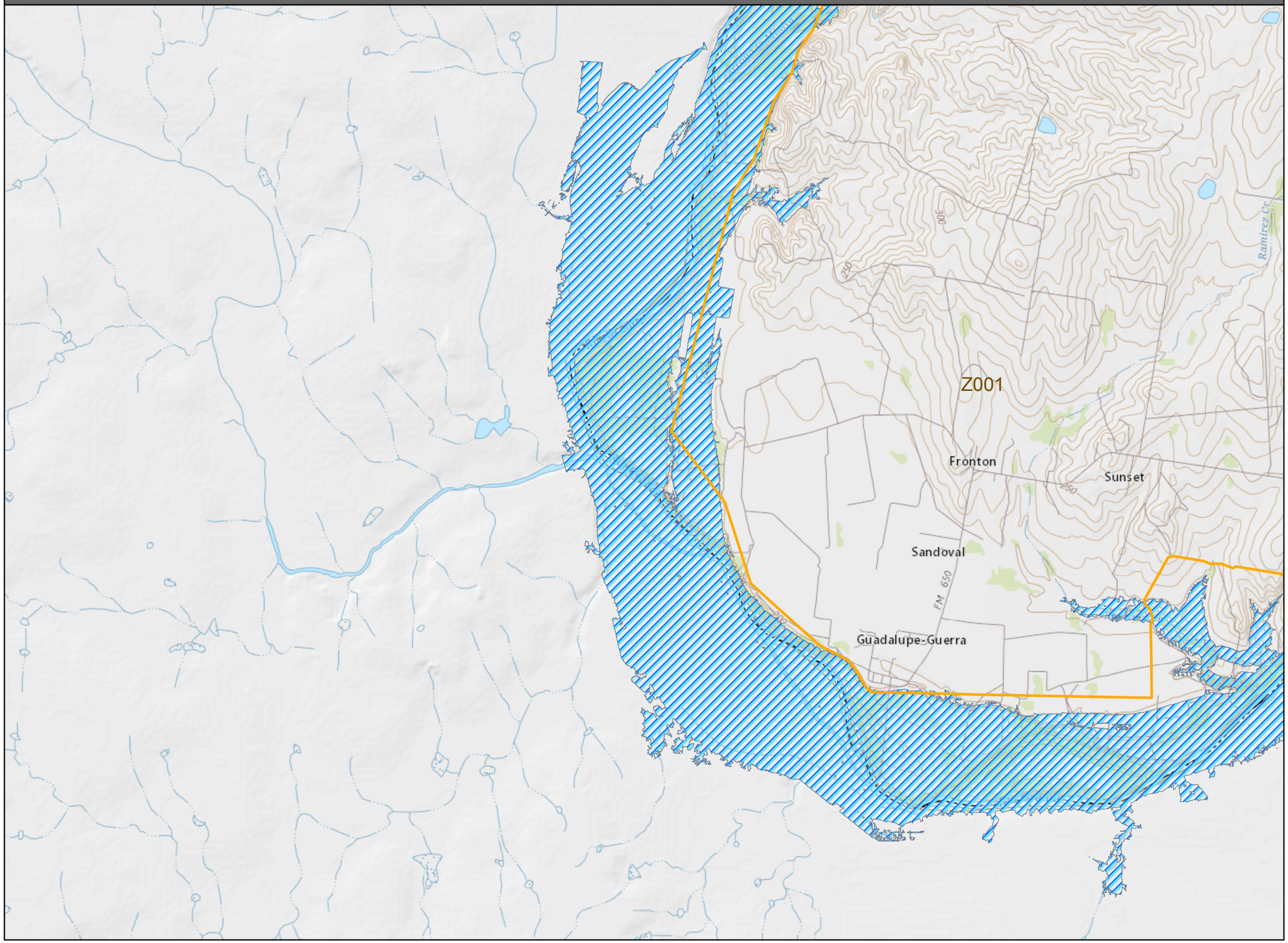
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- Floodplain Extents
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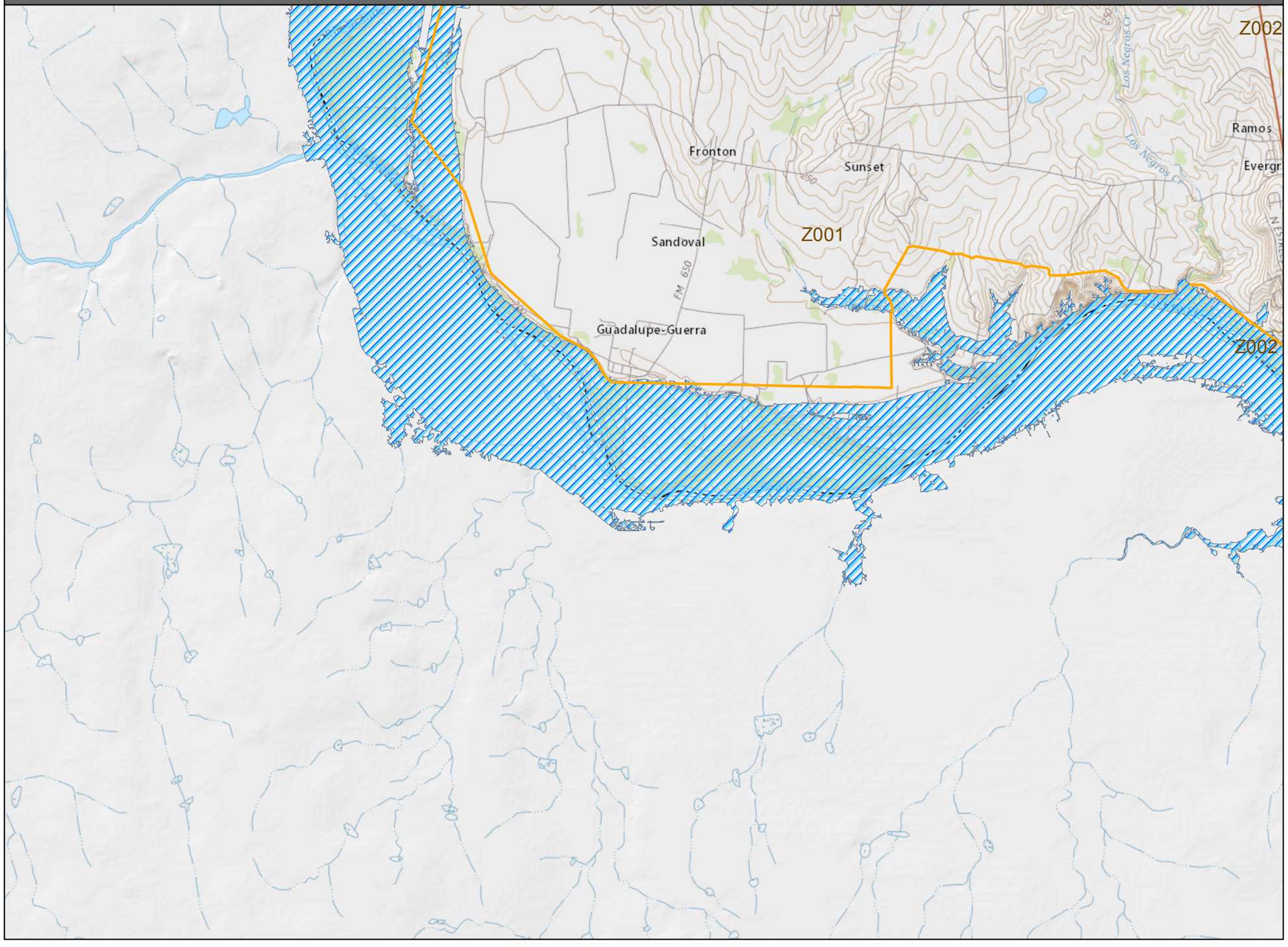
1 in = 3,000 feet 1:36,000



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Figure A7: Falcon Dam to Penitas Existing Conditions Floodplain Extents



LEGEND

- Floodplain Extents
- RGV-63 miles
- USBP Station Zones

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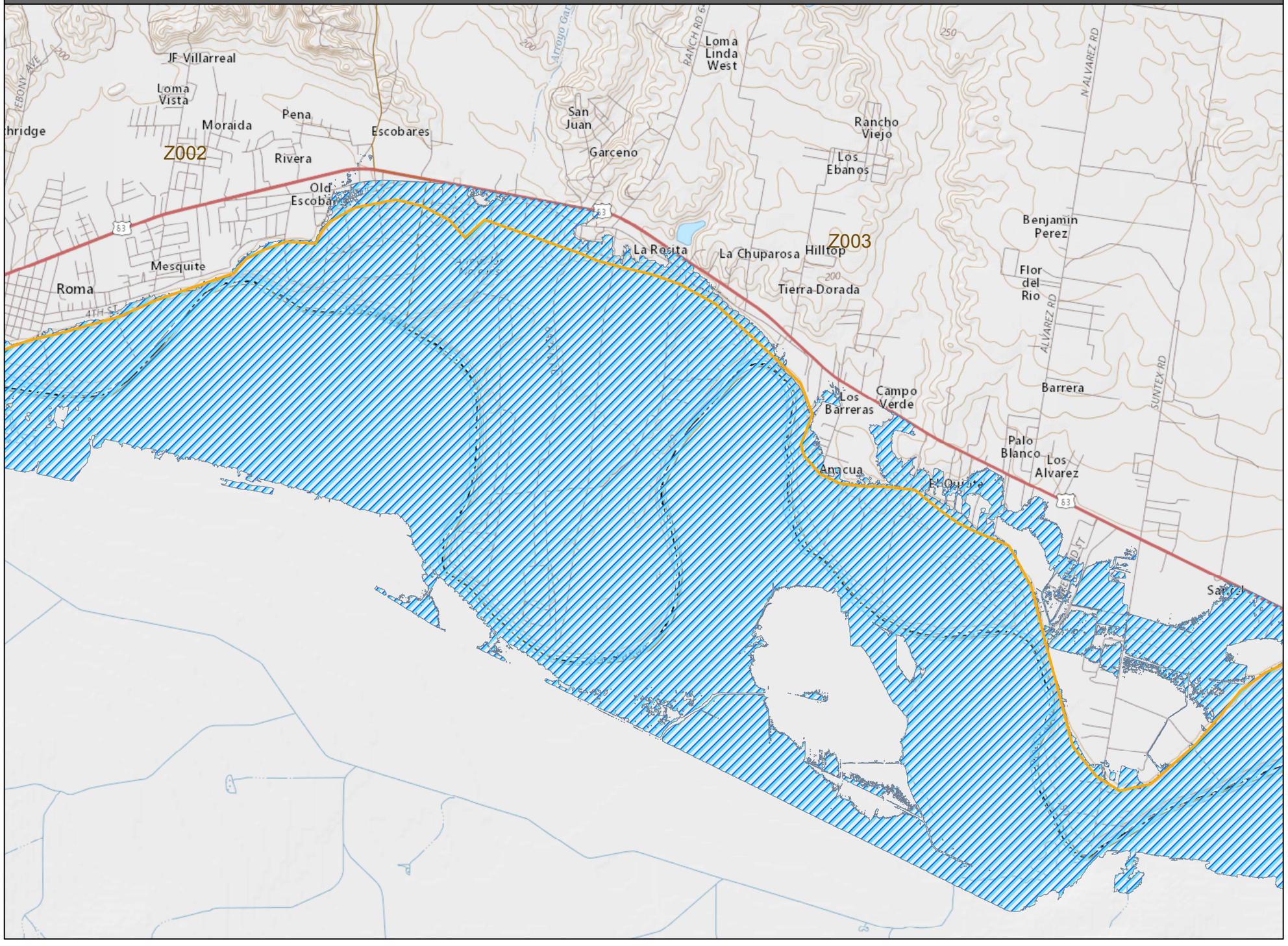
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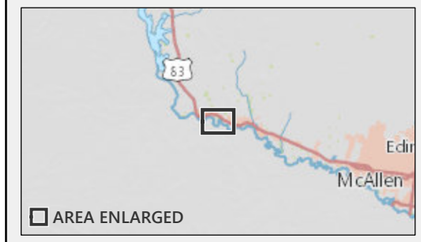


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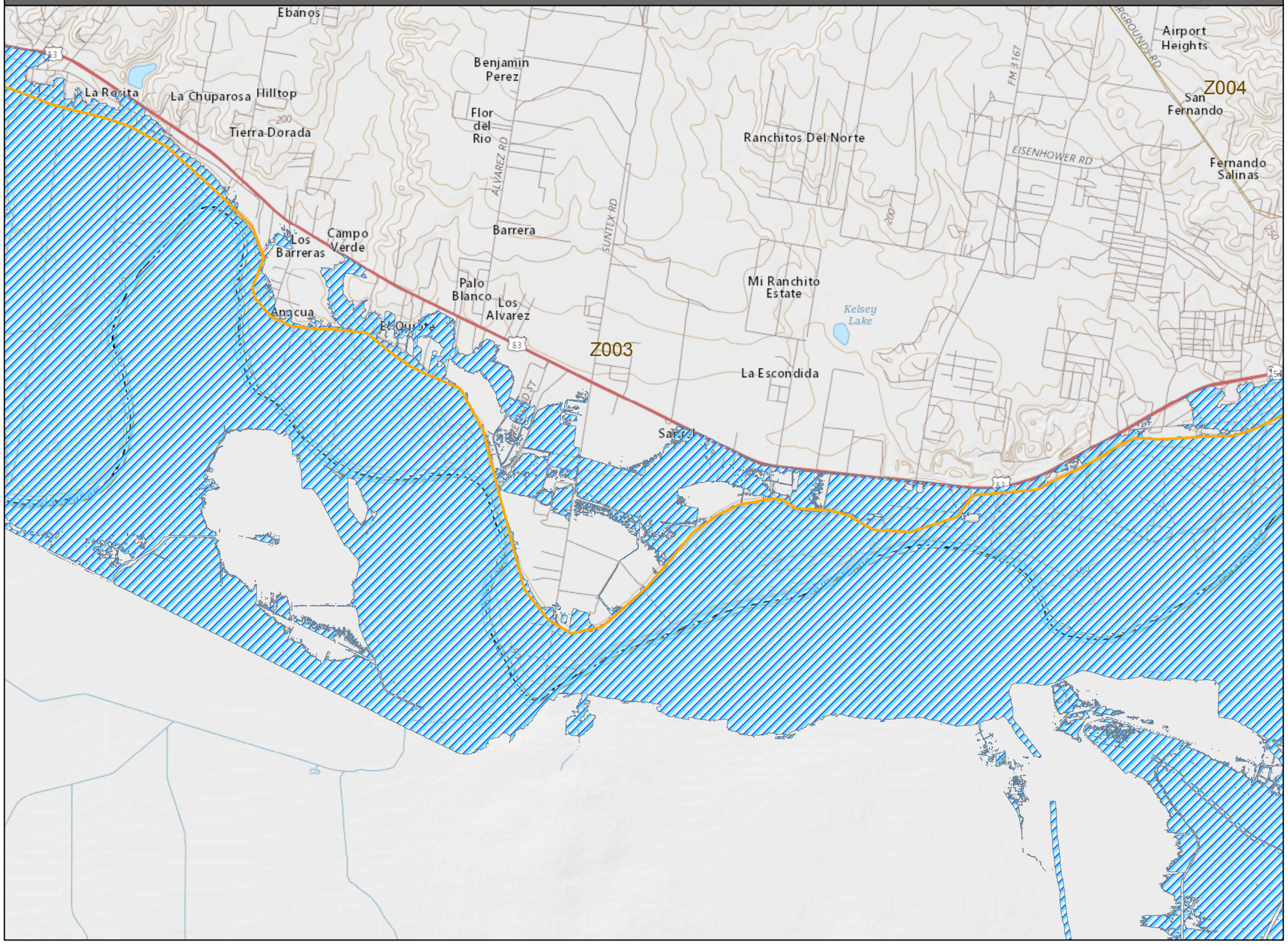
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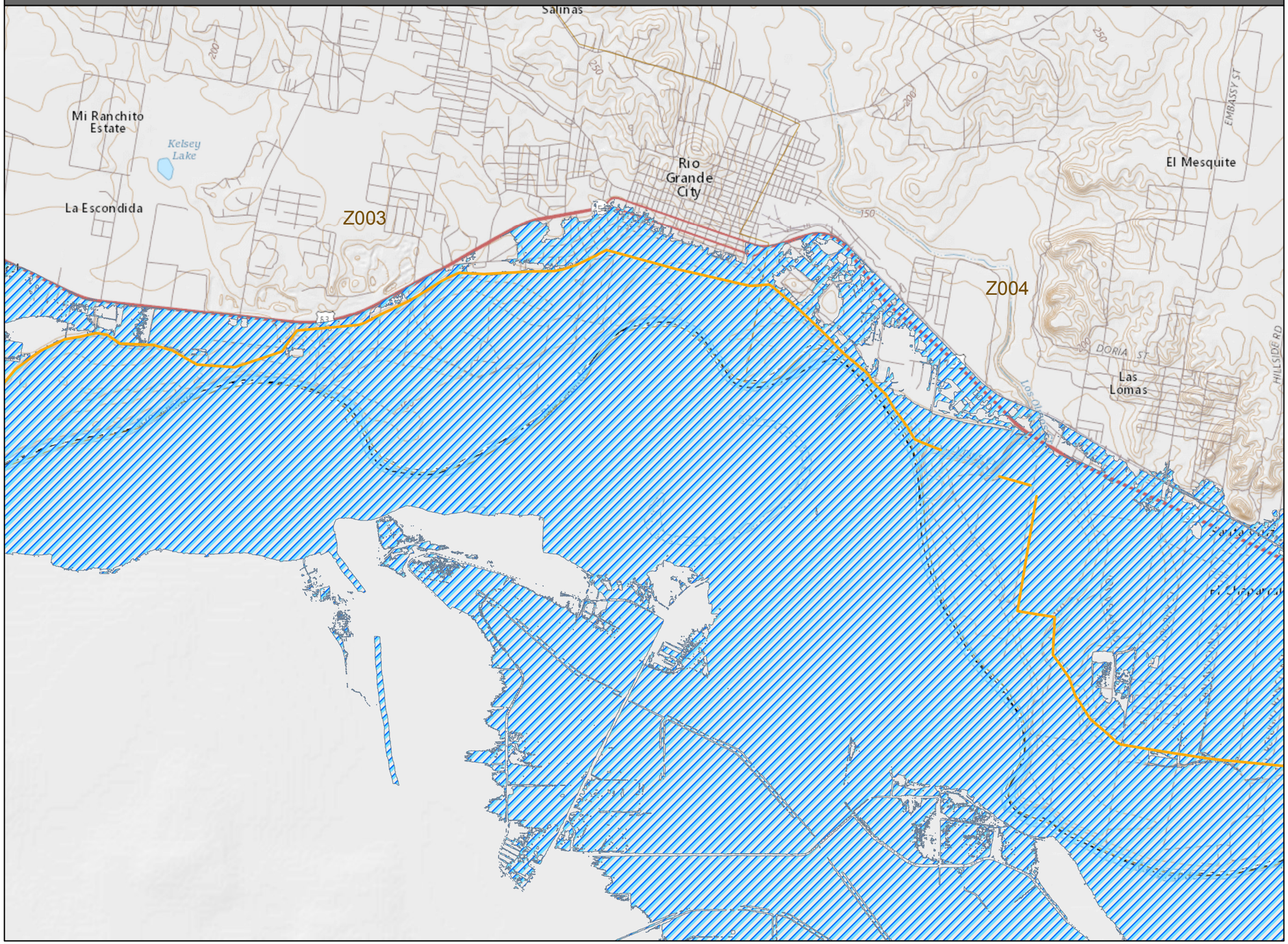
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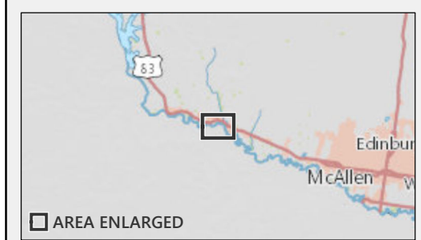


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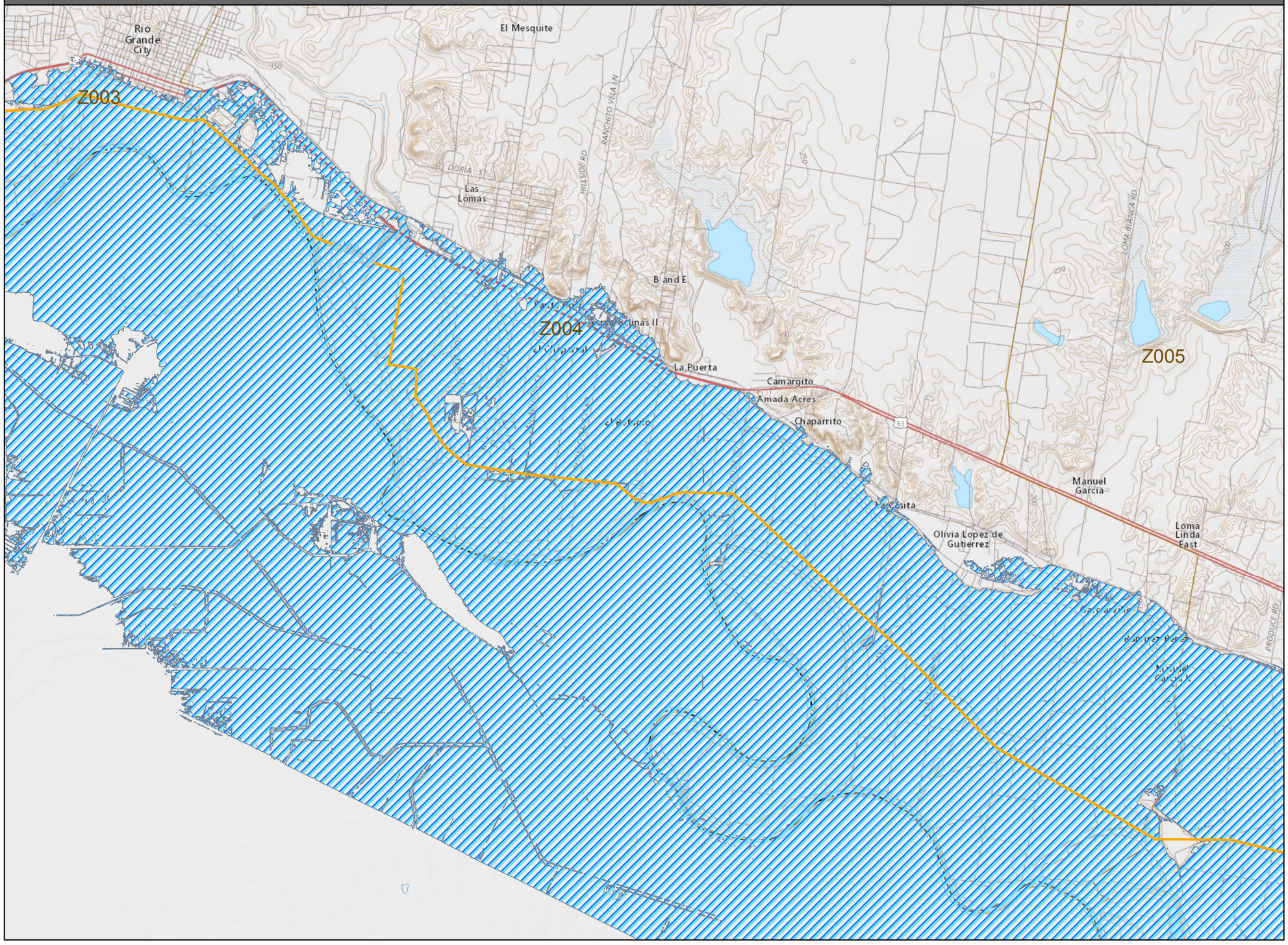
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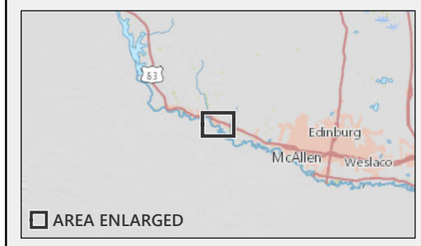


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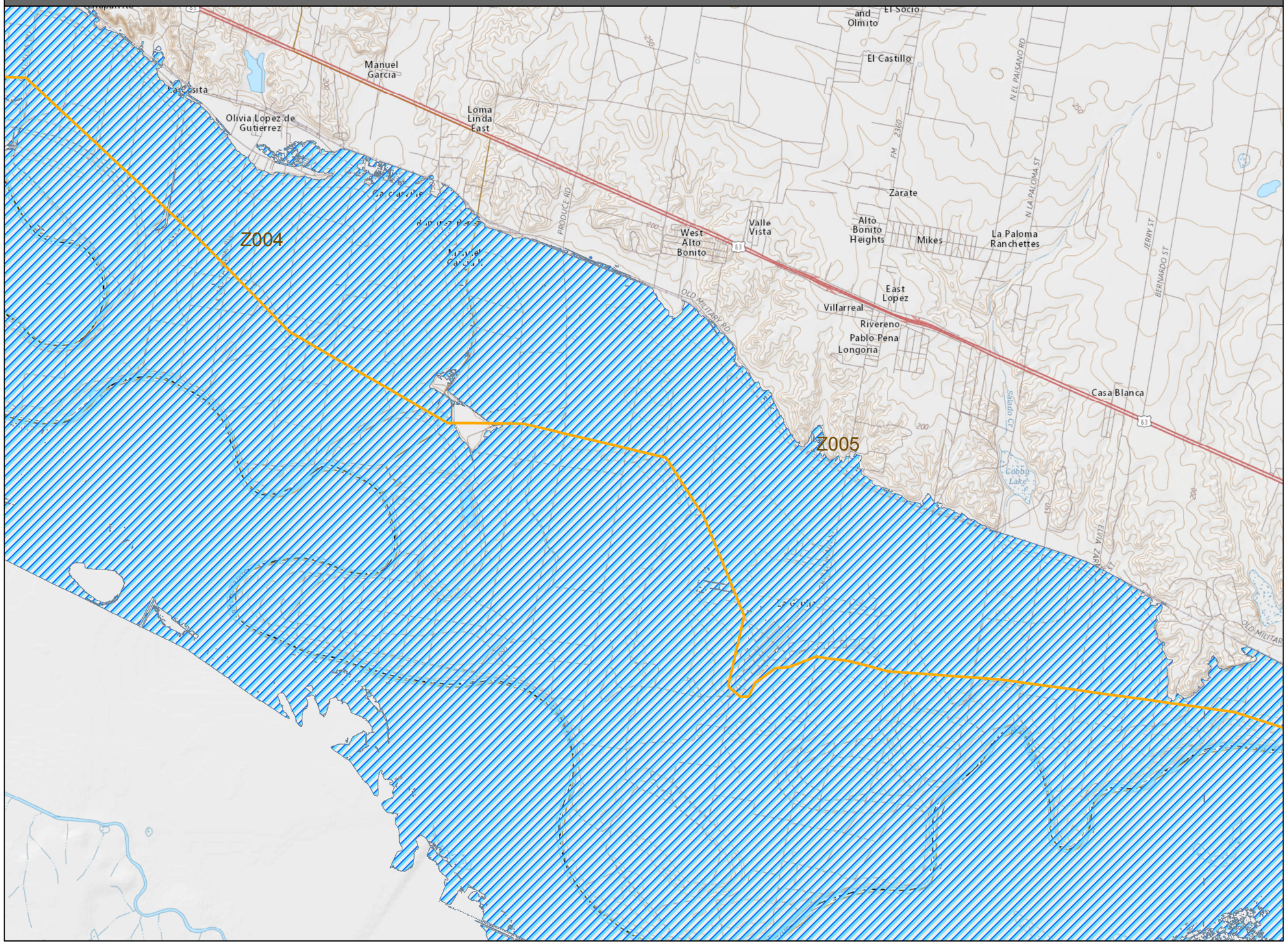
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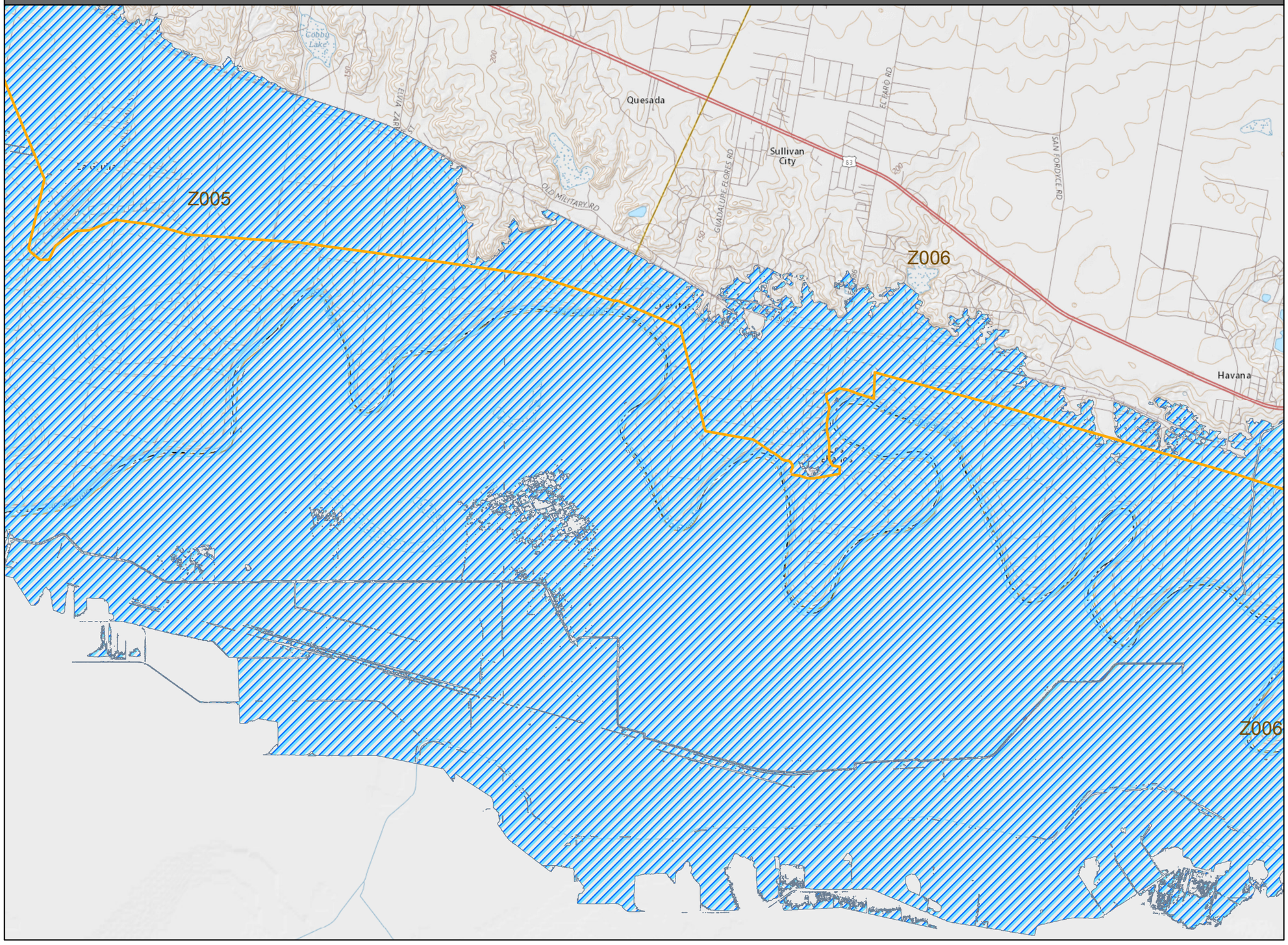
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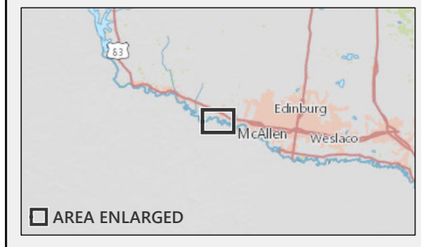


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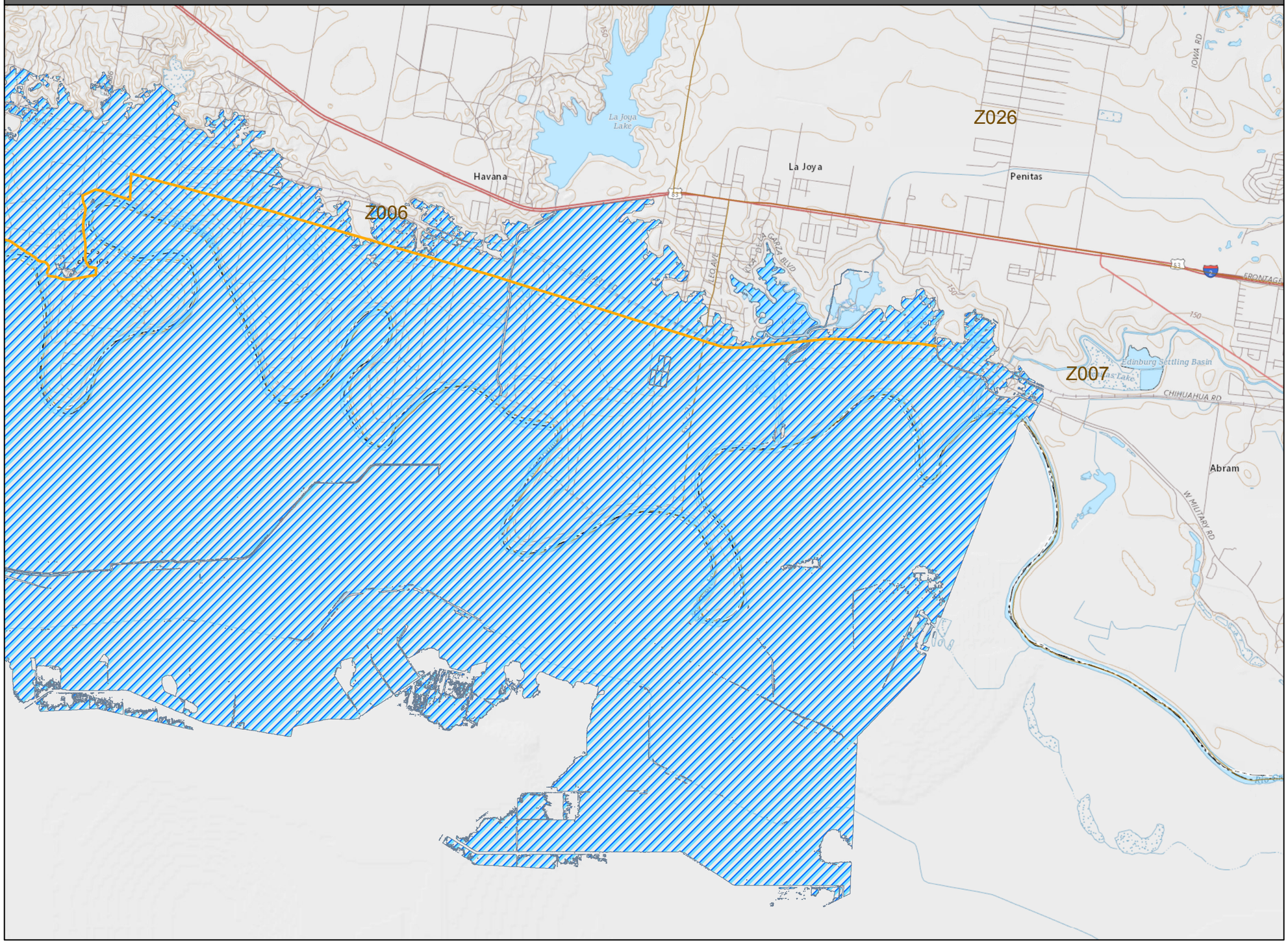
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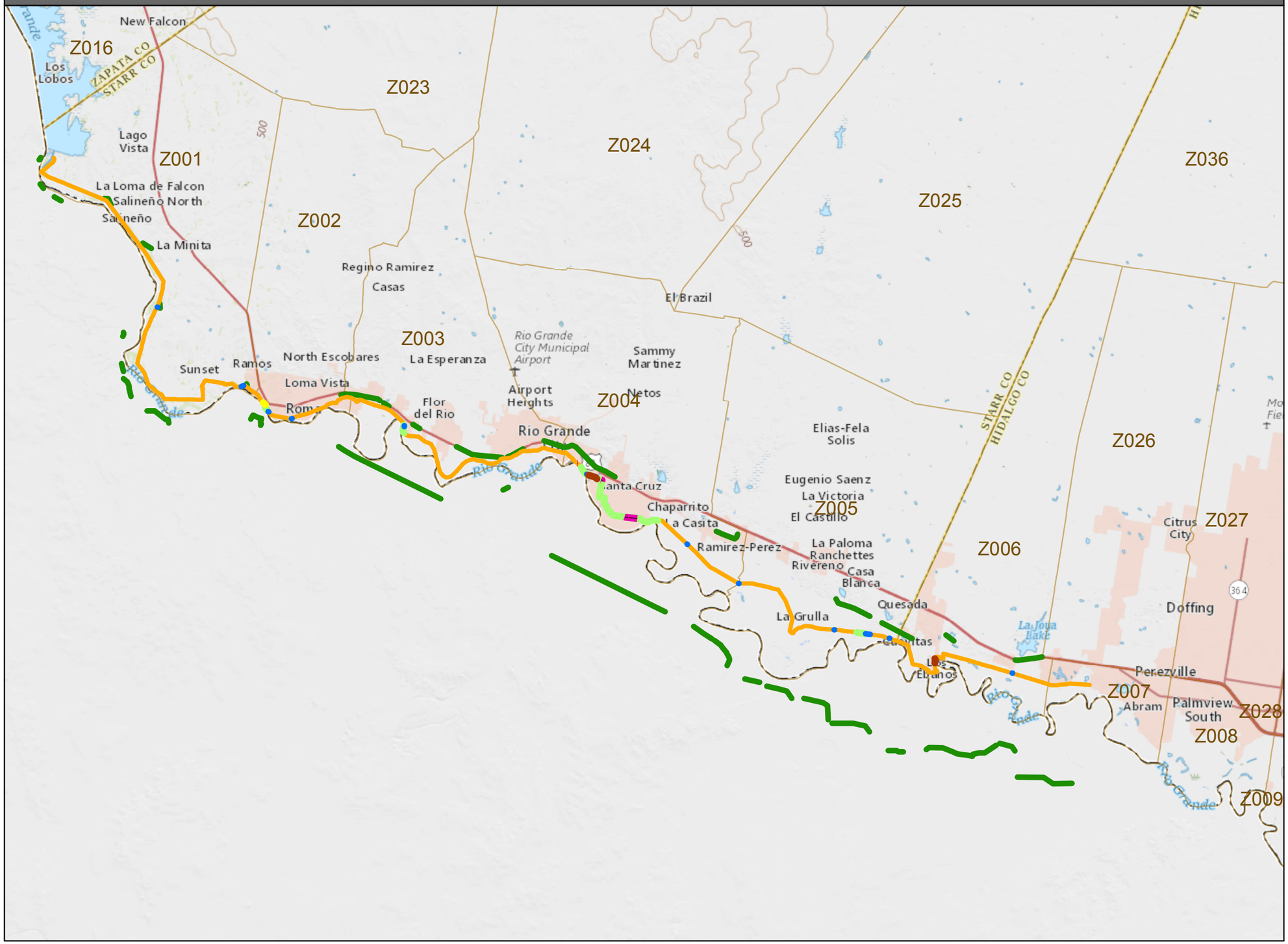
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Figure A8: Falcon Dam to Penitas 2-D Proposed Wall Configuration



LEGEND

Gaps

- LWC
- Natural Barrier
- POE
- Road

Rotated Bollards

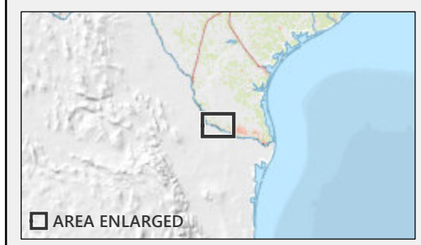
RGV 63 Miles

Limits of Study

- USBP Station Zones

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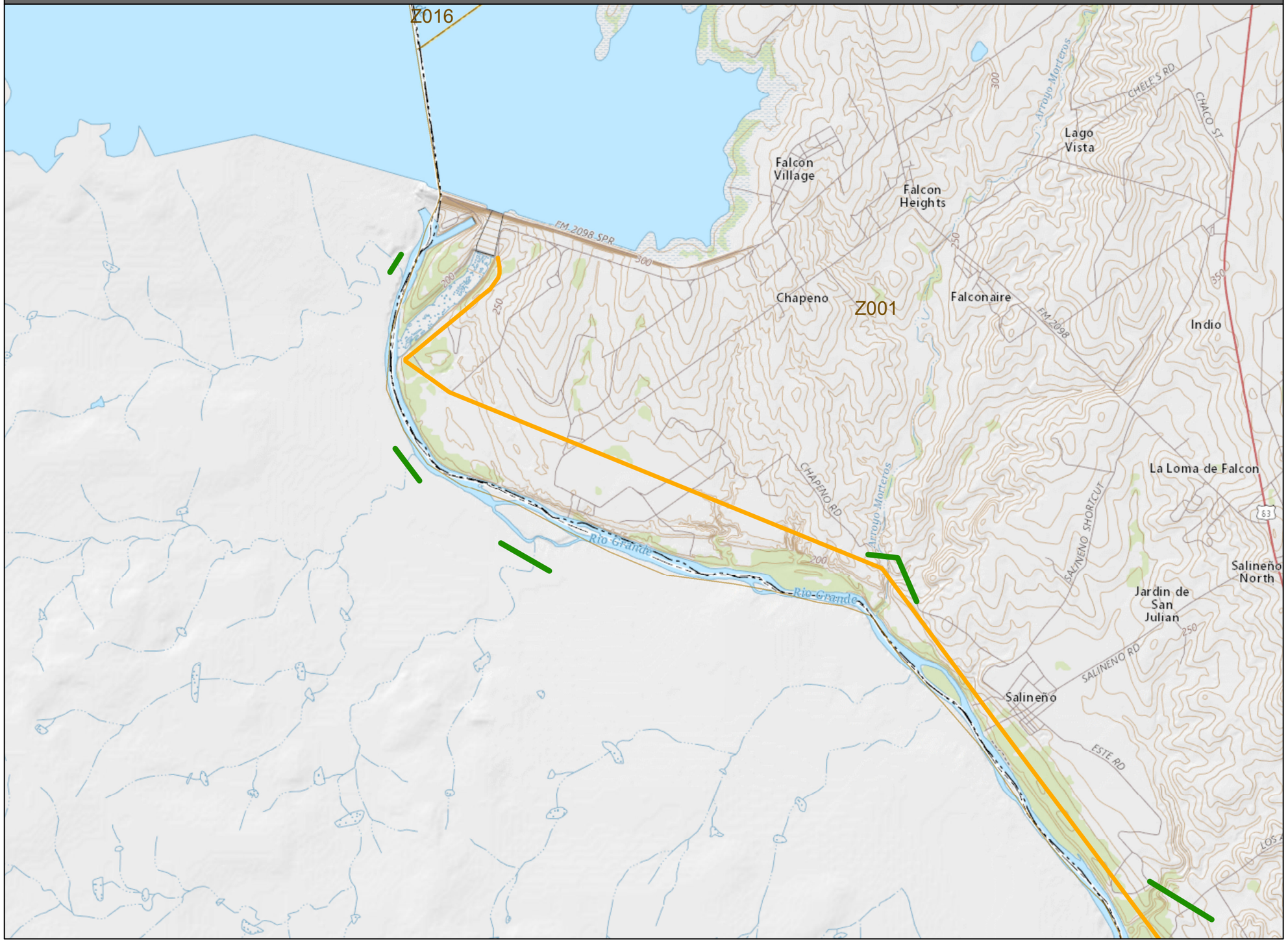
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LEGEND

Gaps

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- POE
- Road

Rotated Bollards

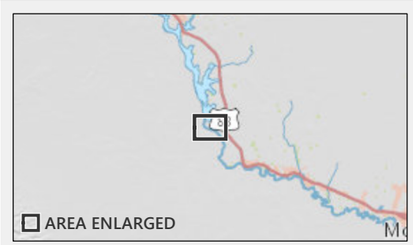
RGV 63 Miles

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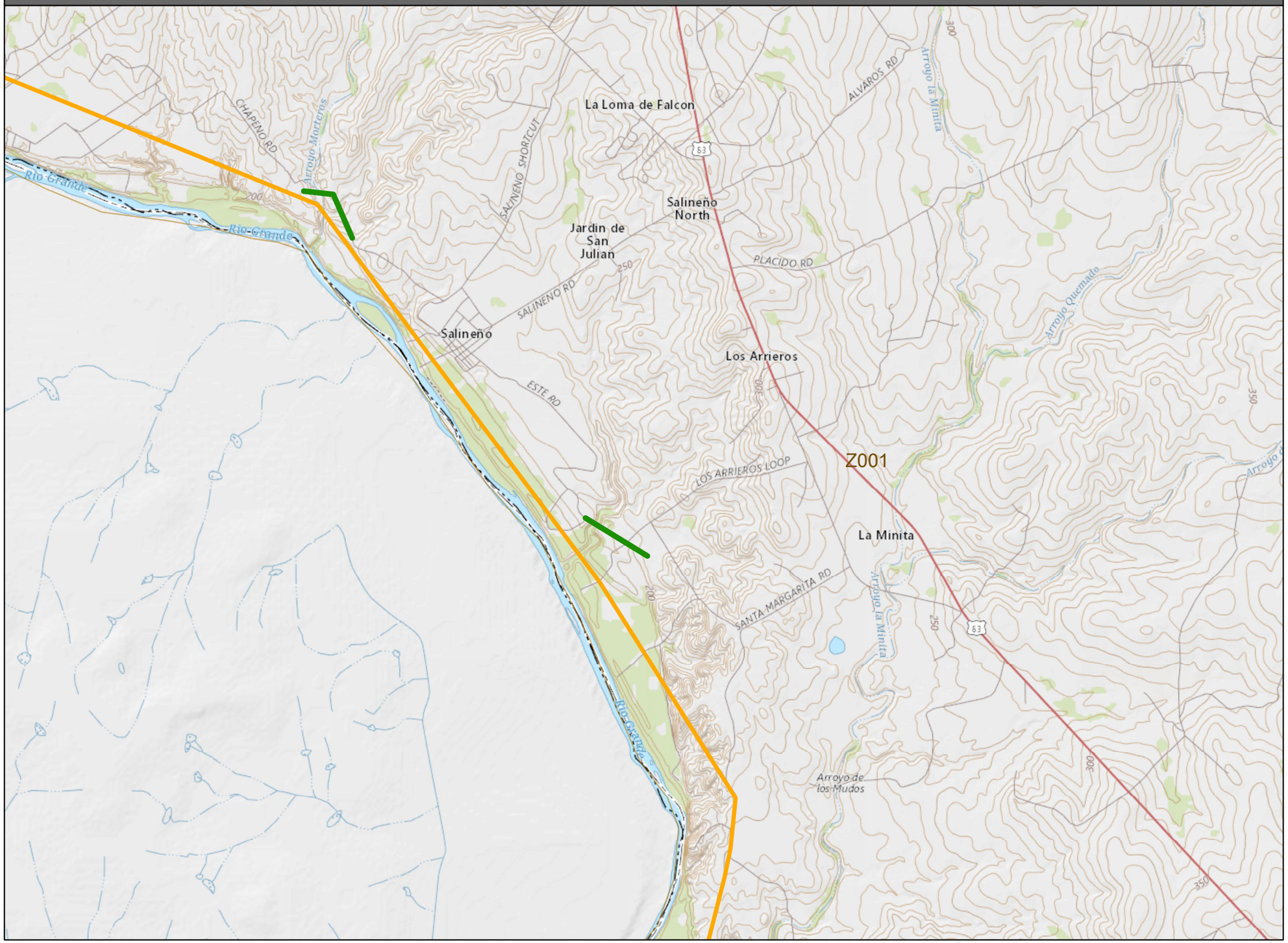
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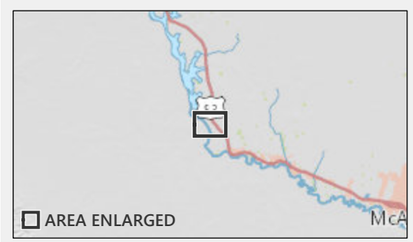
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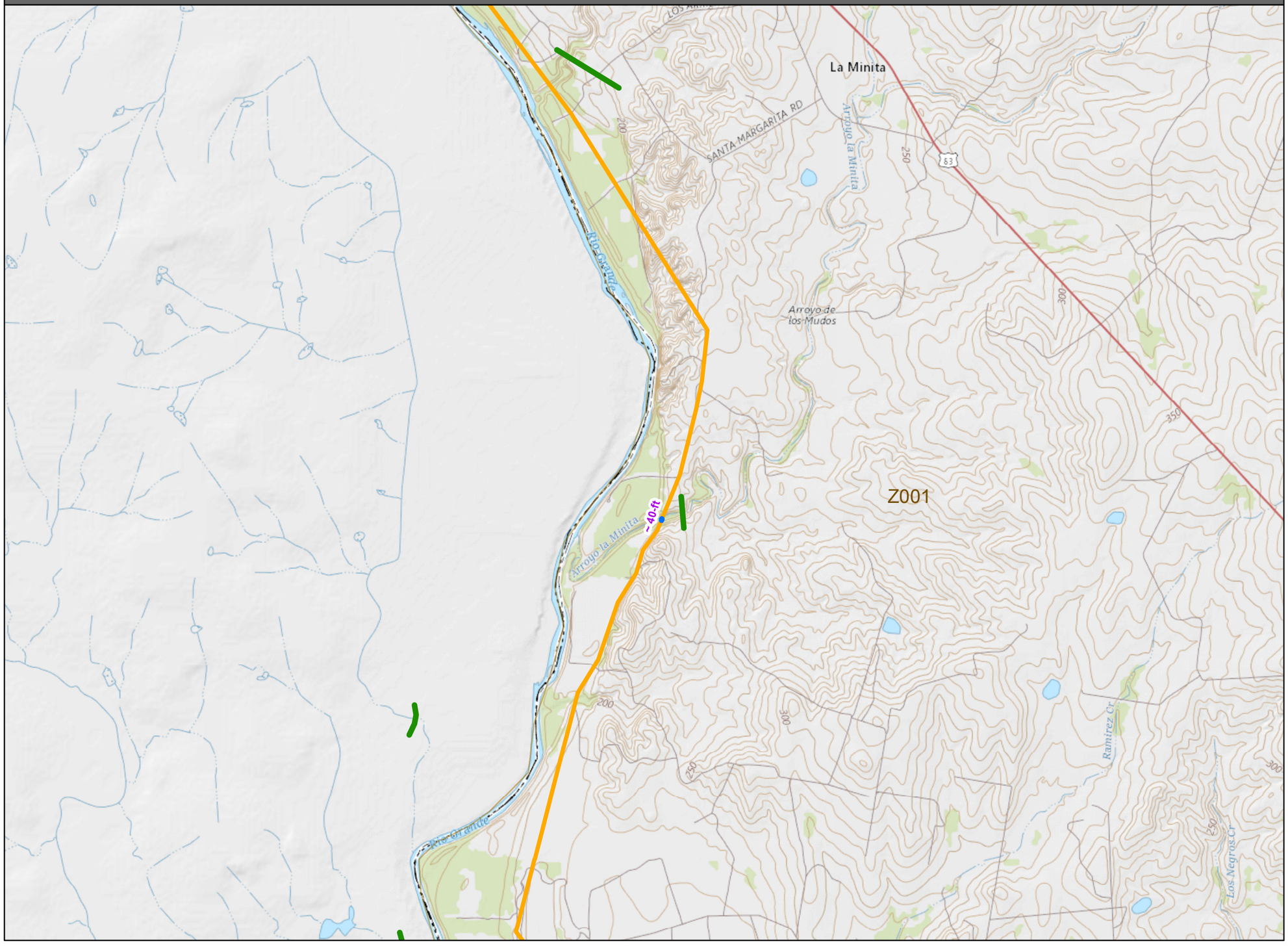
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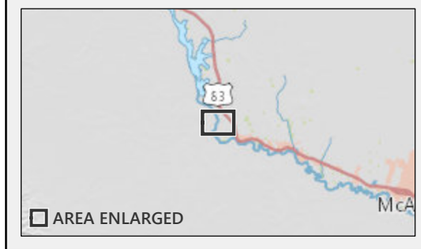
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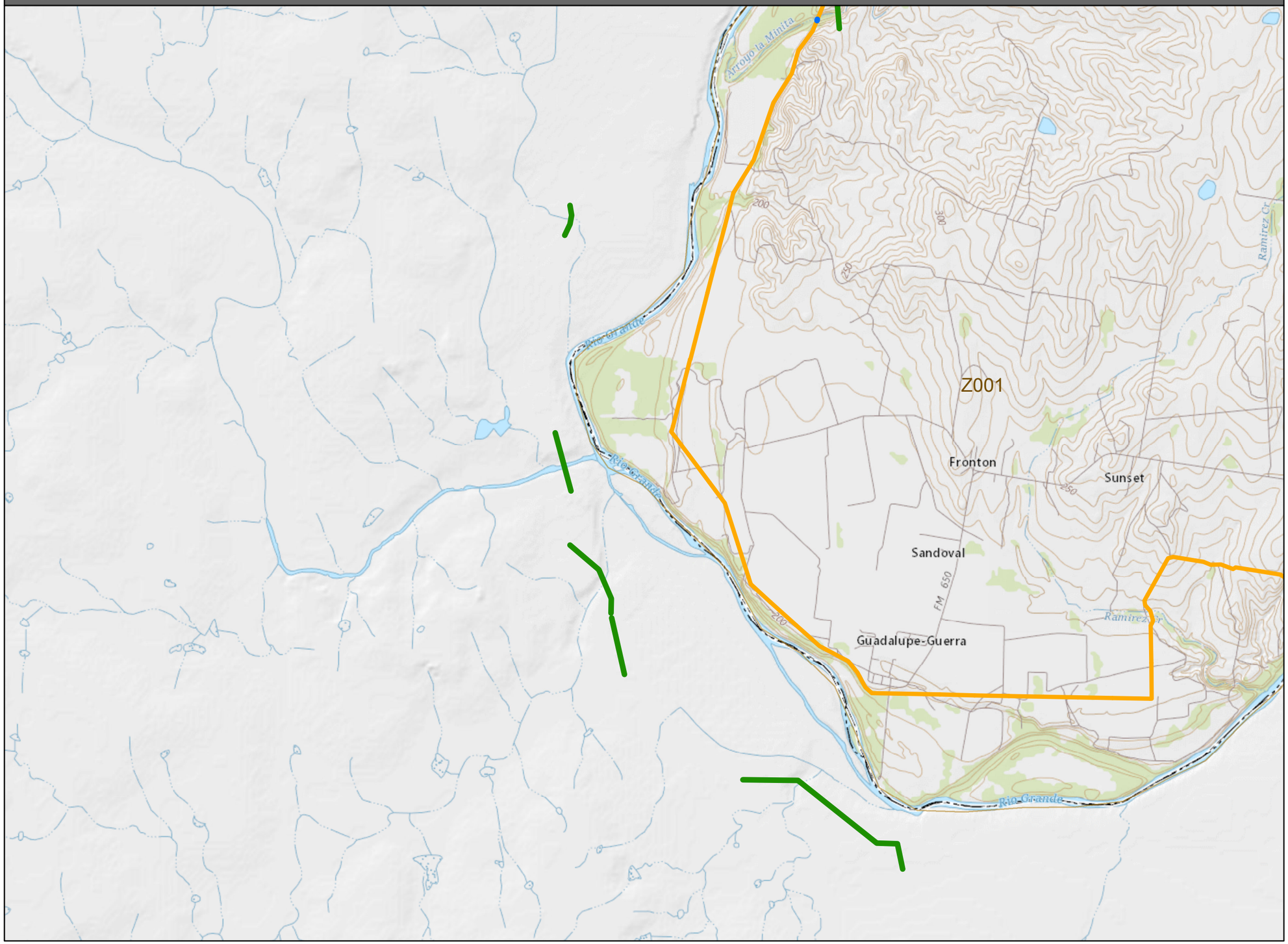
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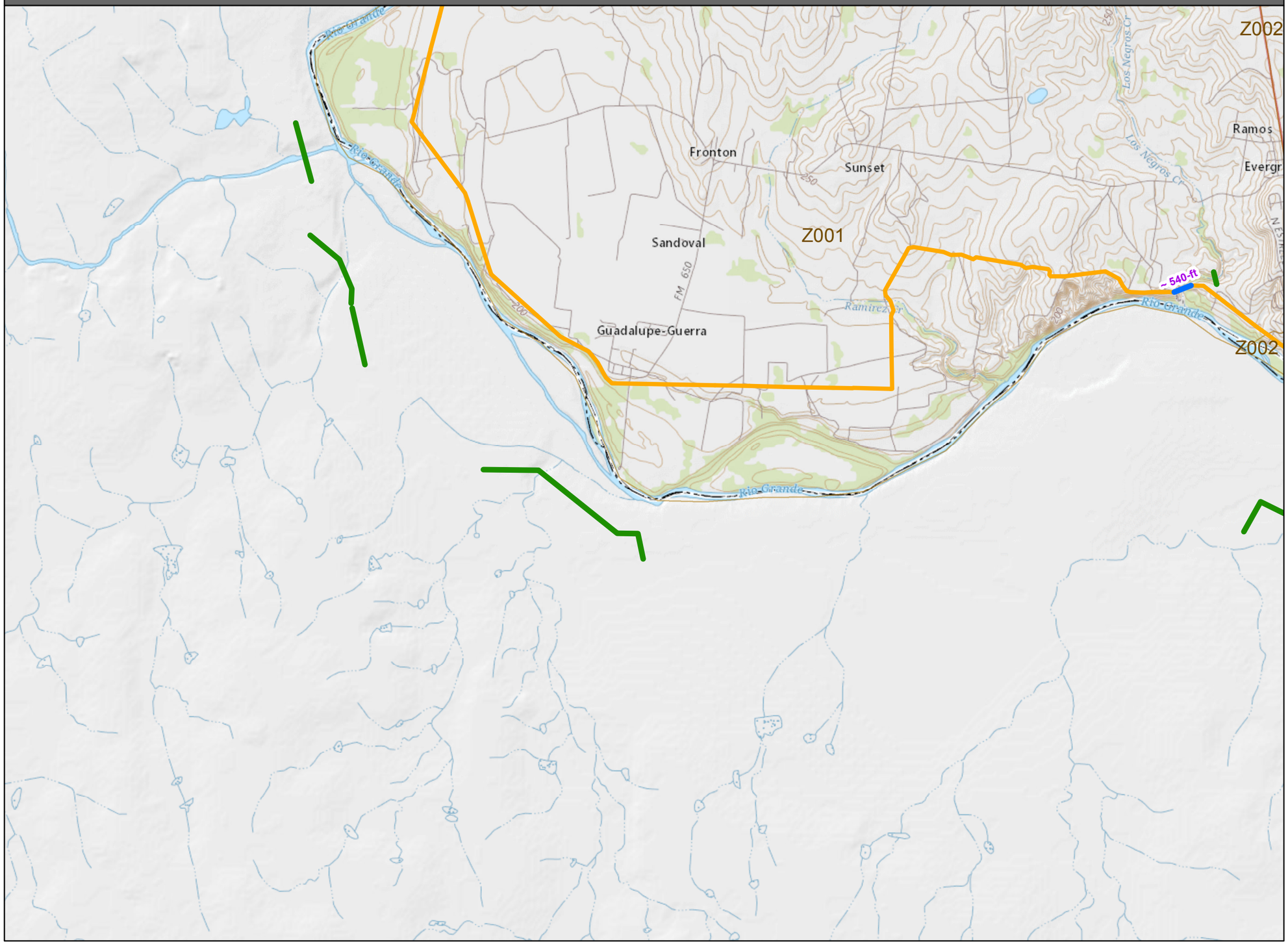
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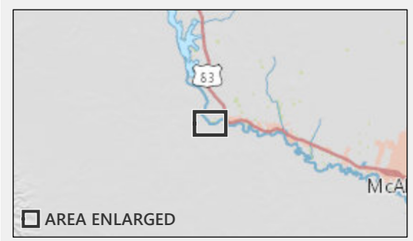
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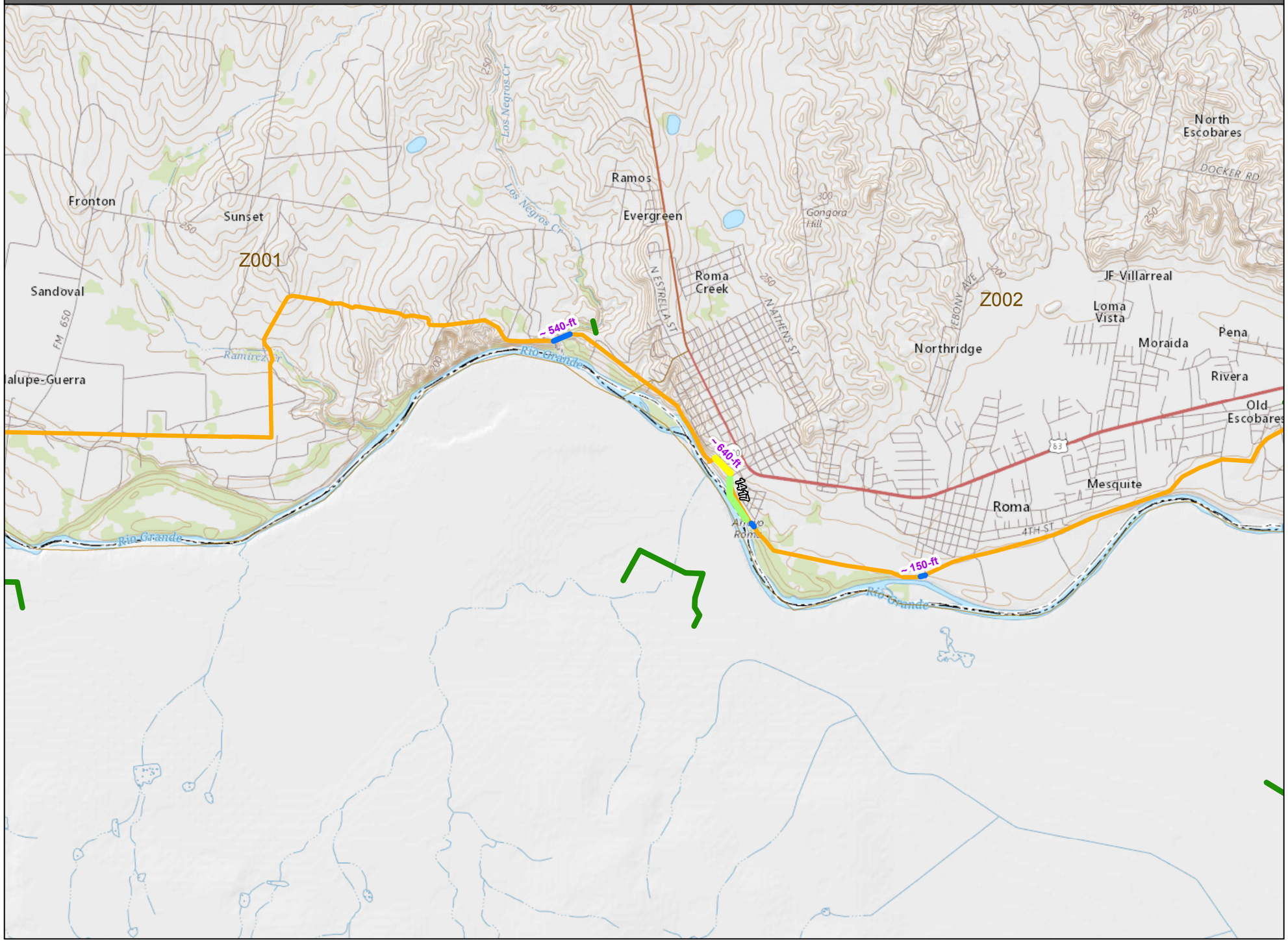
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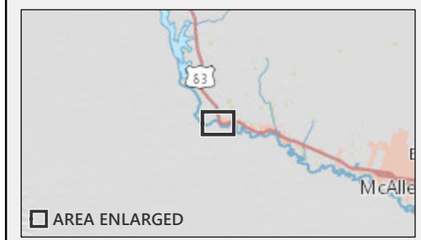
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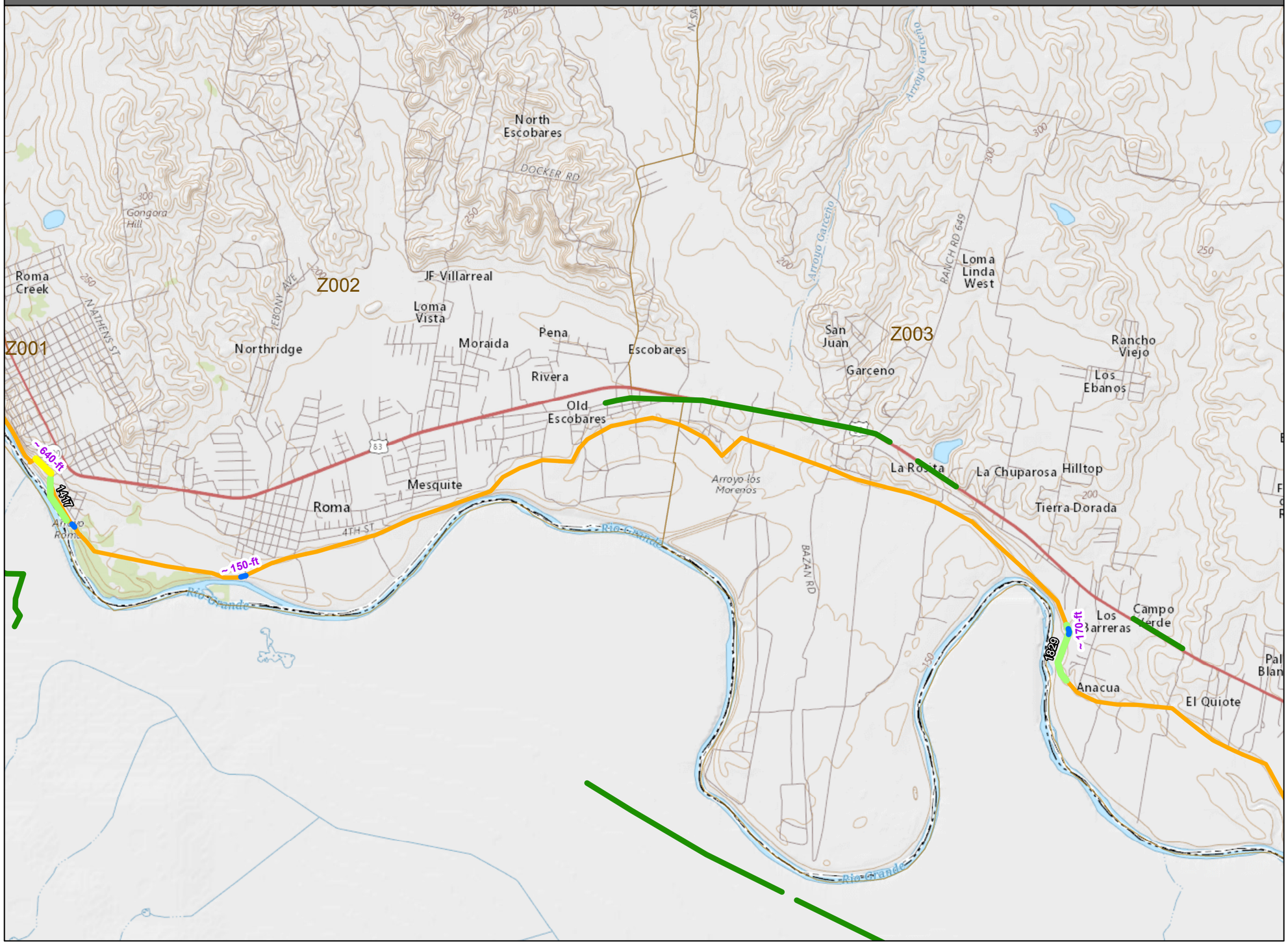
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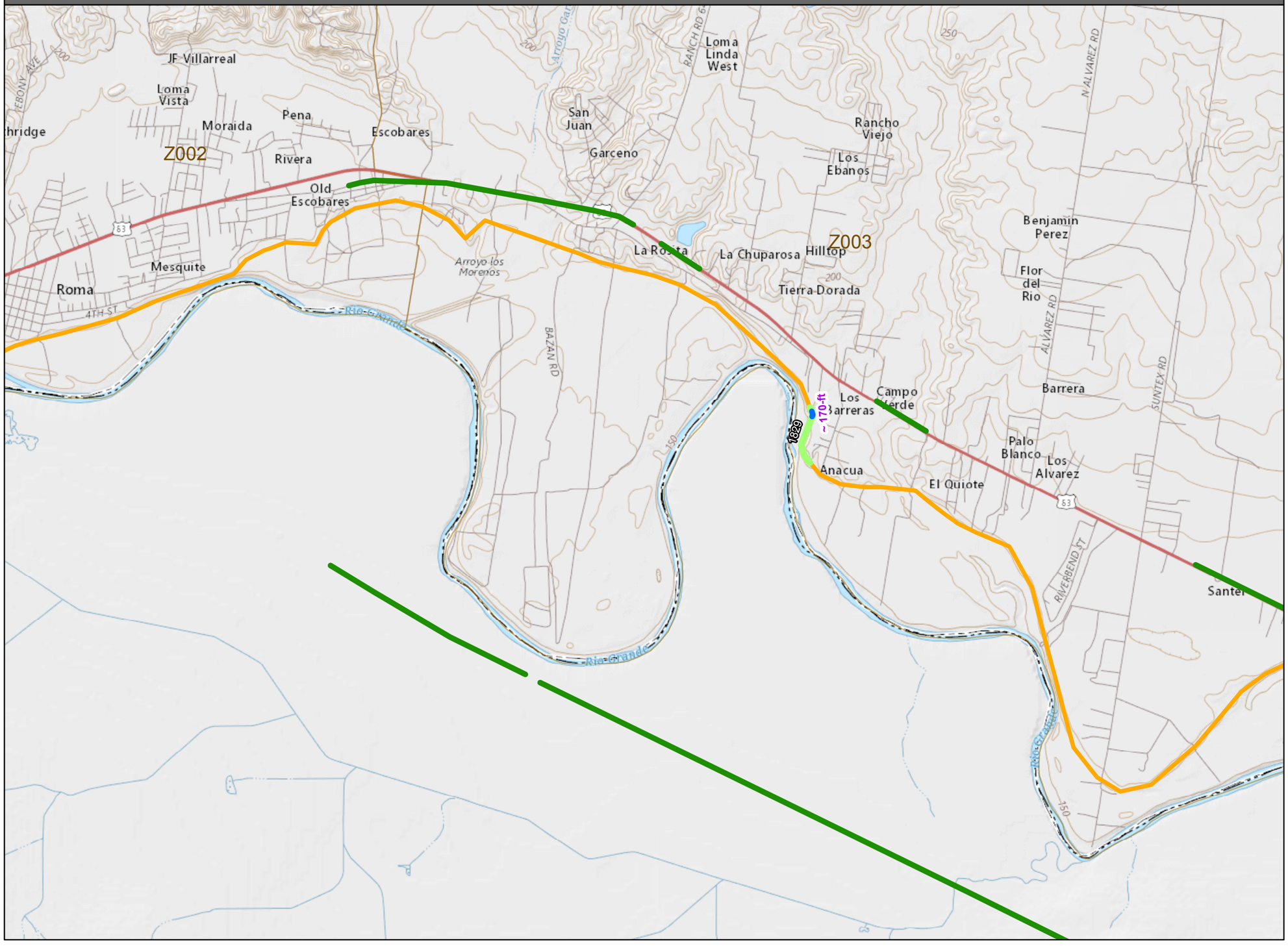
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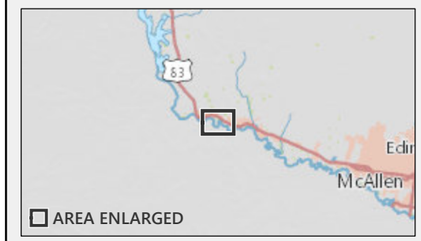
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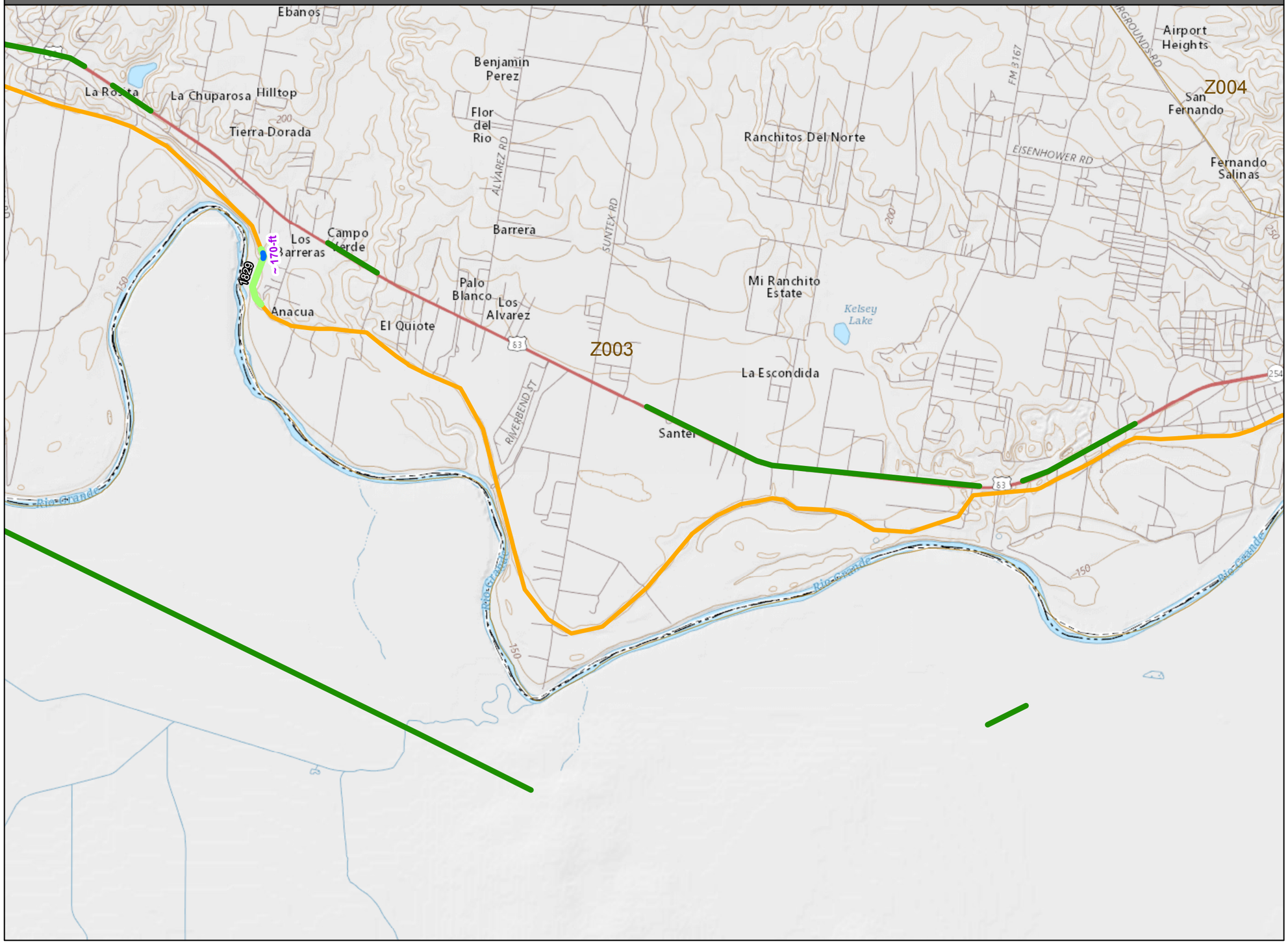
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Figure A8: Falcon Dam to Penitas 2-D Proposed Wall Configuration



LEGEND

Gaps

- LWC
- Natural Barrier
- POE
- Road

Rotated Bollards

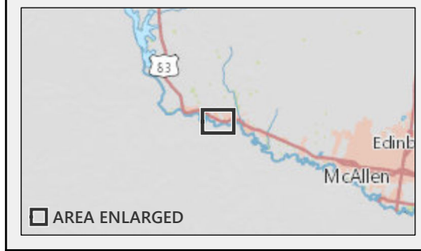
RGV 63 Miles

Limits of Study

- USBP Station Zones

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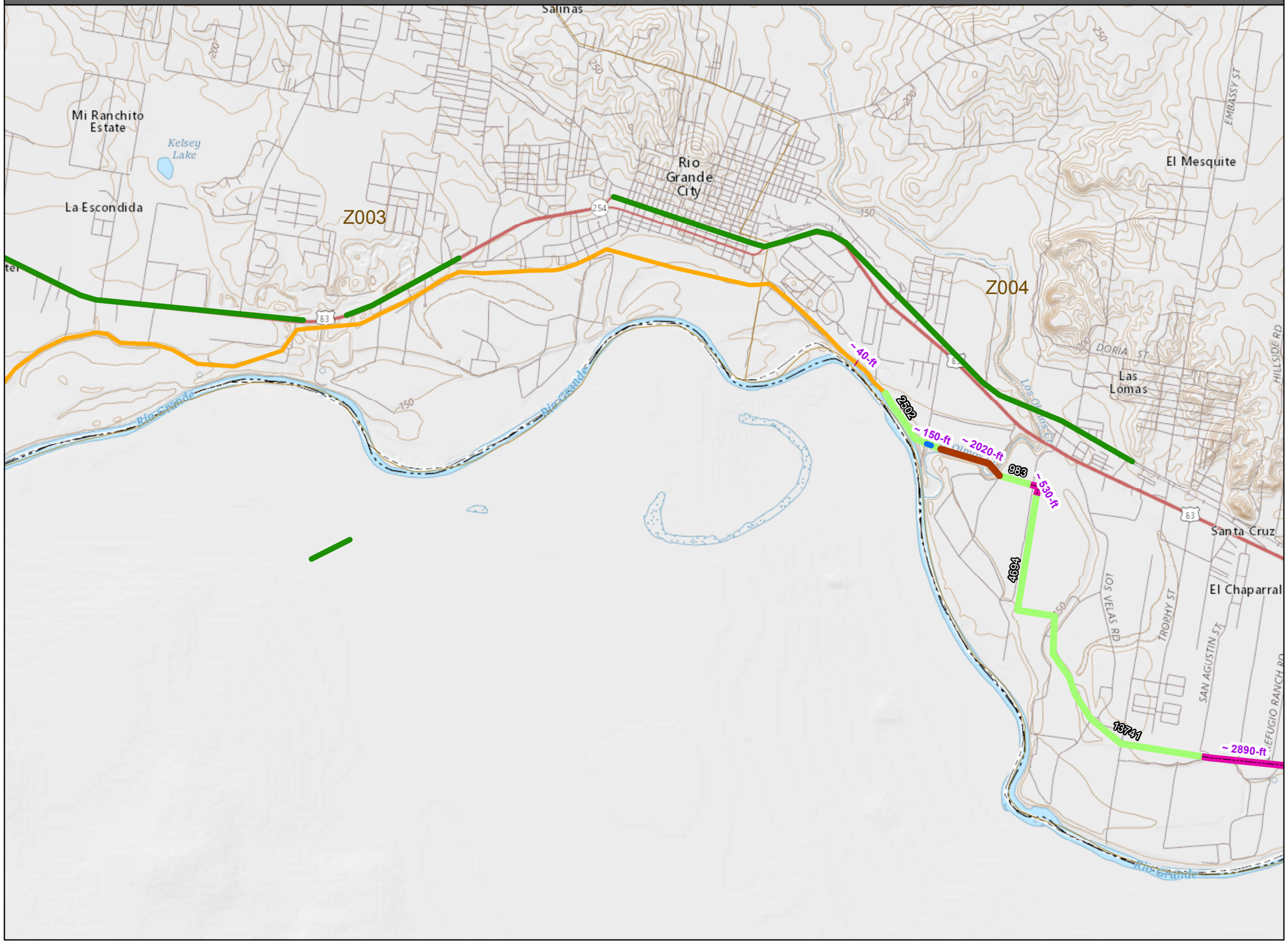
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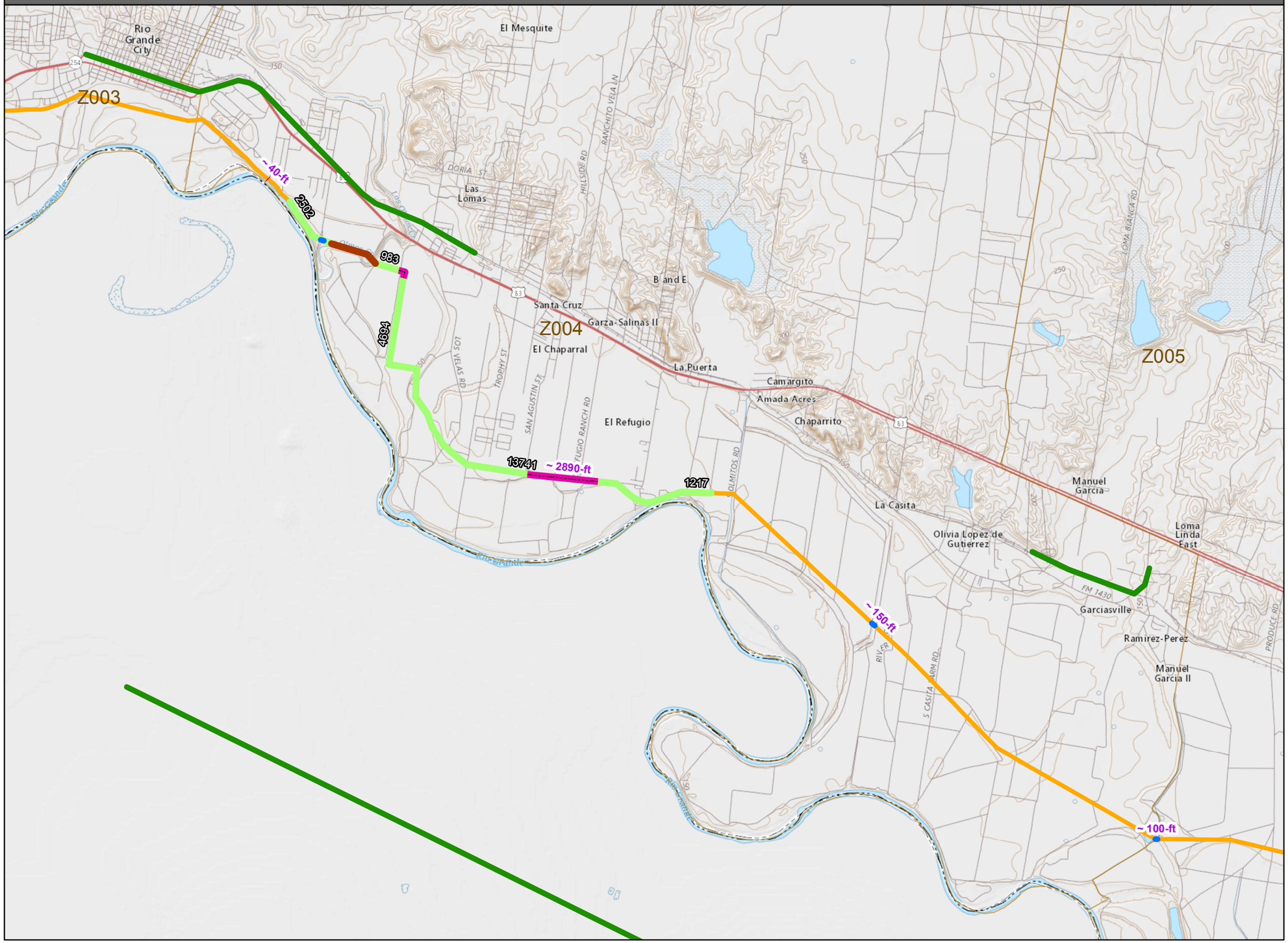
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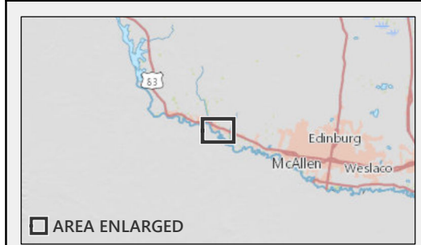
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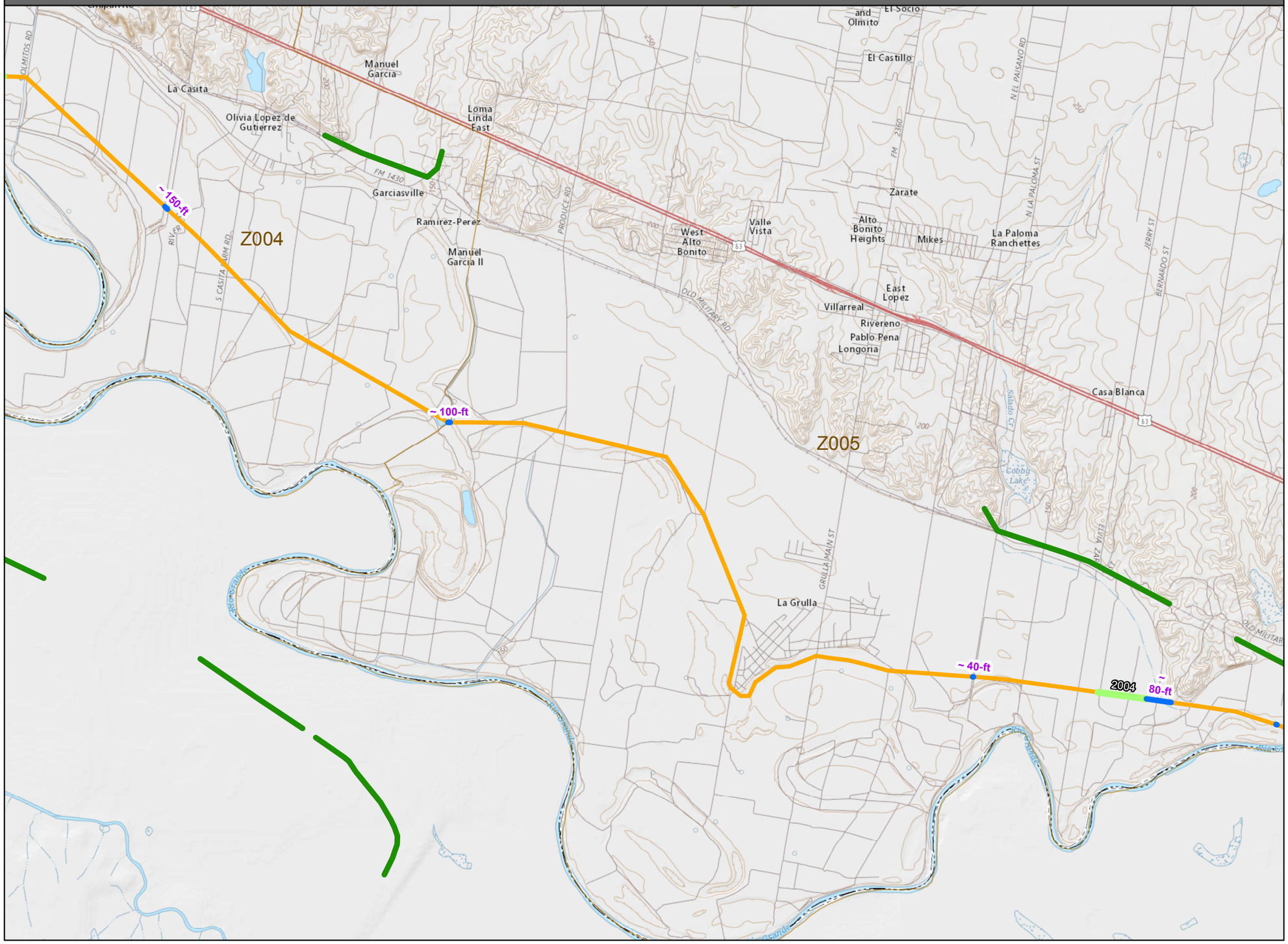
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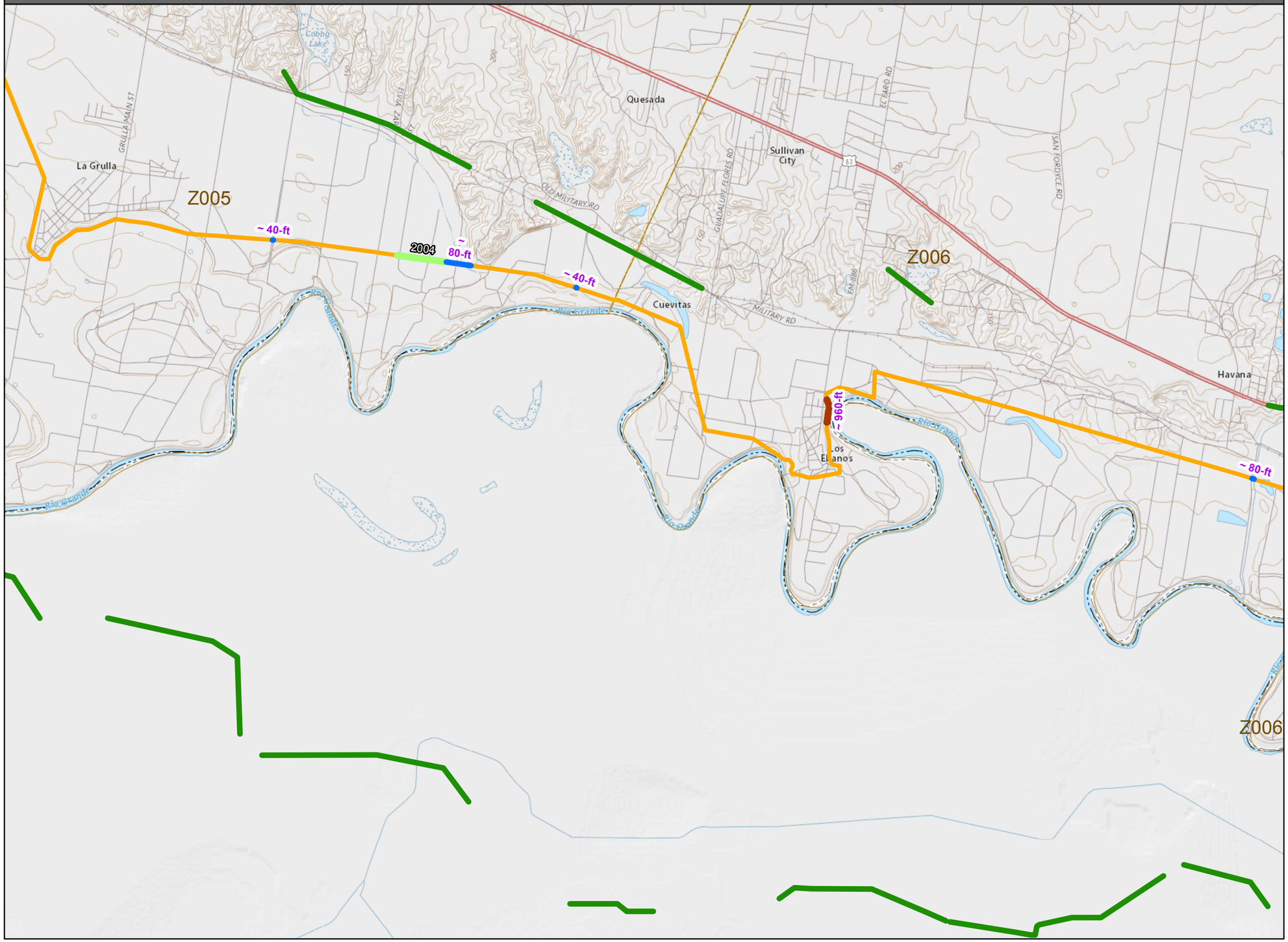
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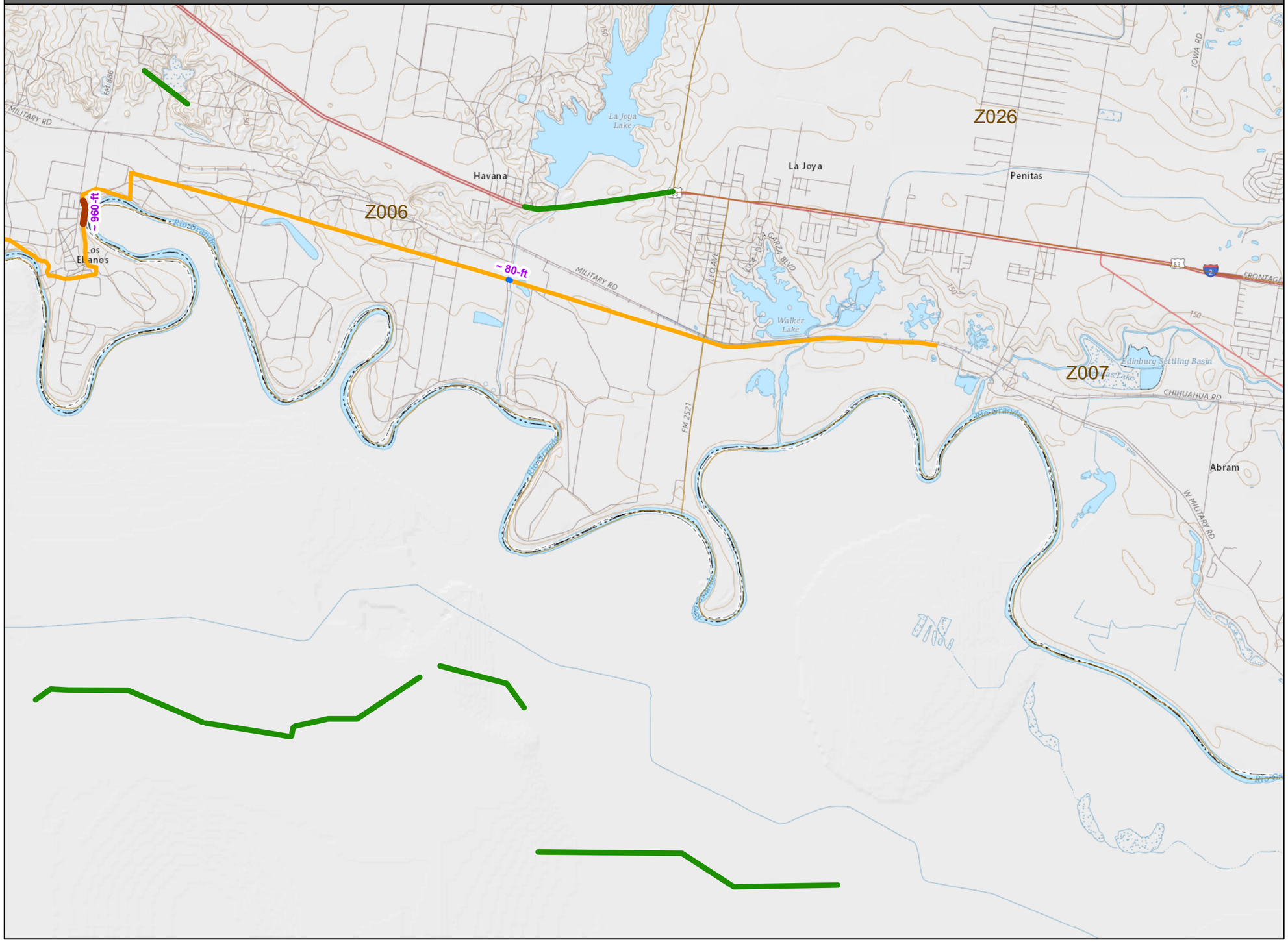
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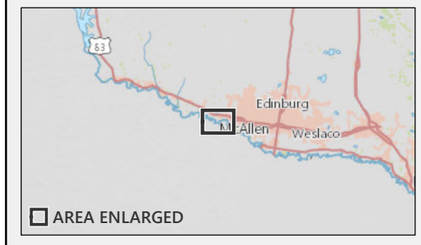
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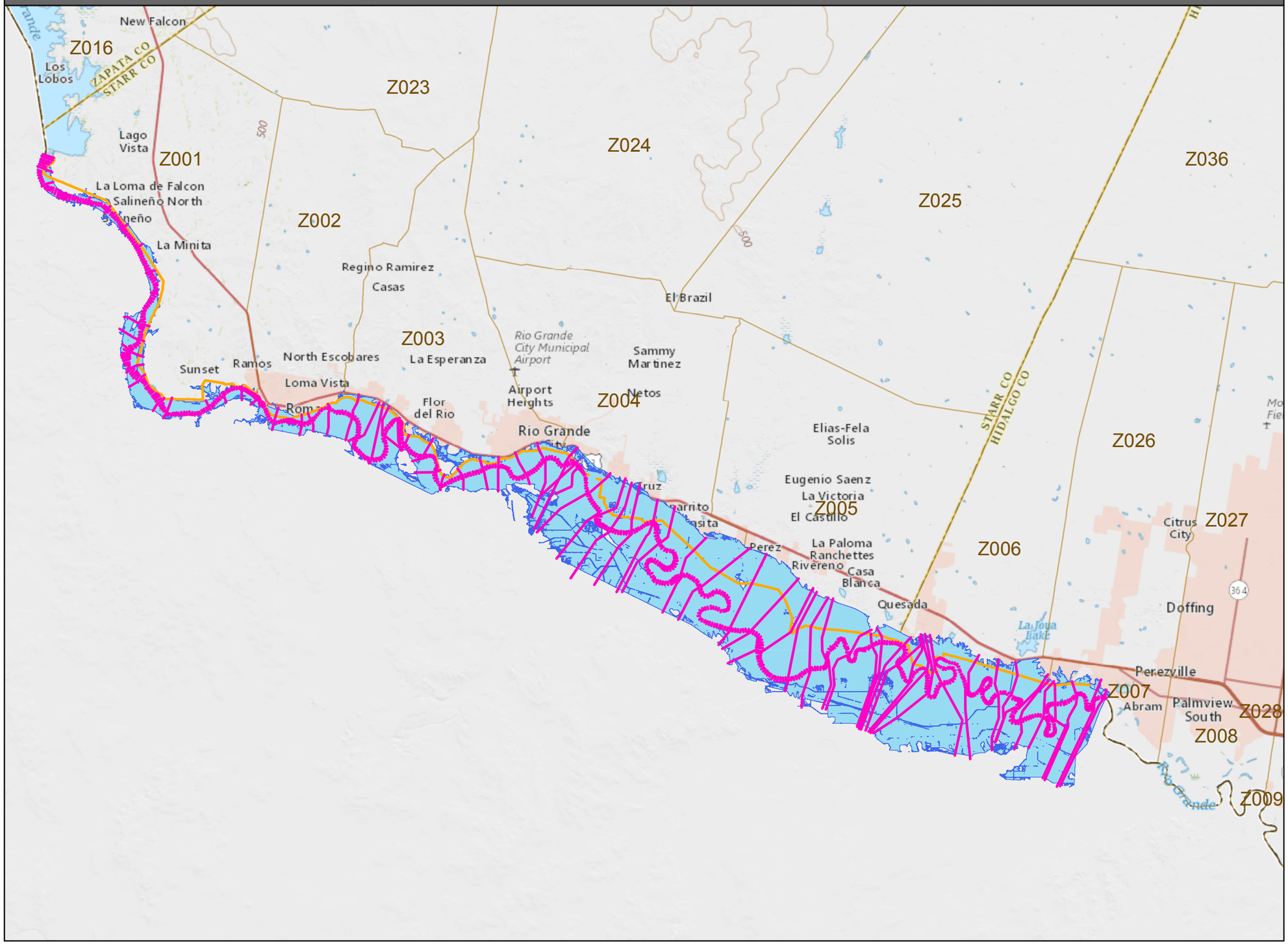
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Figure A9: Falcon Dam to Penitas 2-D Deflection Calculation Cross-sections

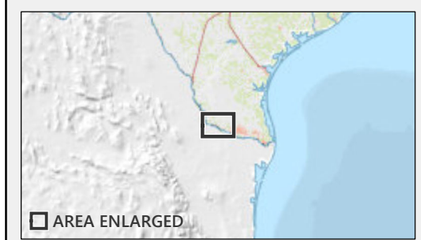


LEGEND

- Delfection Cross-sections
- Floodplain_03_26_18
- RGV-63 miles
- USBP Station Zones

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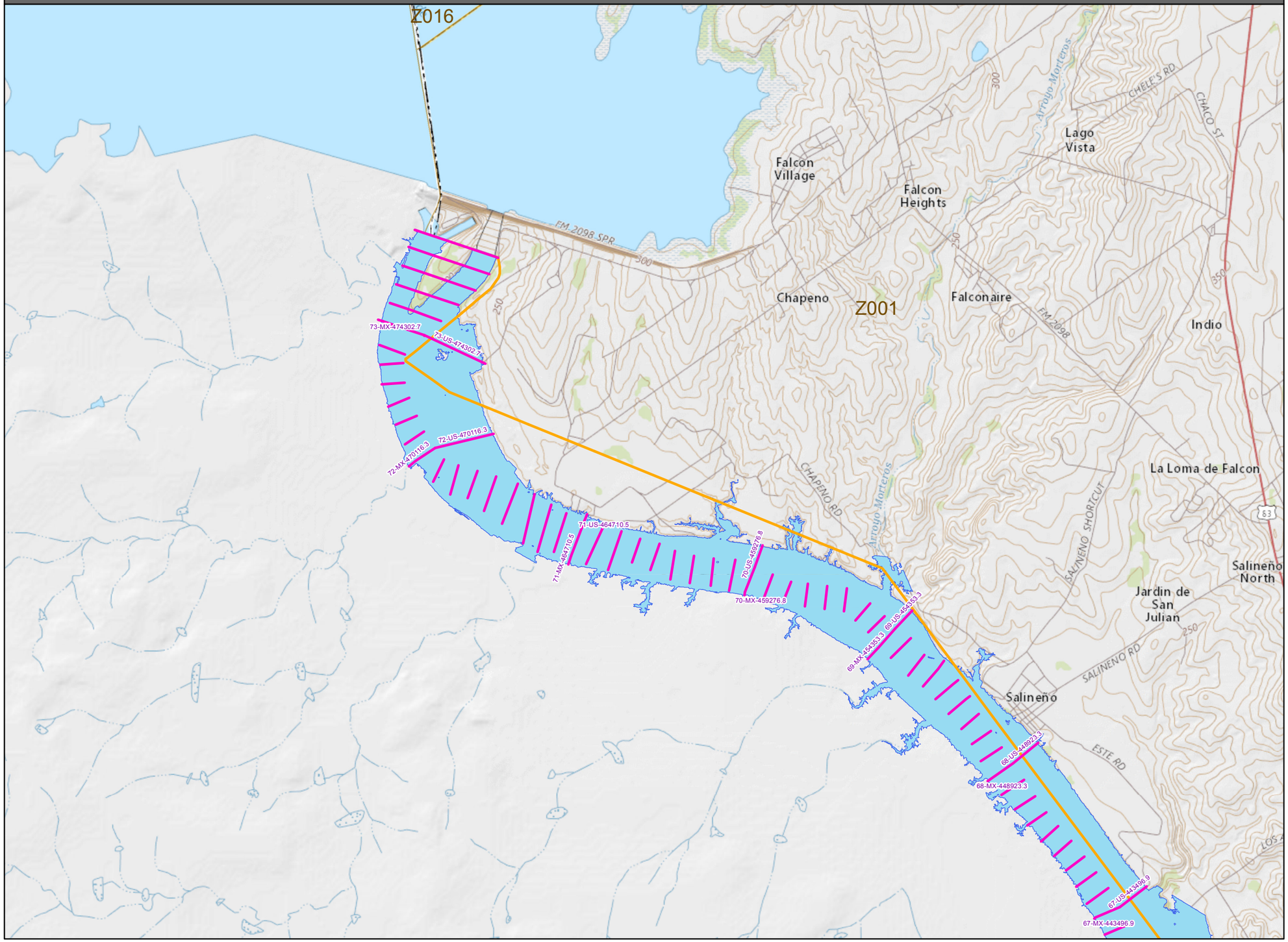
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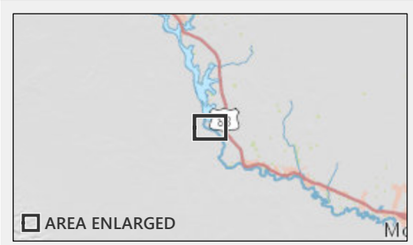


LEGEND

- Delfection Cross-sections
- Floodplain_03_26_18
- RGV-63 miles
- USBP Station Zones

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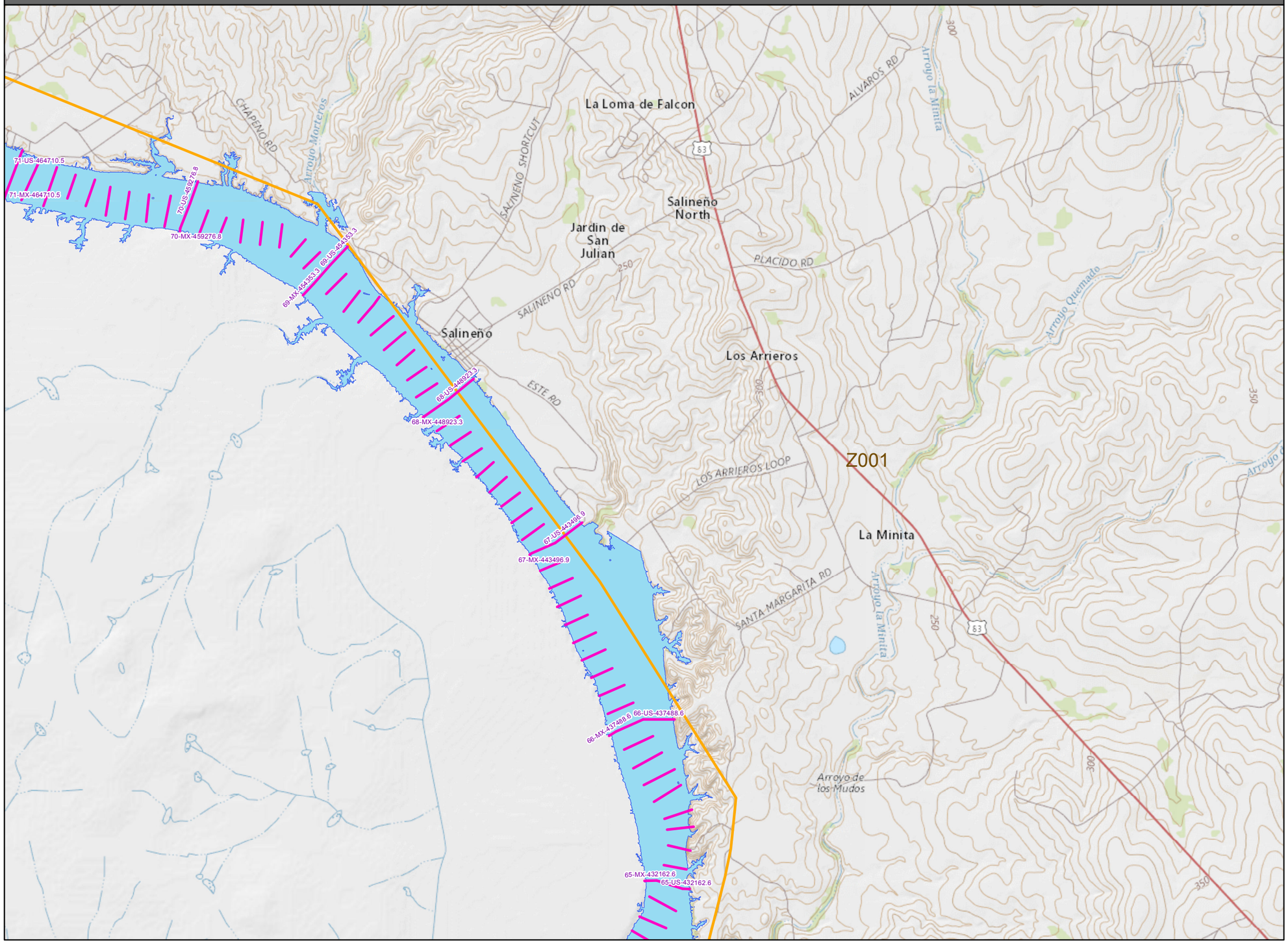
1 in = 3,000 feet 1:36,000



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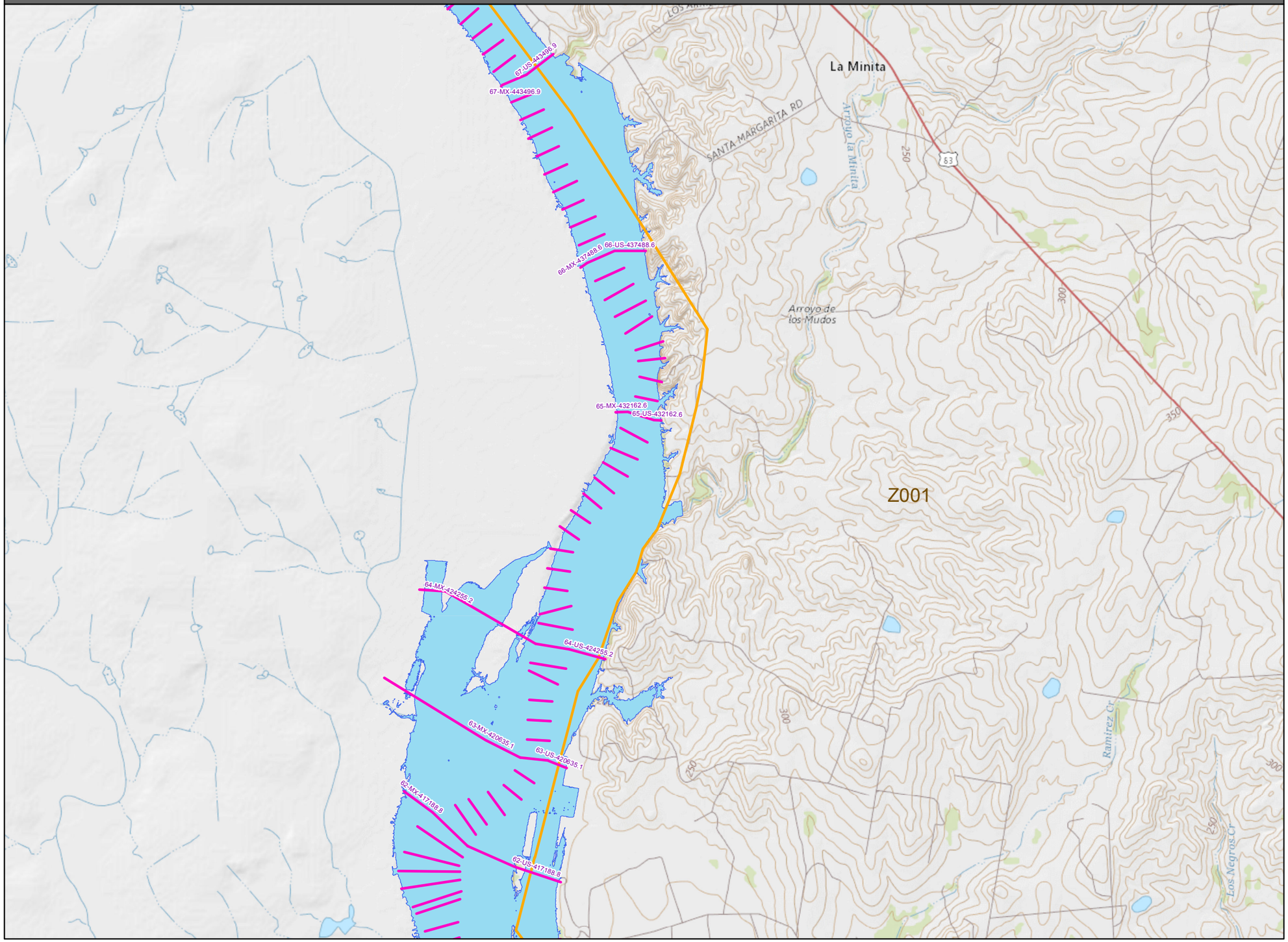
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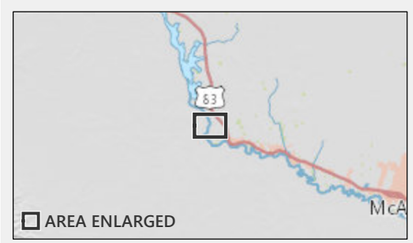


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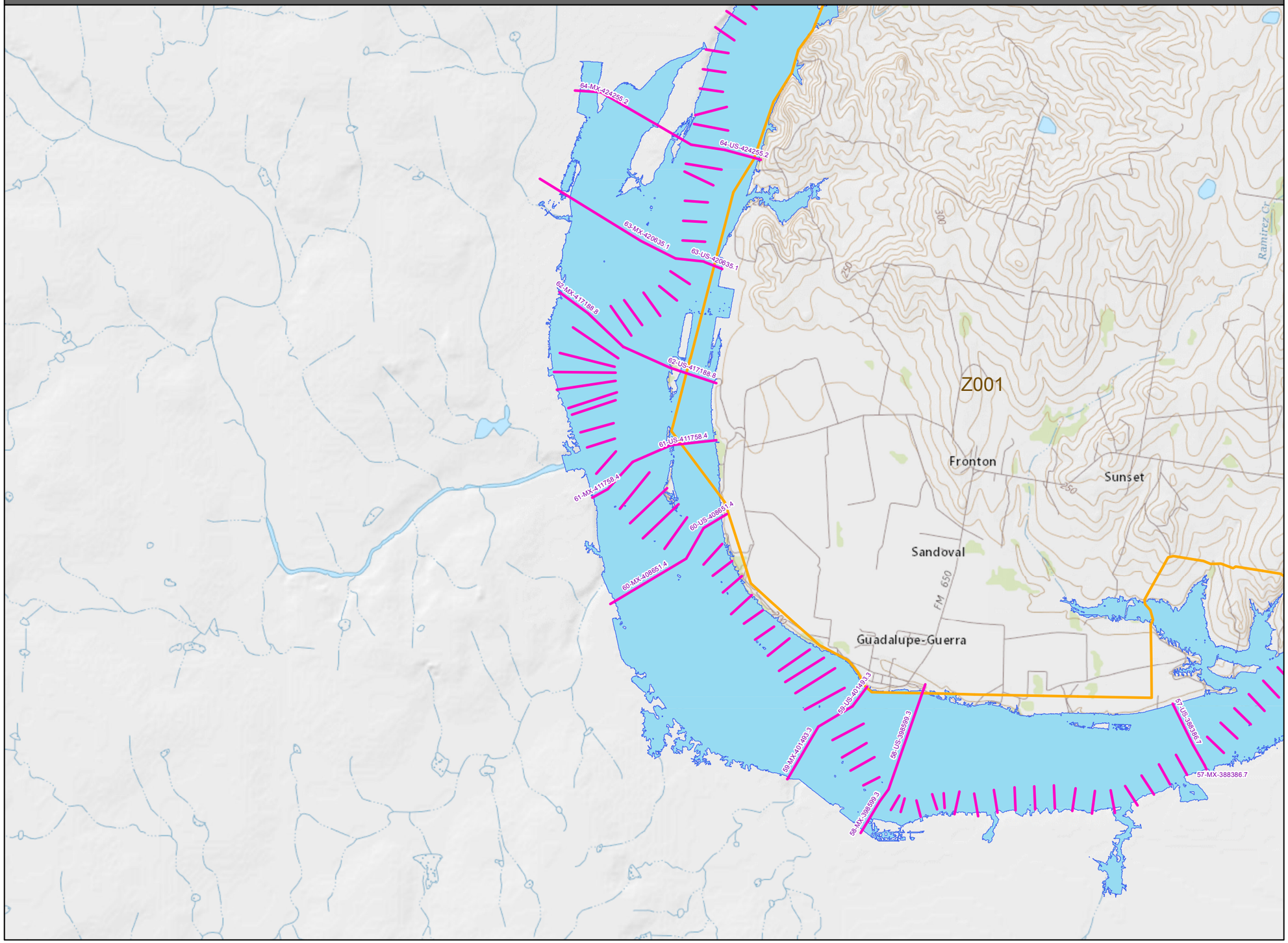
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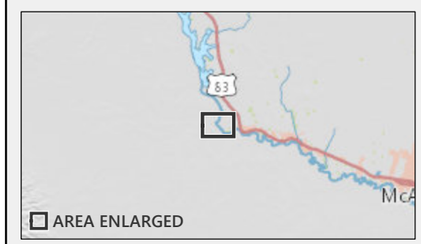


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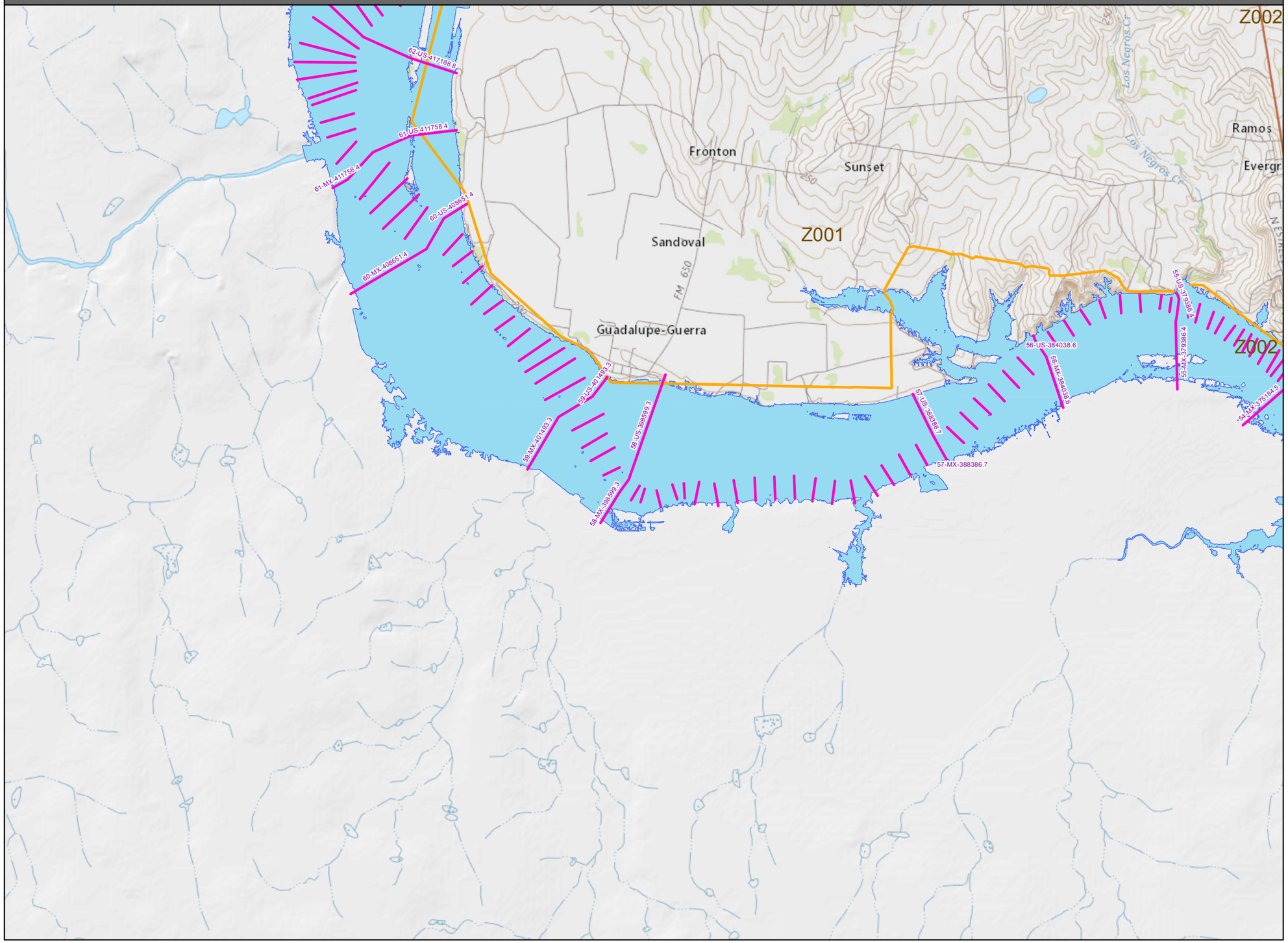
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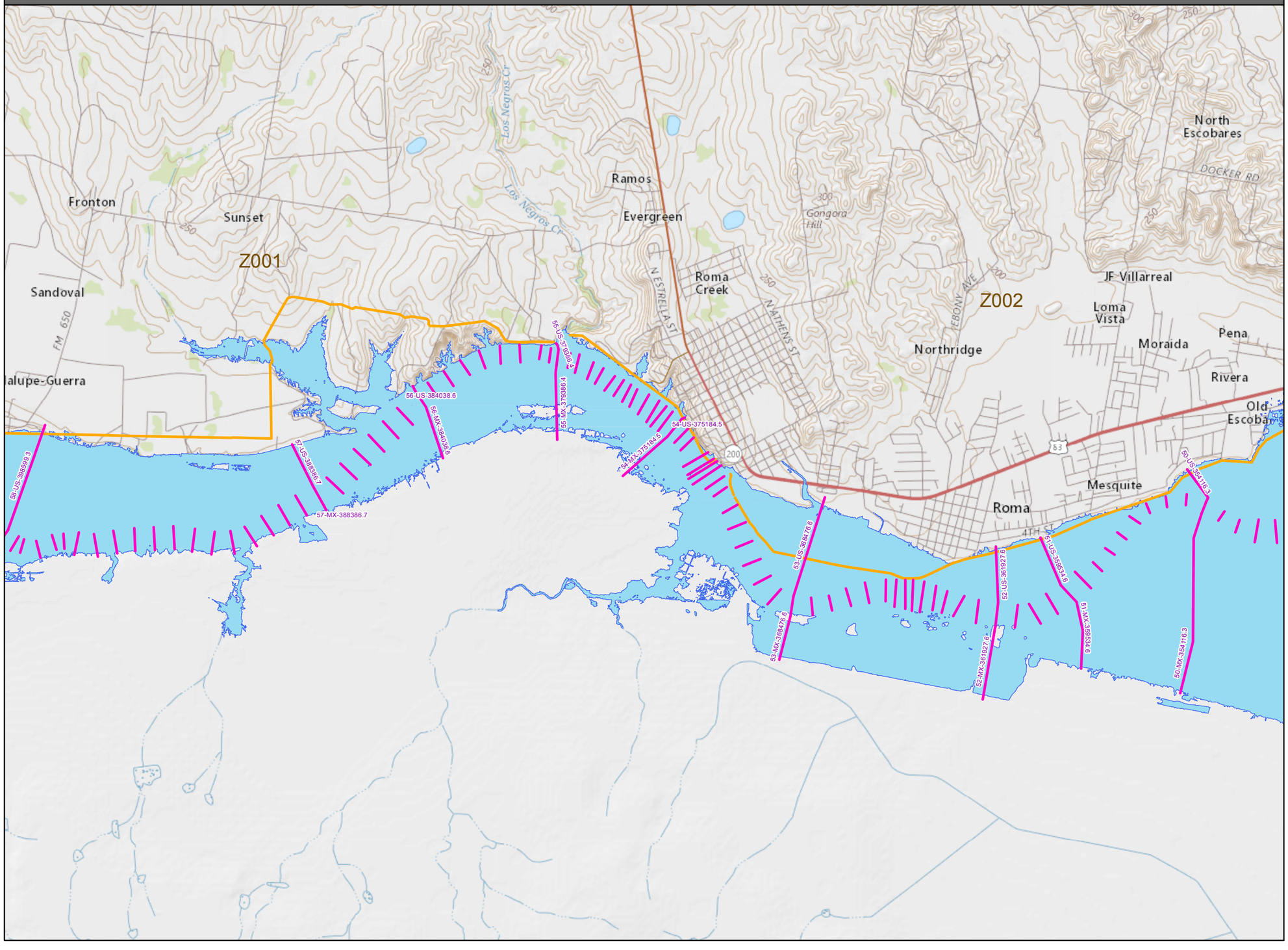
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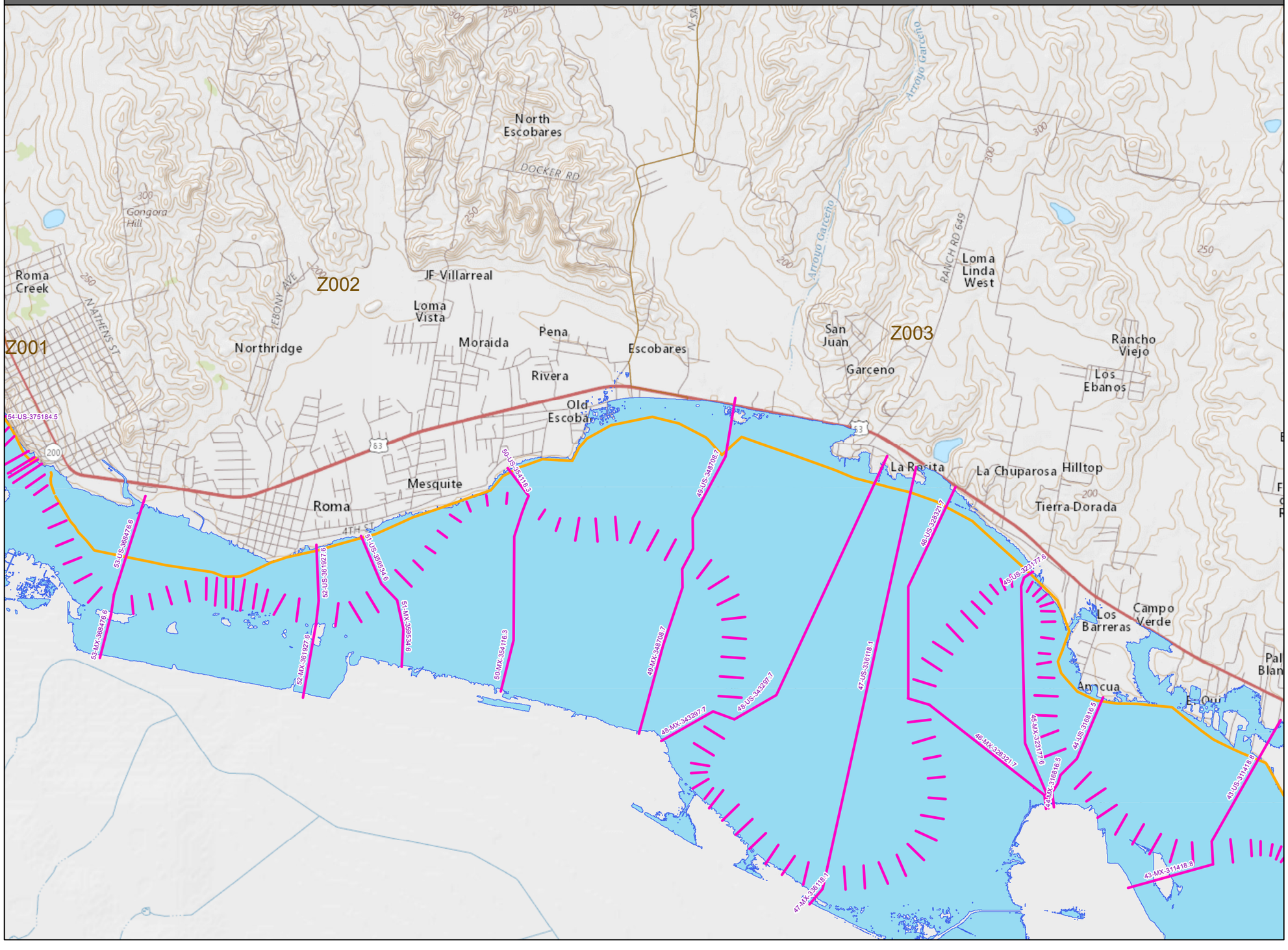
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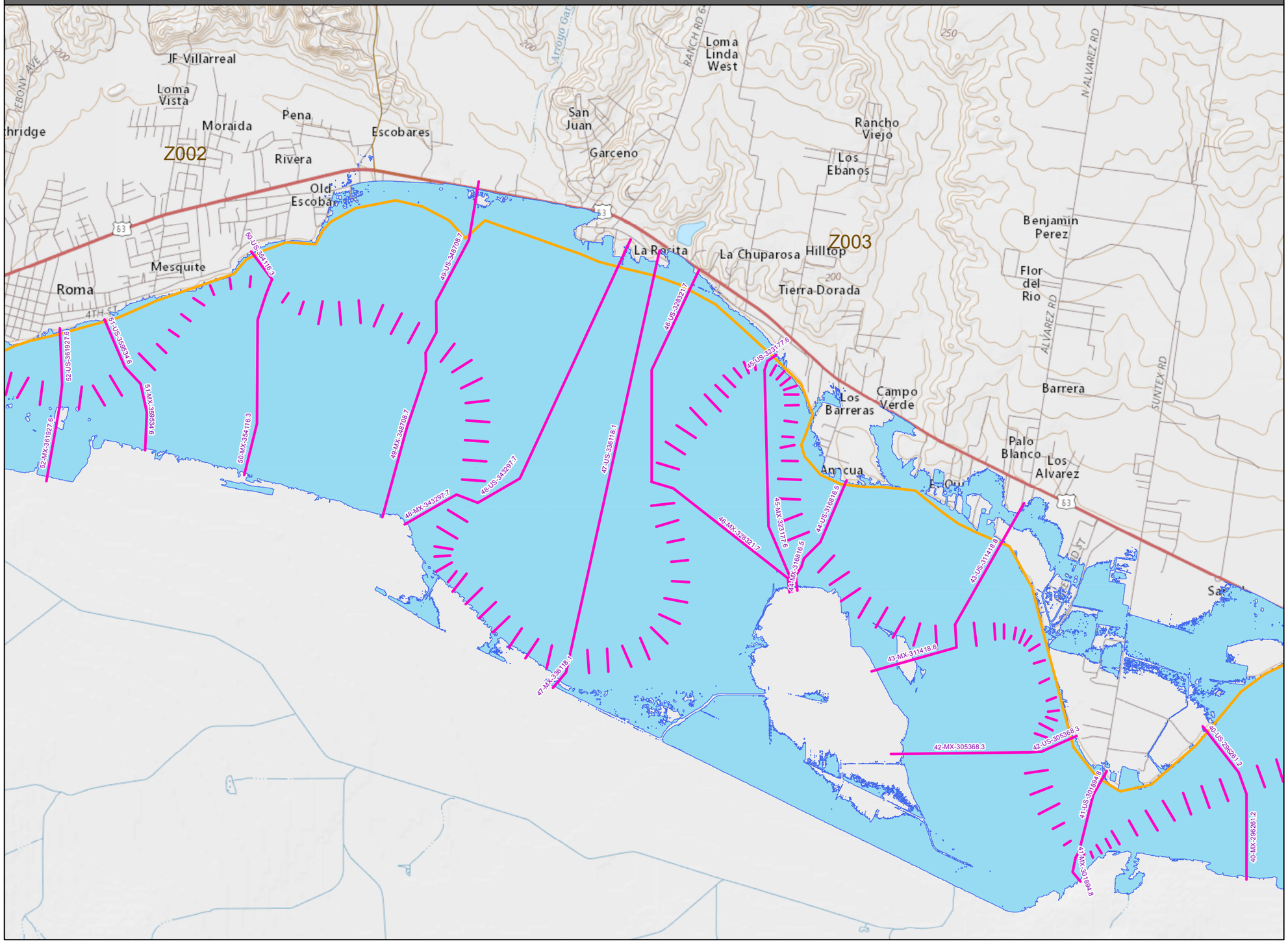
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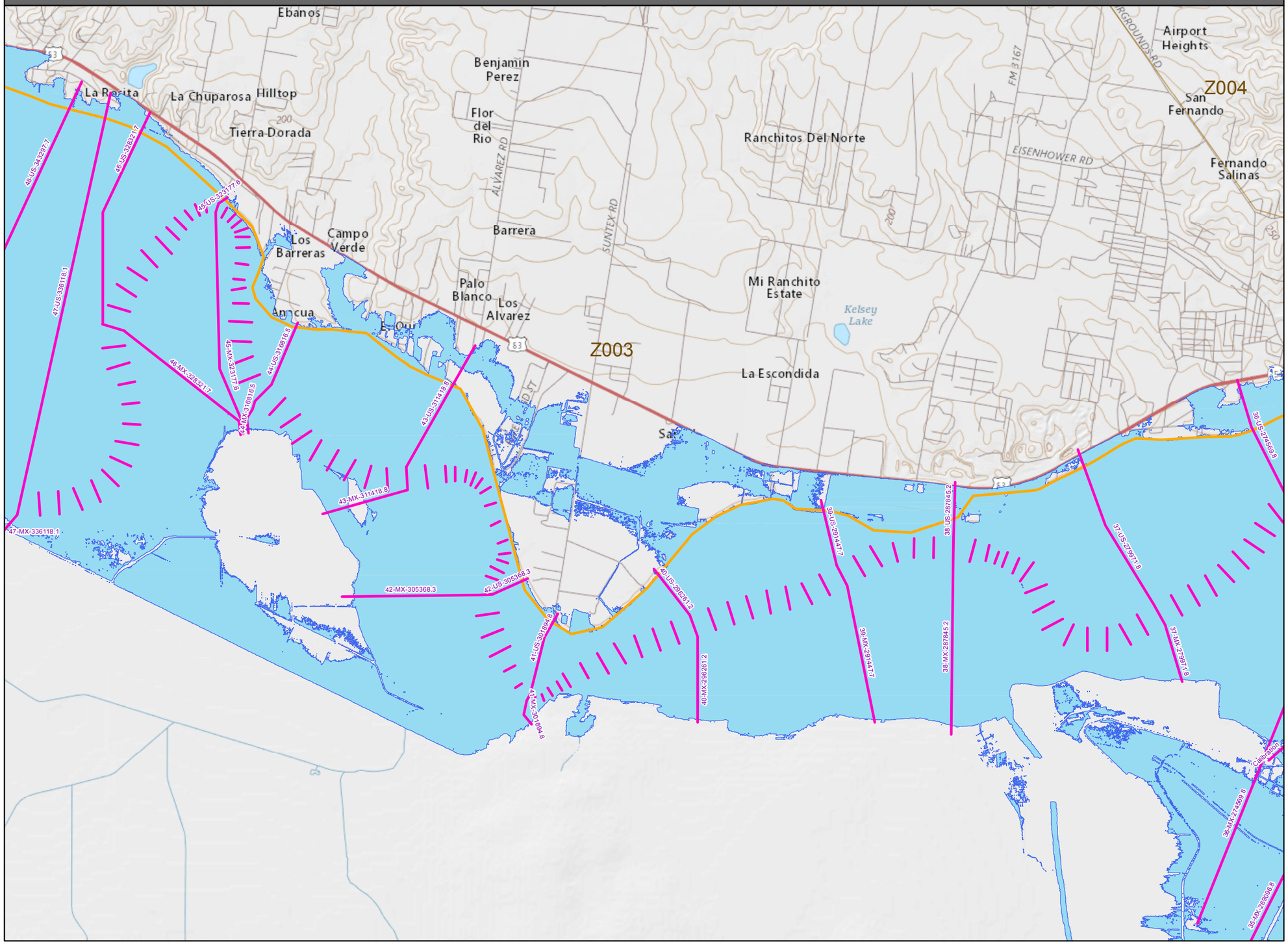
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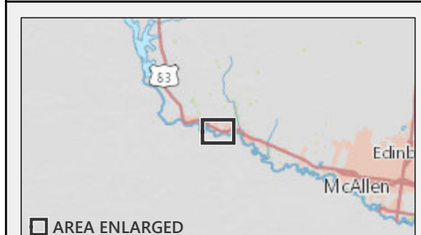


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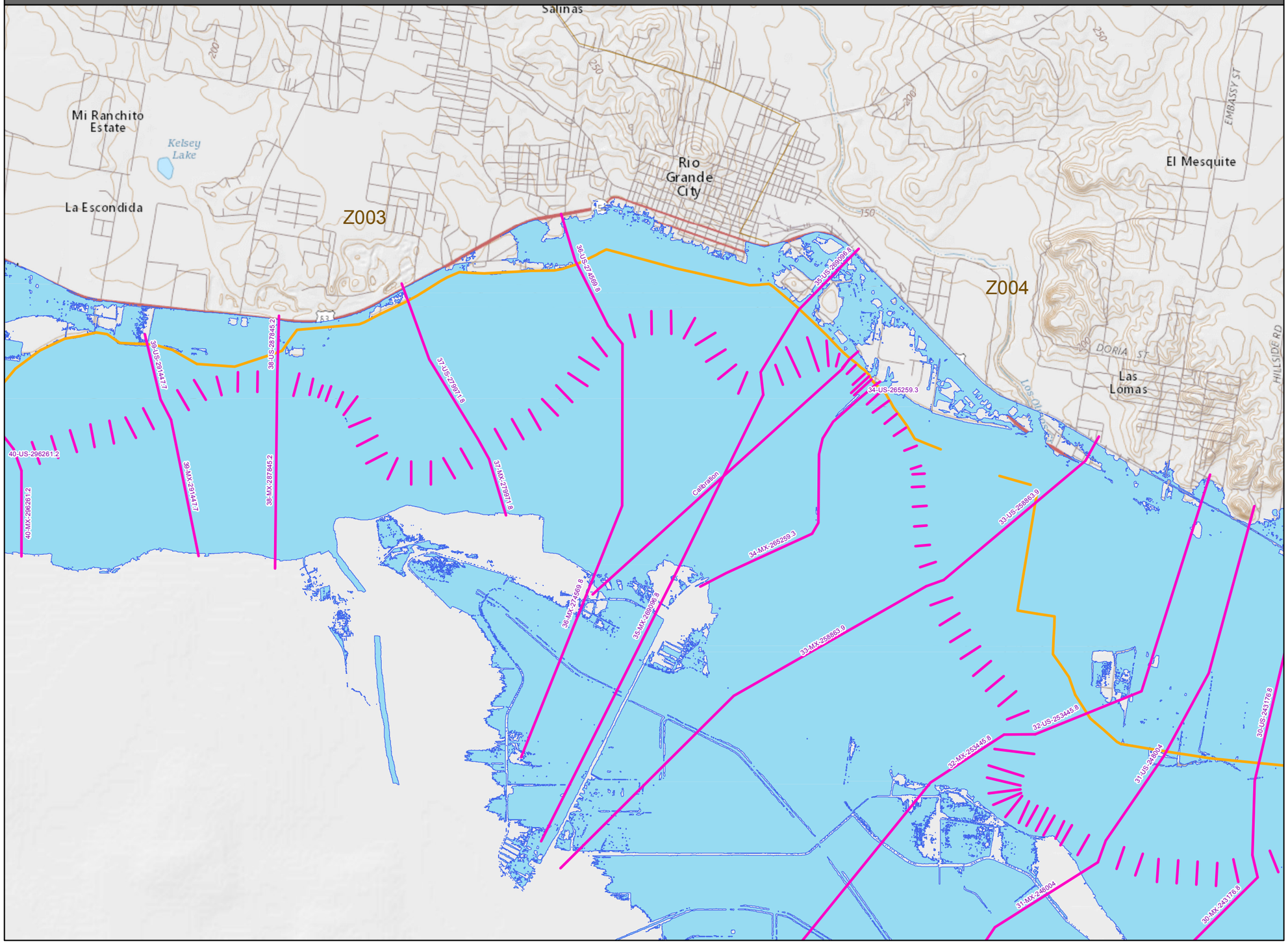
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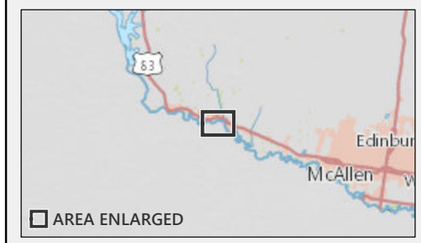


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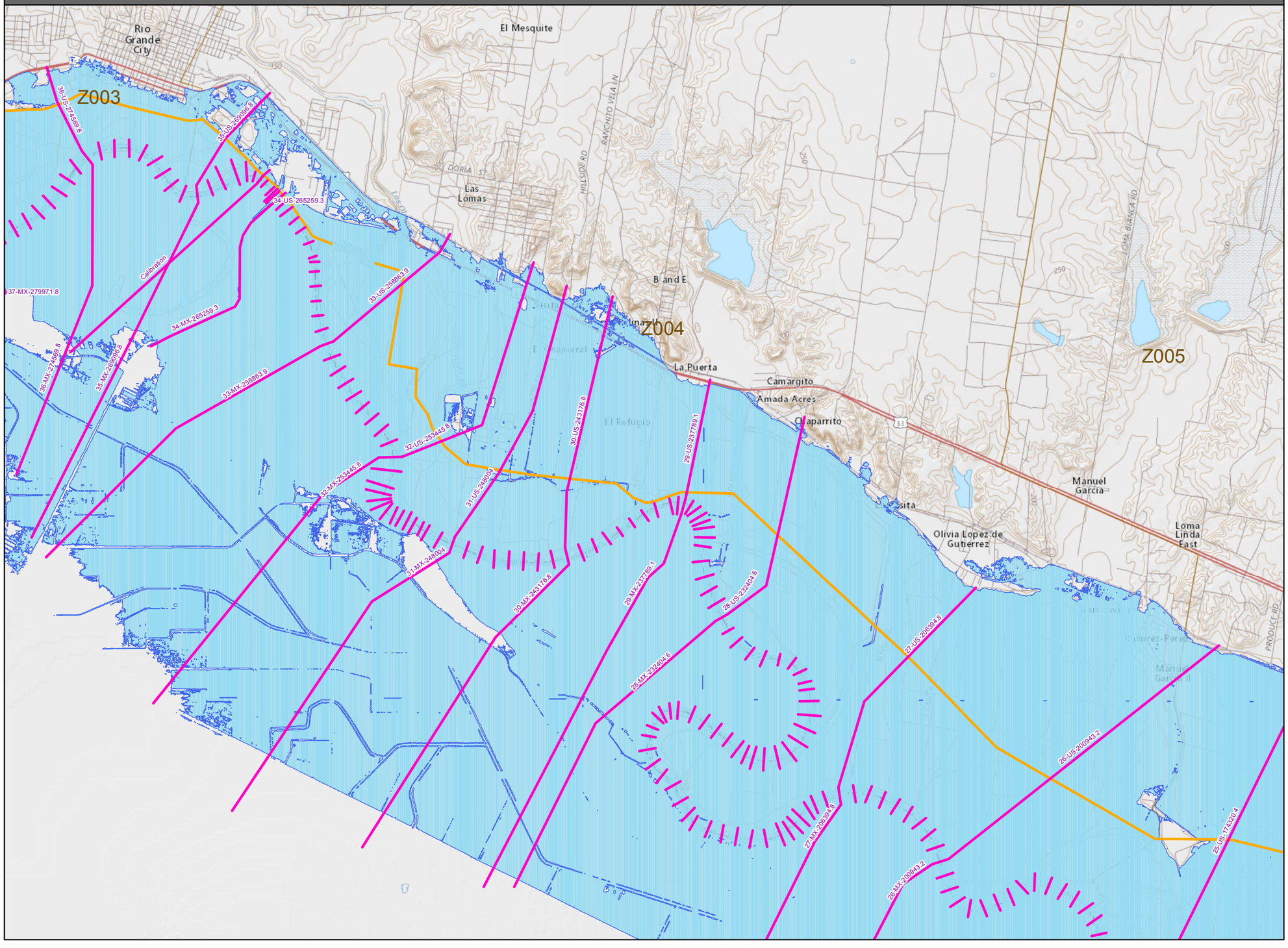
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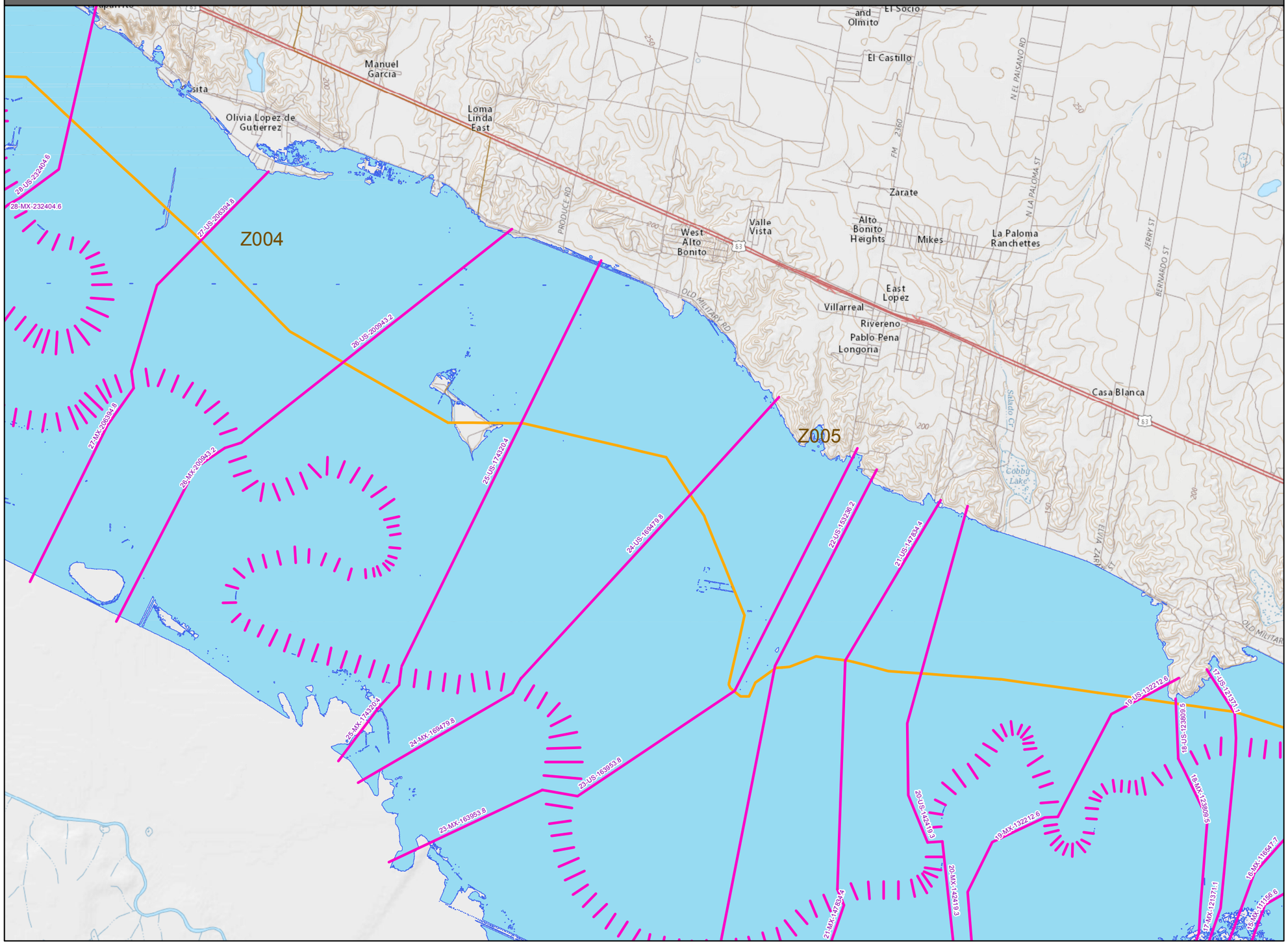
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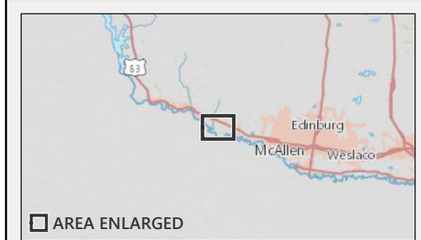


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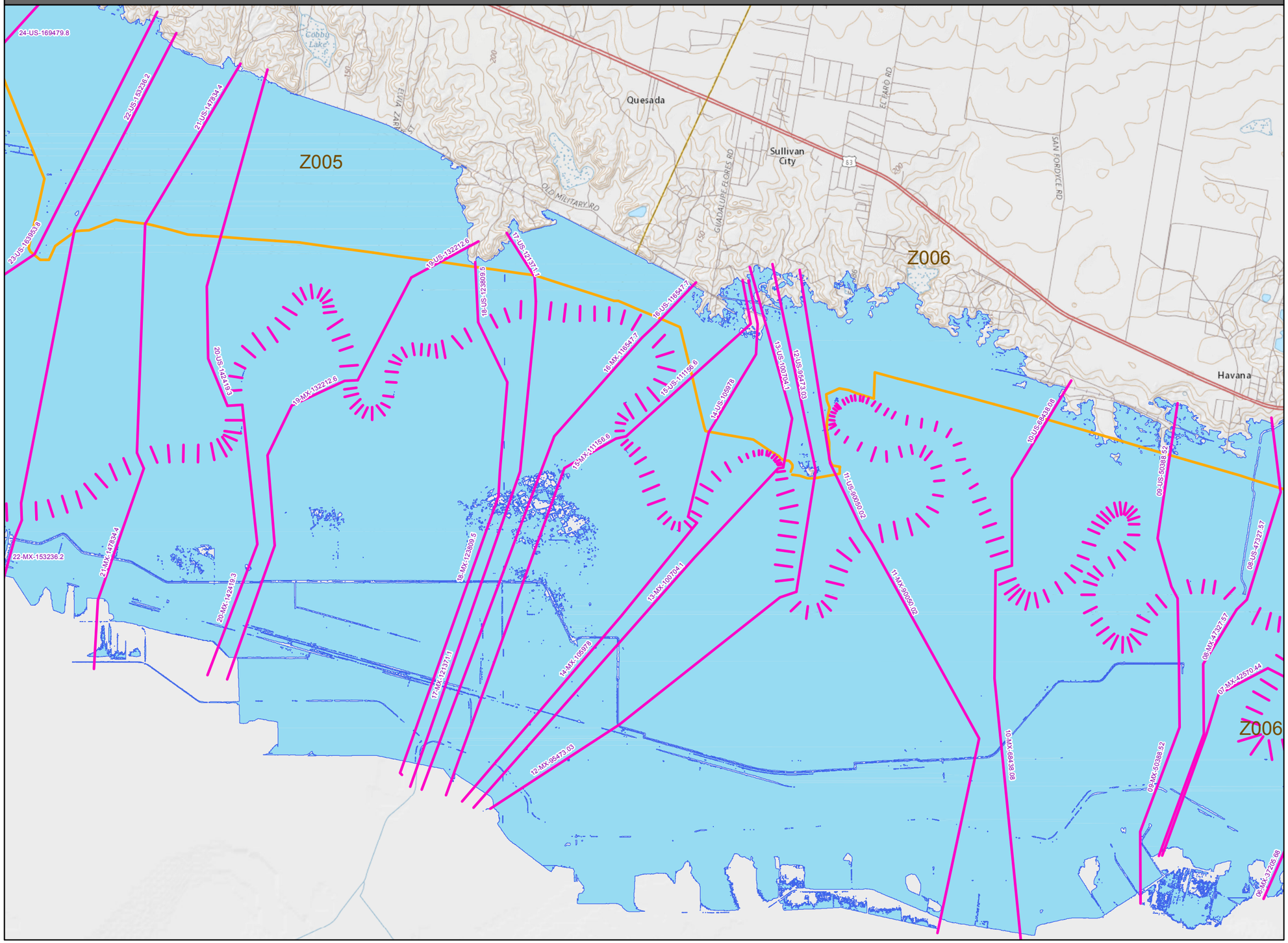
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Figure A9: Falcon Dam to Penitas 2-D Deflection Calculation Cross-sections

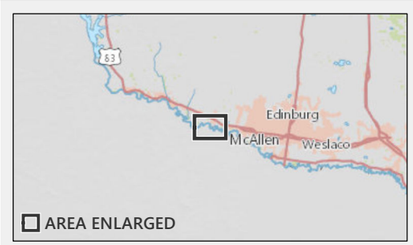


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- Delfection Cross-sections
- Floodplain_03_26_18
- RGV-63 miles
- USBP Station Zones

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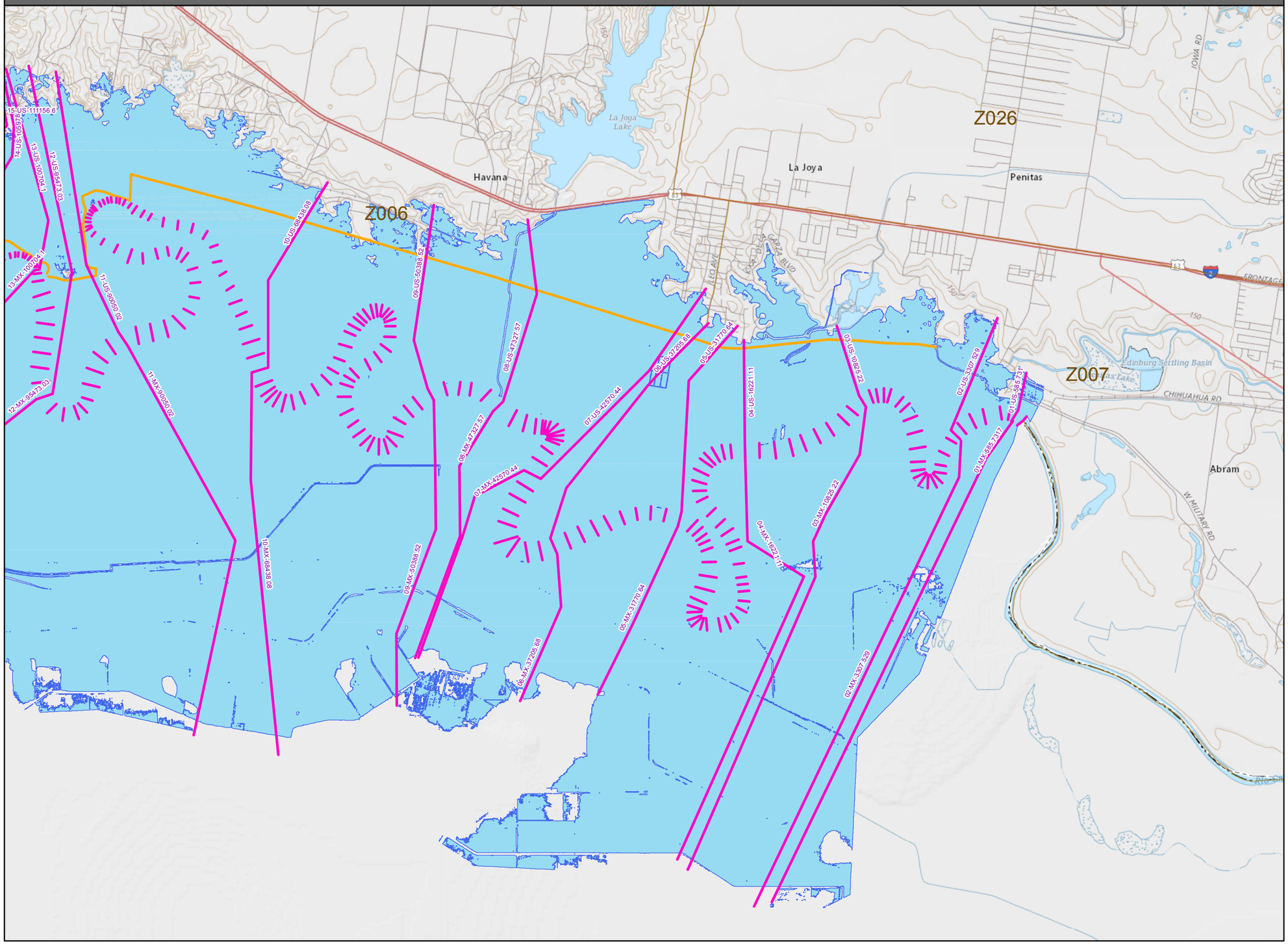
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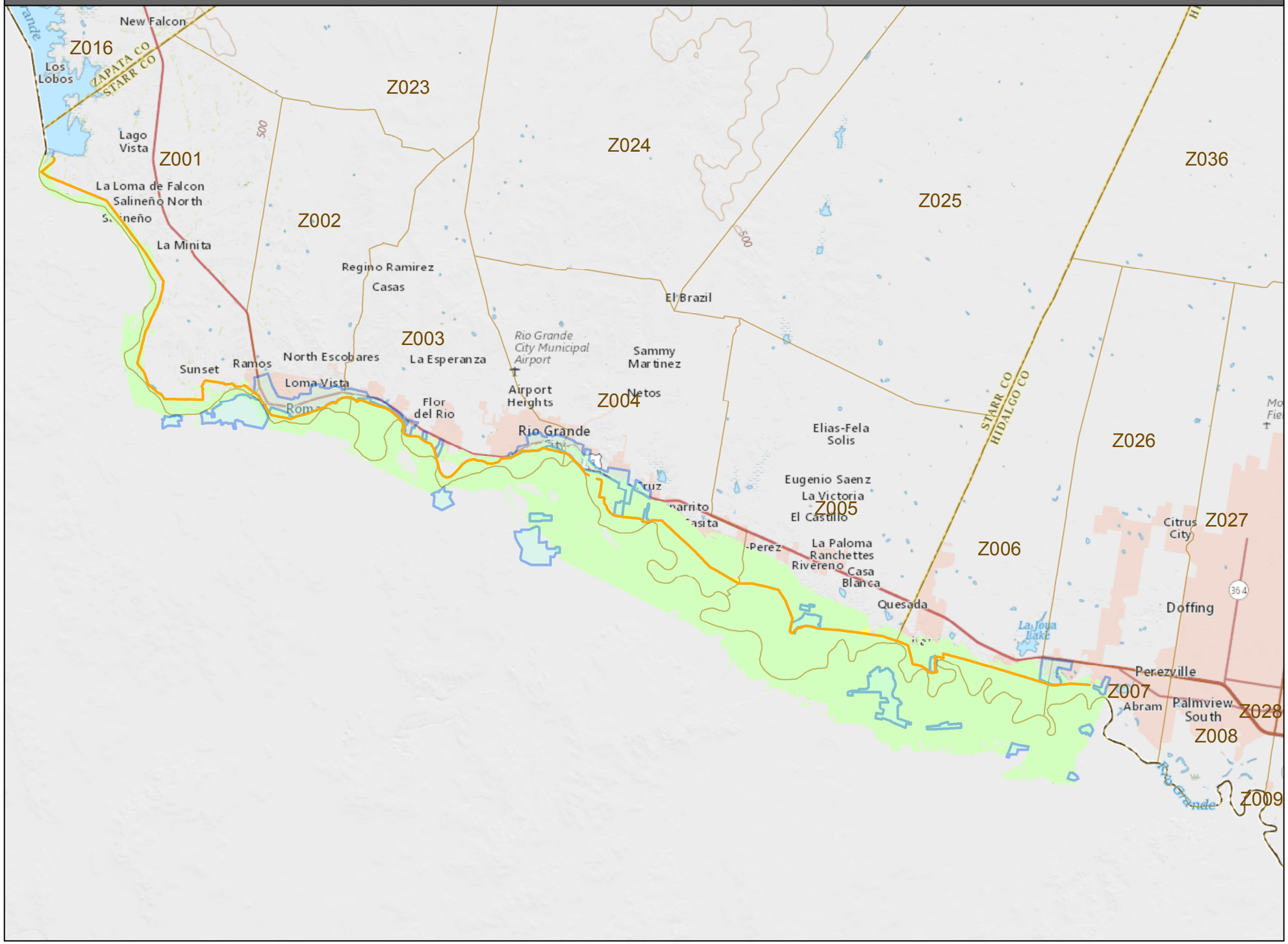
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Figure A10: Falcon Dam to Penitas 2-D WSE Comparison (Proposed – Existing)



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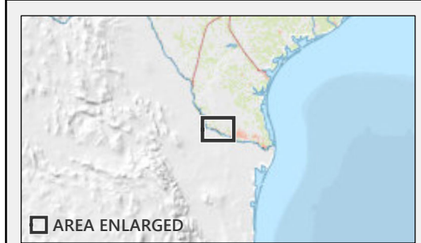
- Urban Areas
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WSE Impacts

- 3-inches and Under
- 3 to 6-inches
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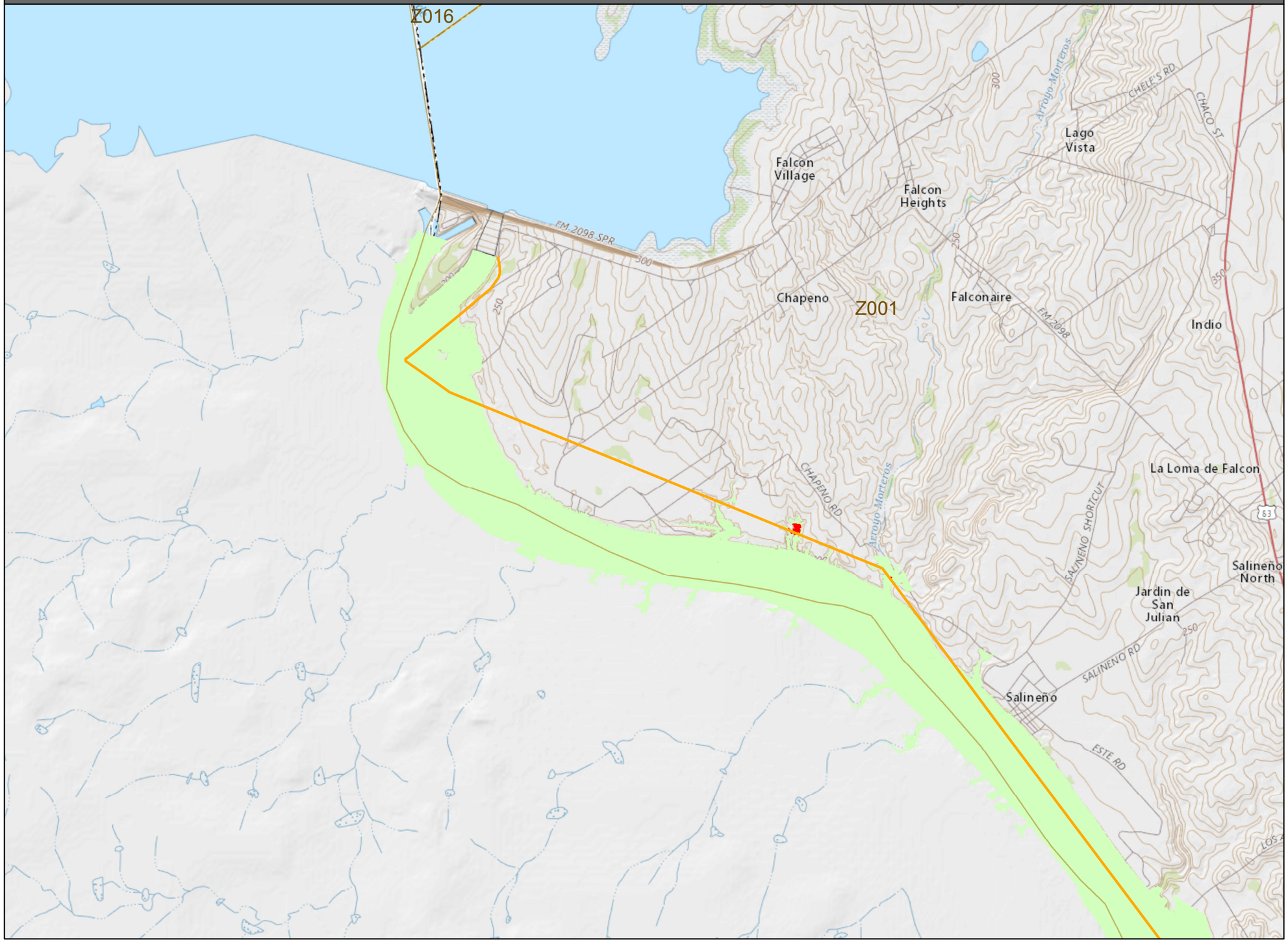
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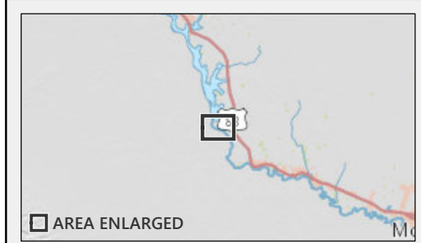
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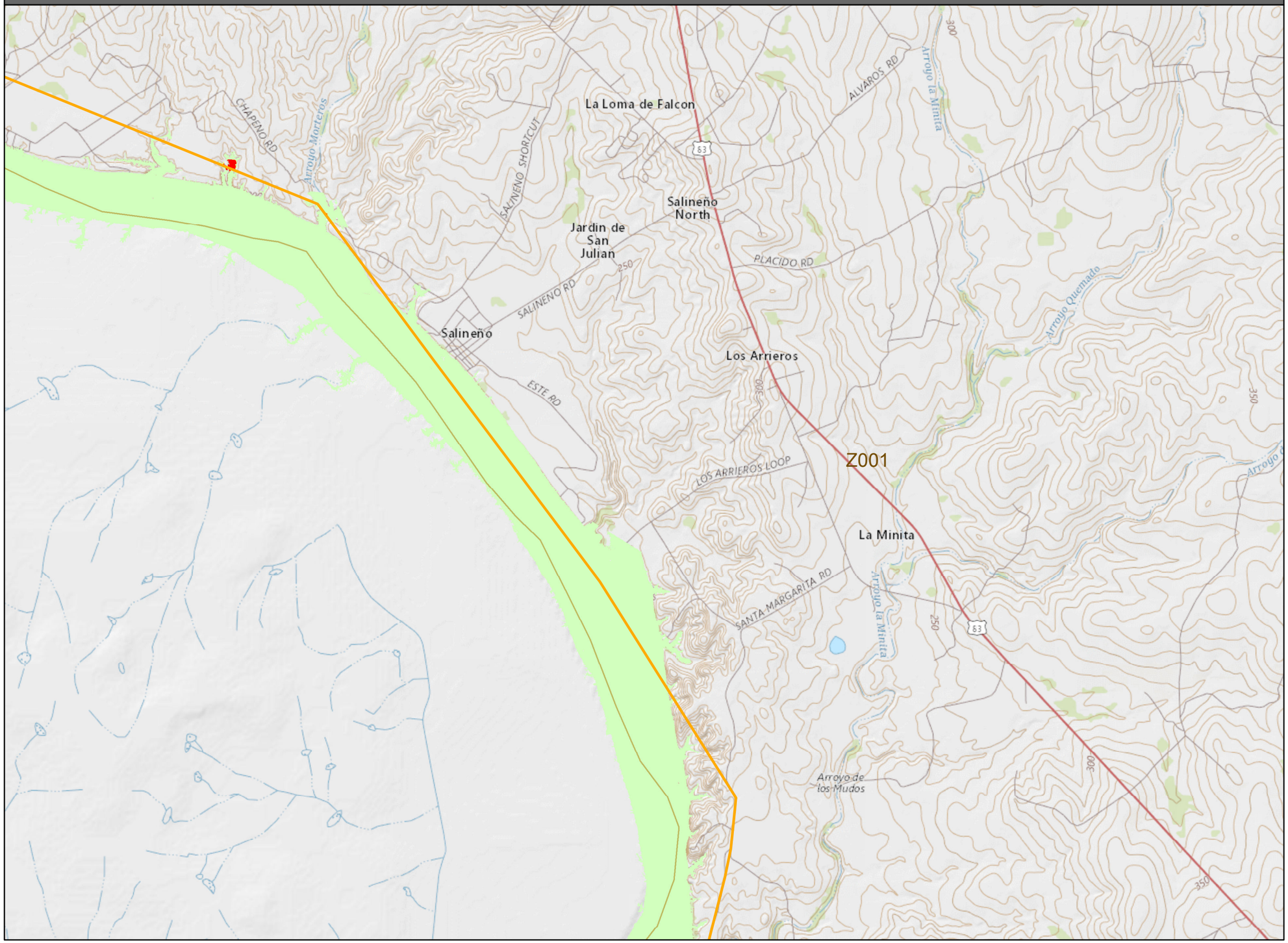
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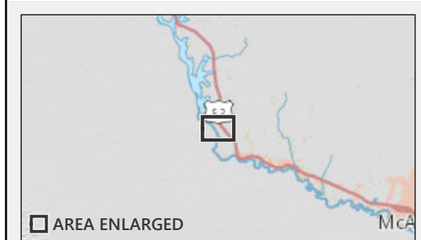
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WSE Impacts

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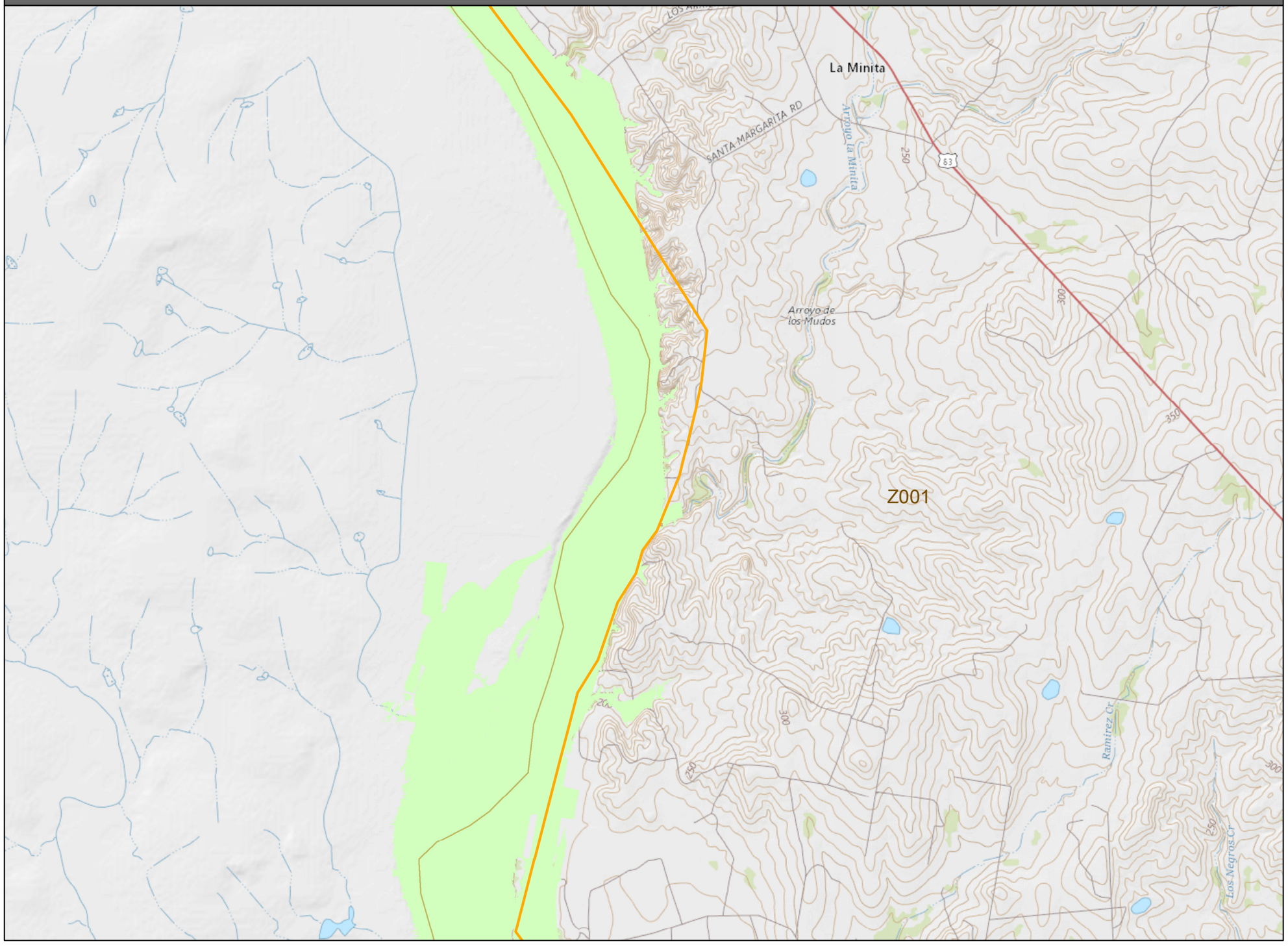
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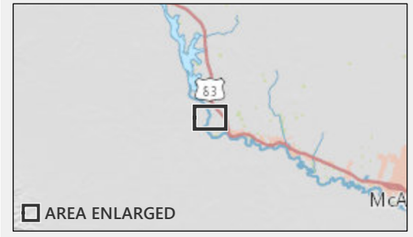
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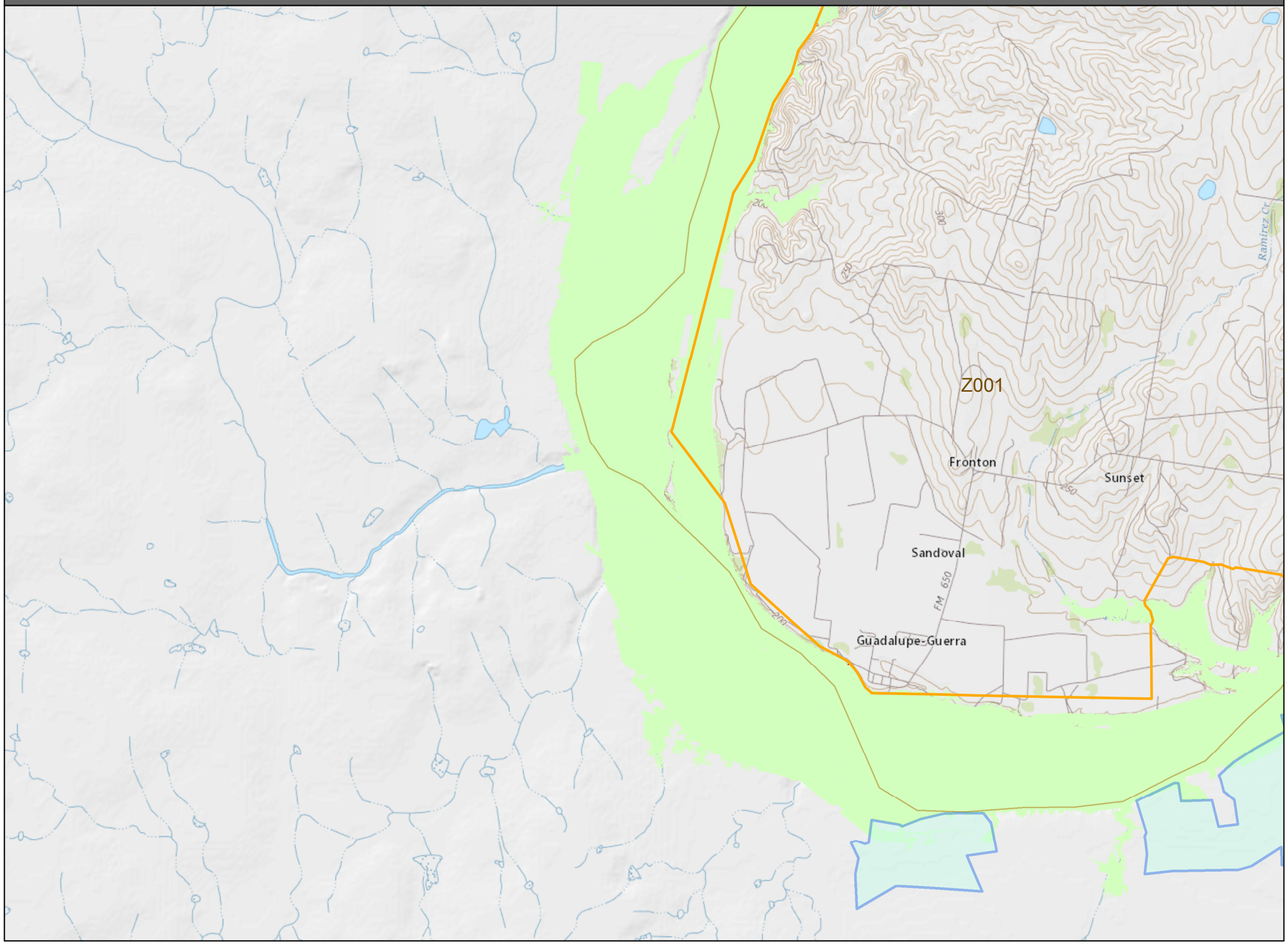
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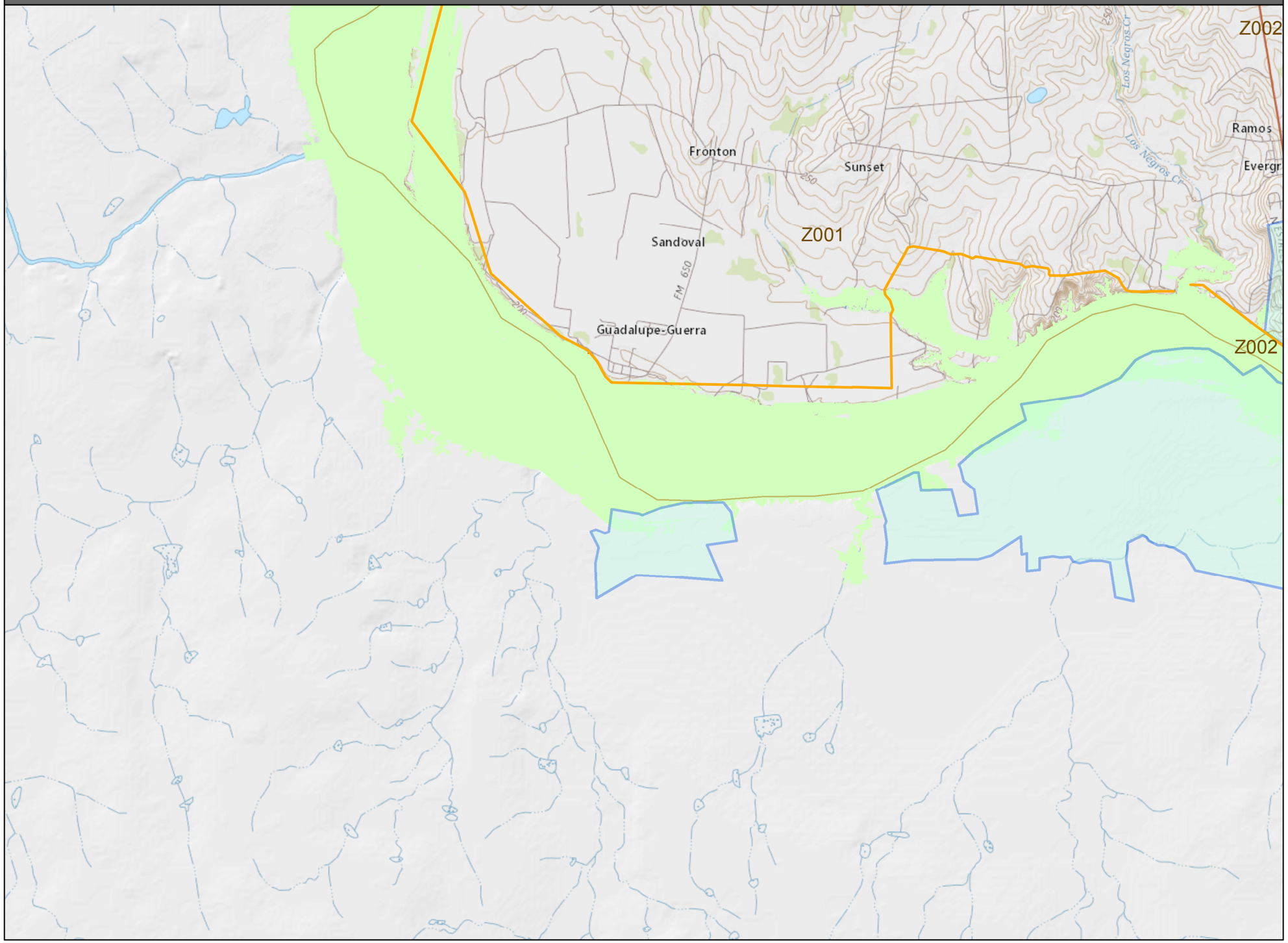
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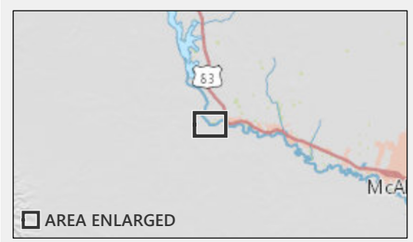
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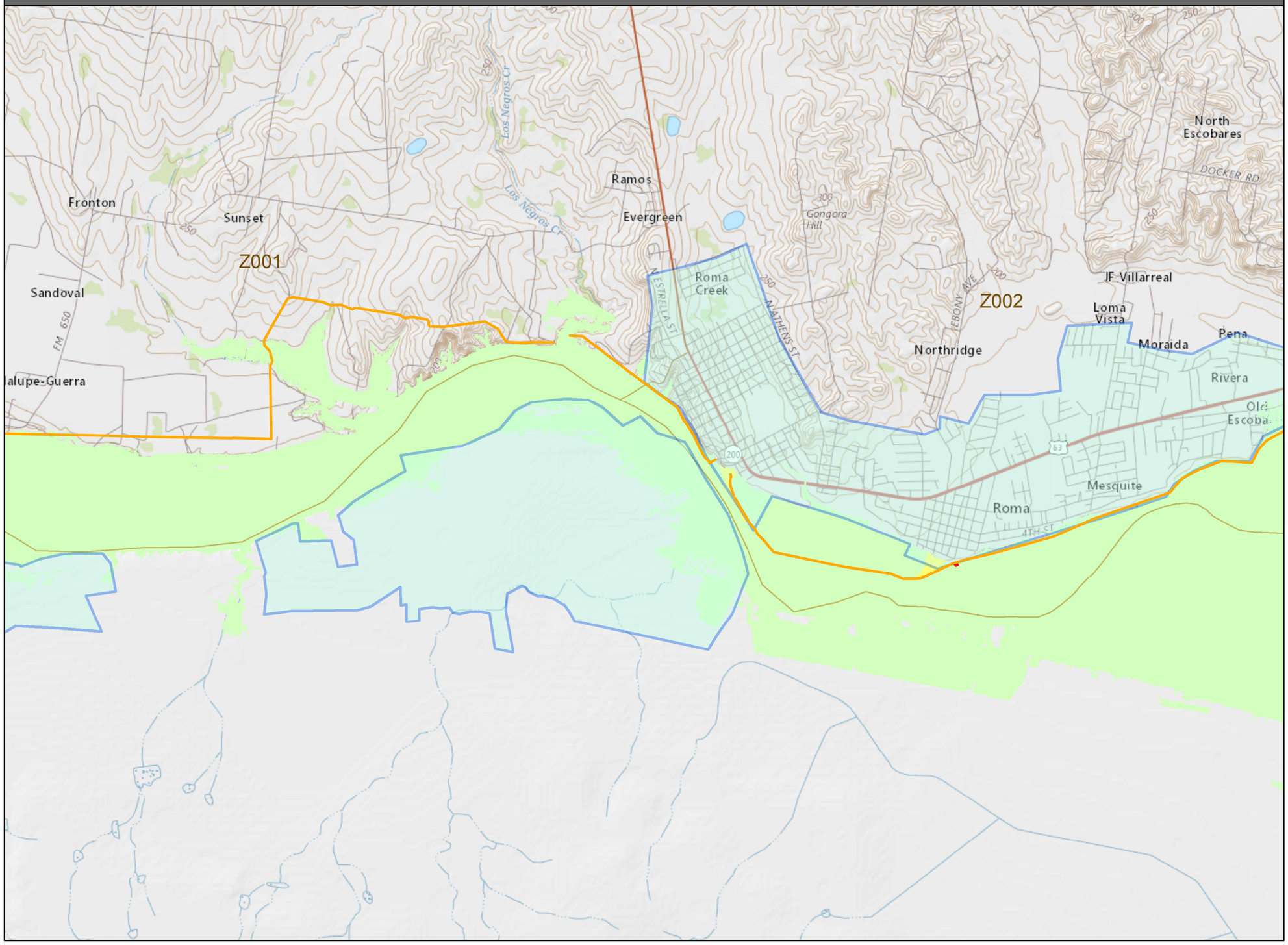
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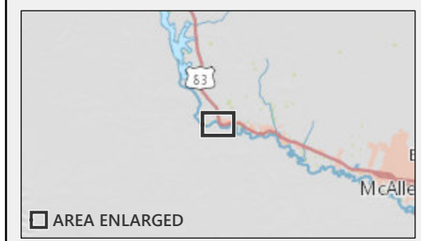
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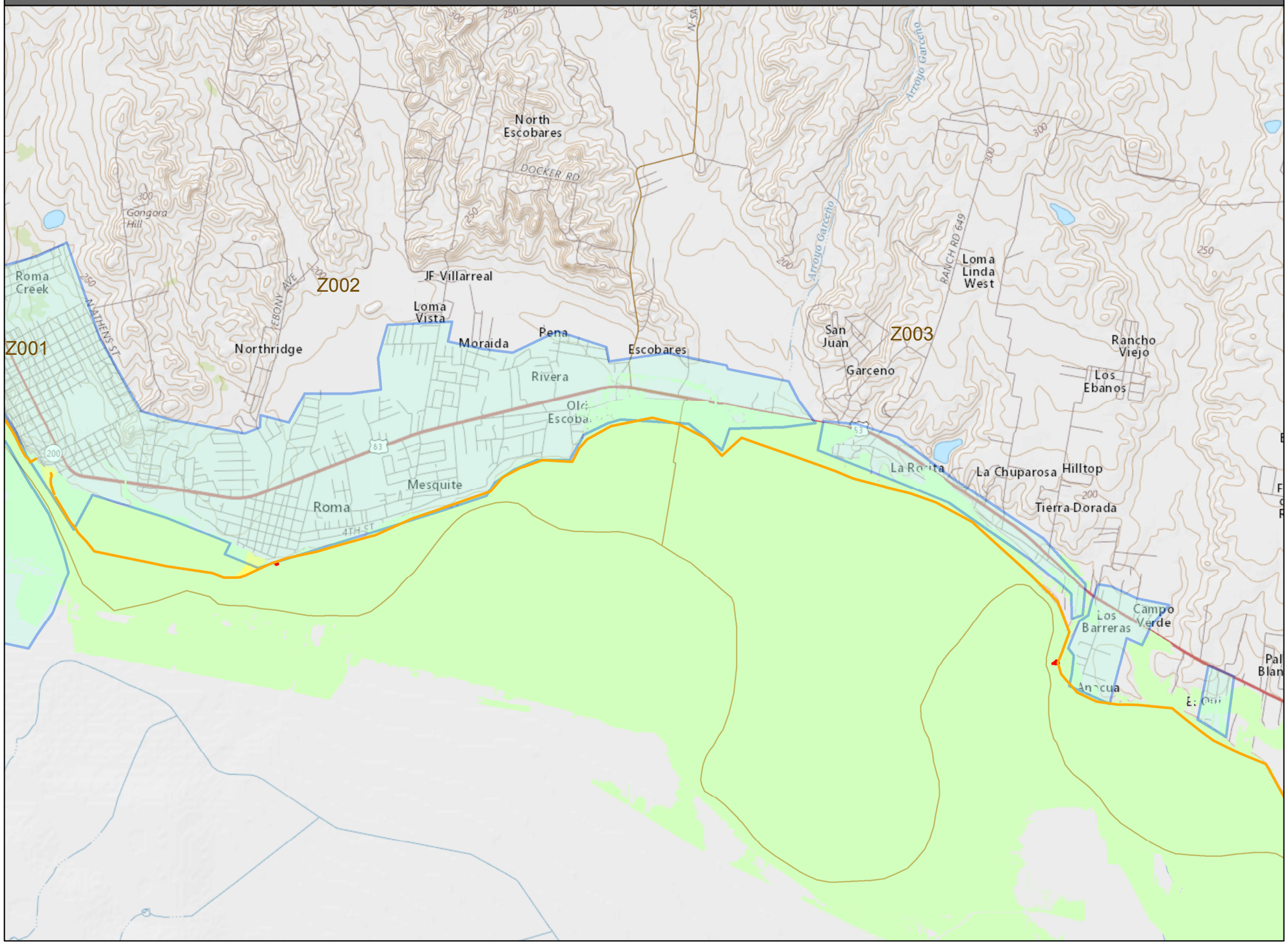
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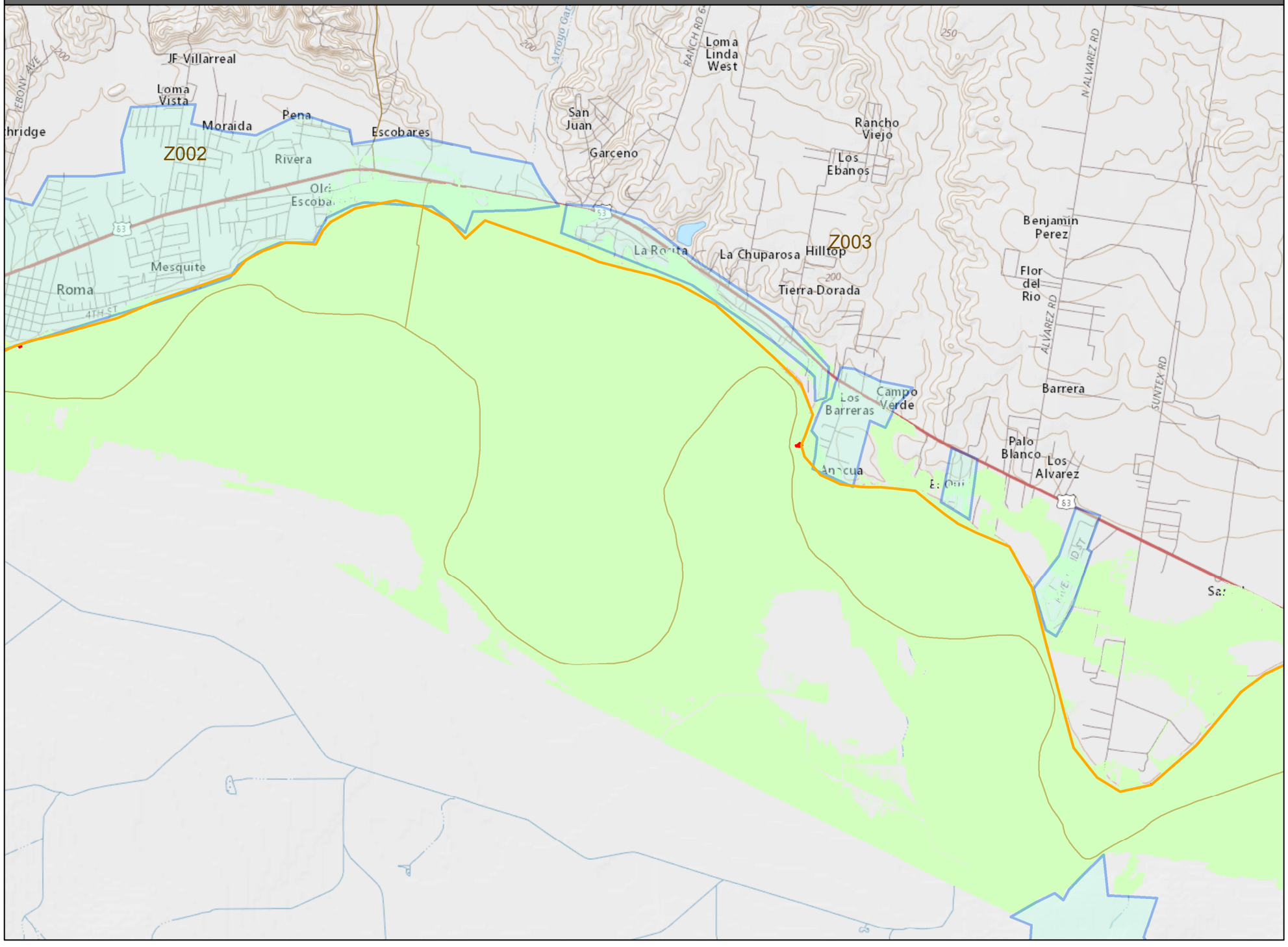
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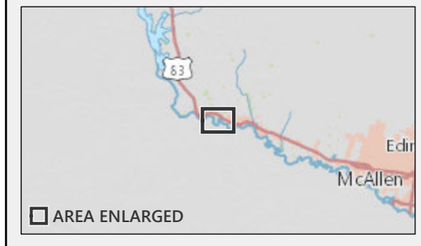
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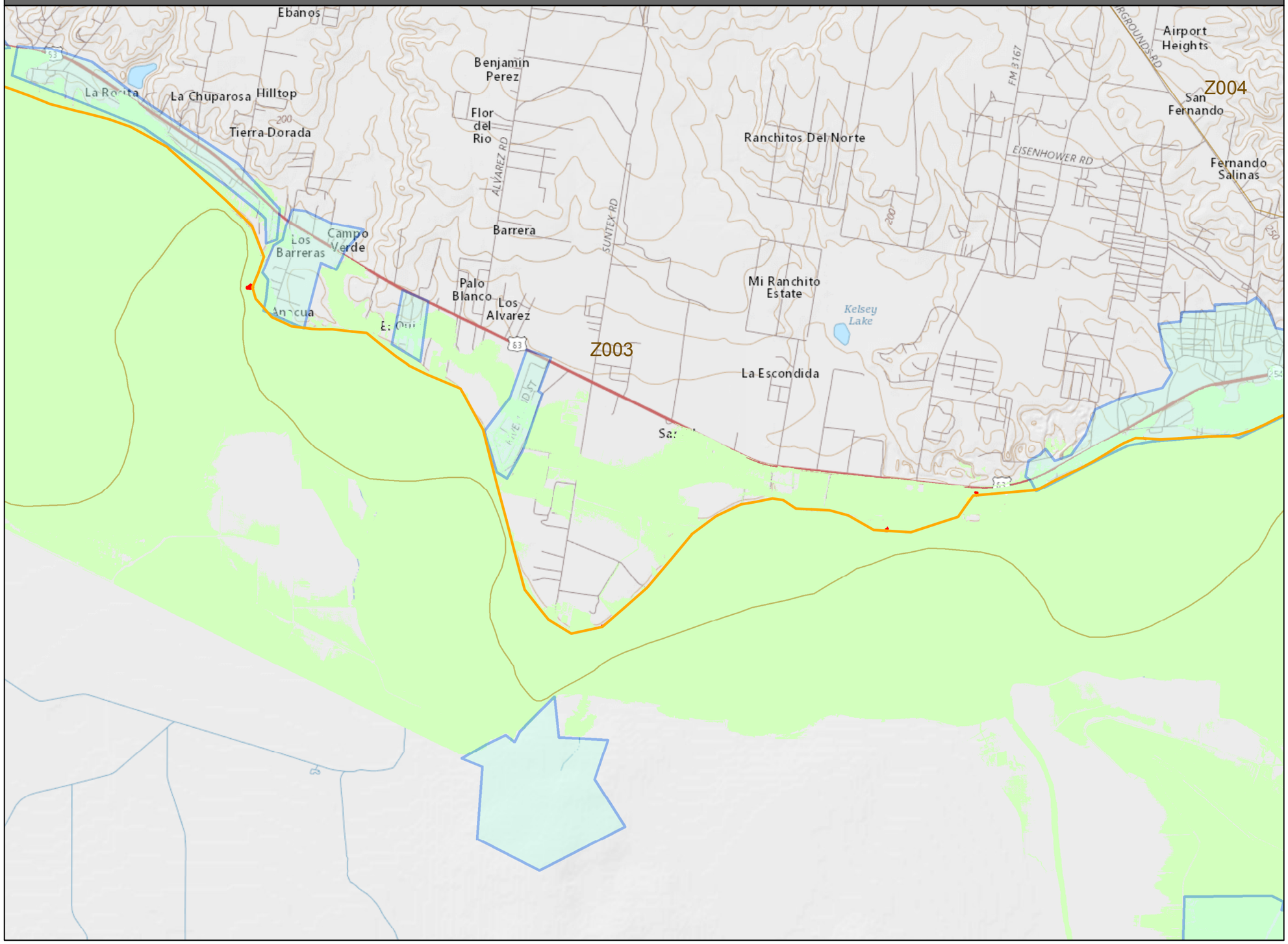
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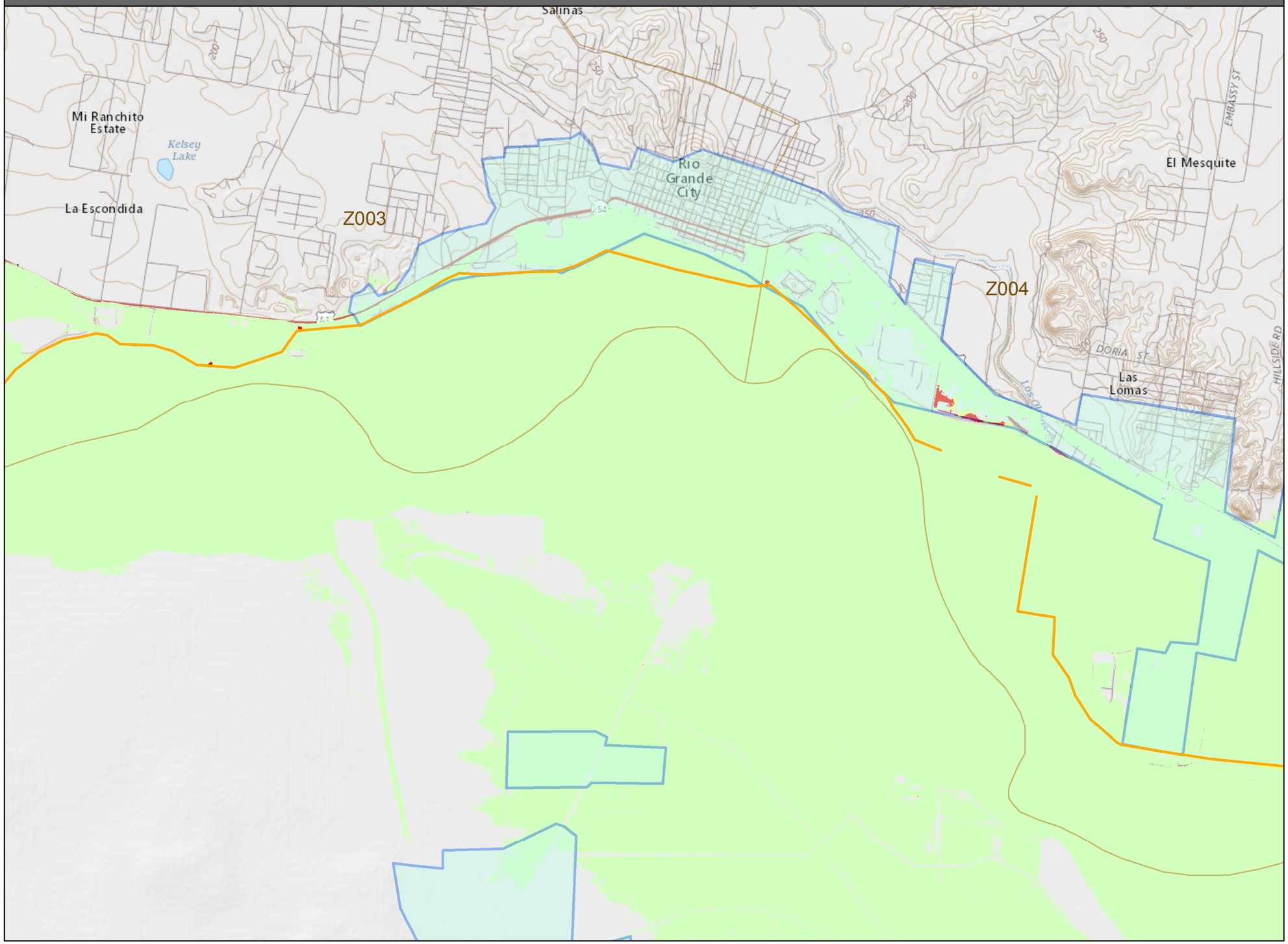
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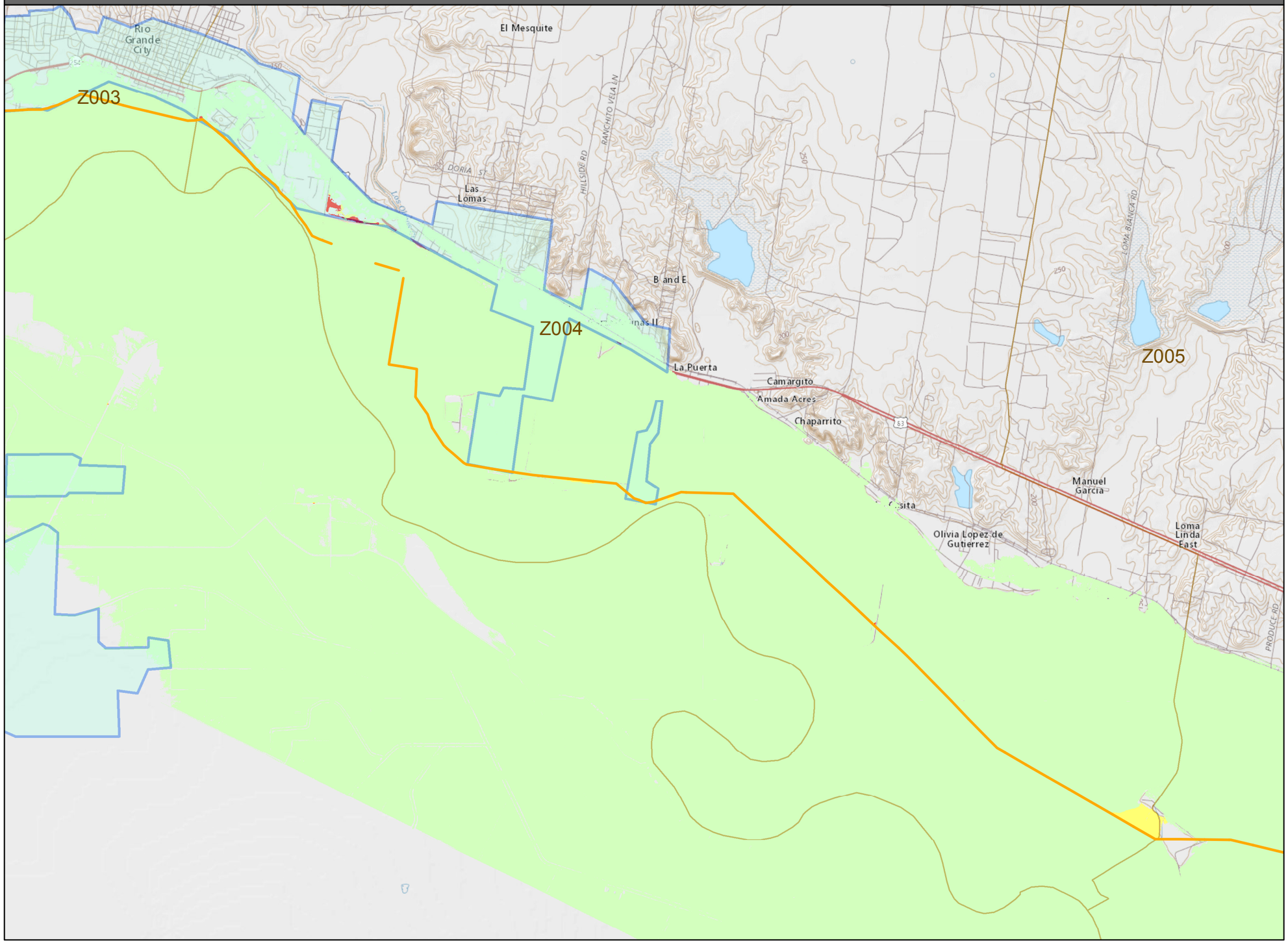


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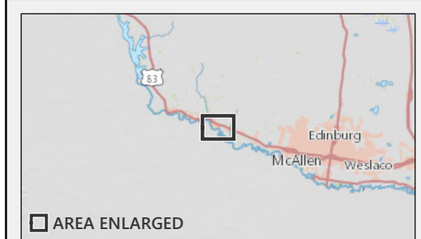
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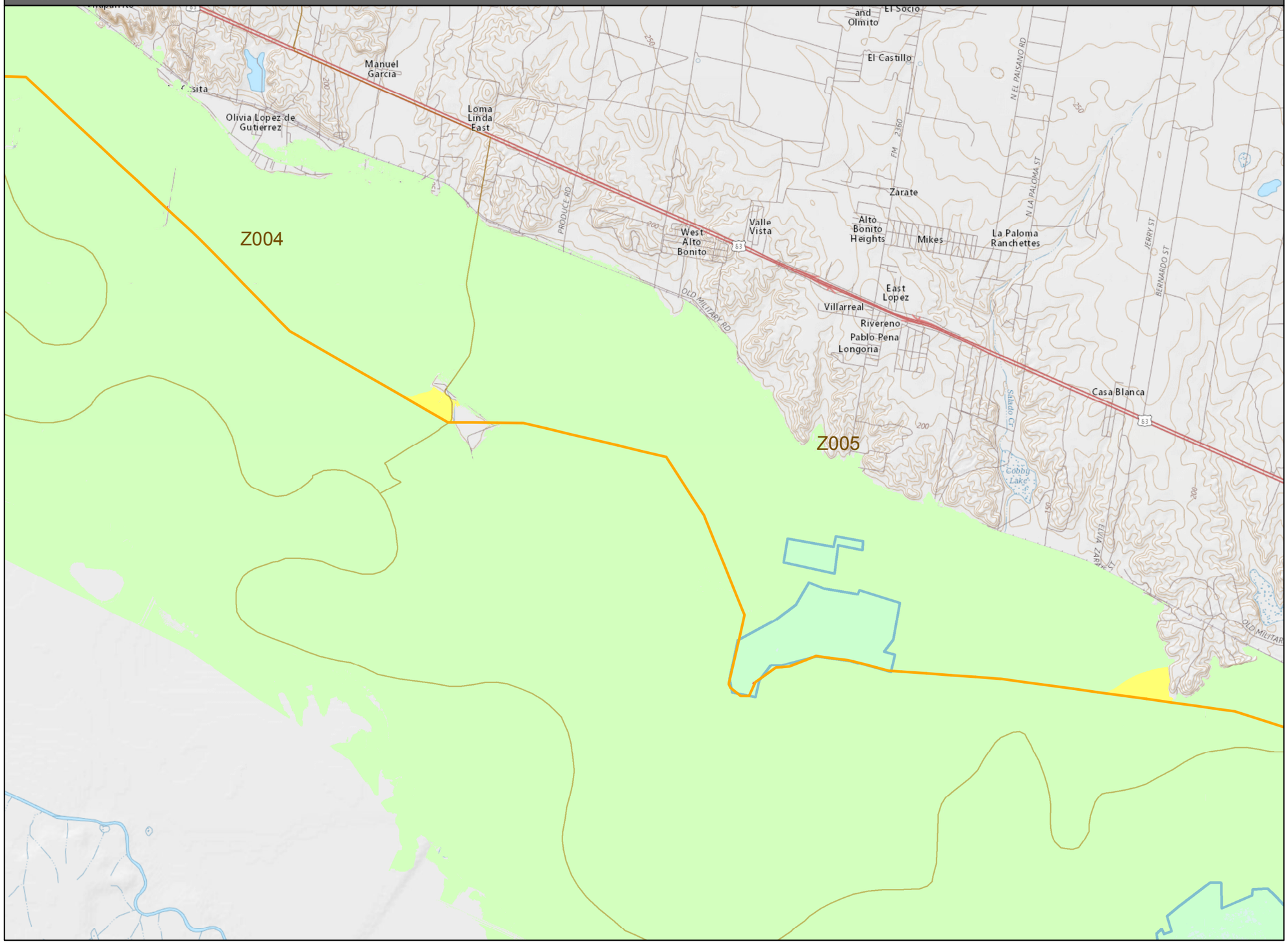
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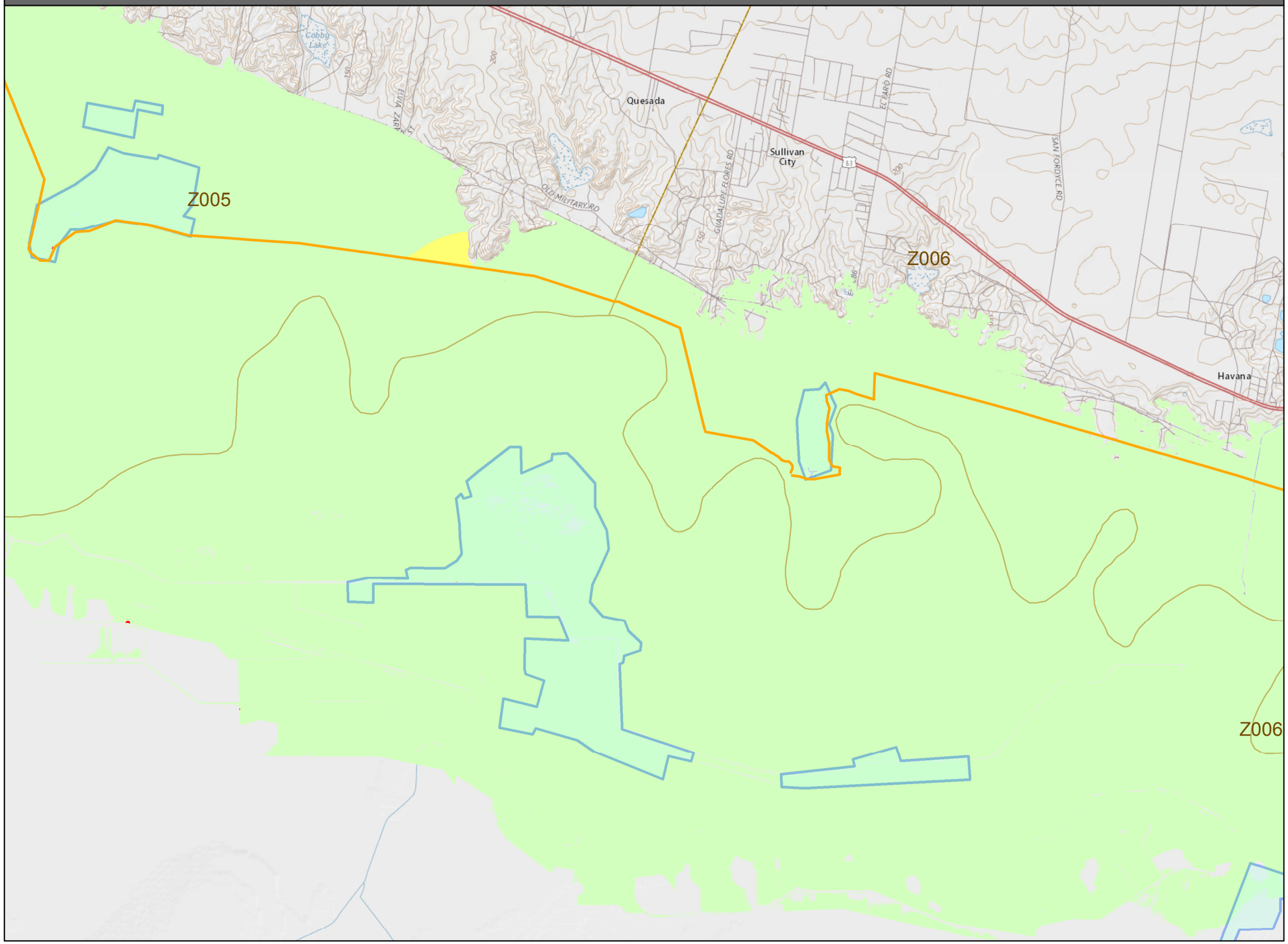


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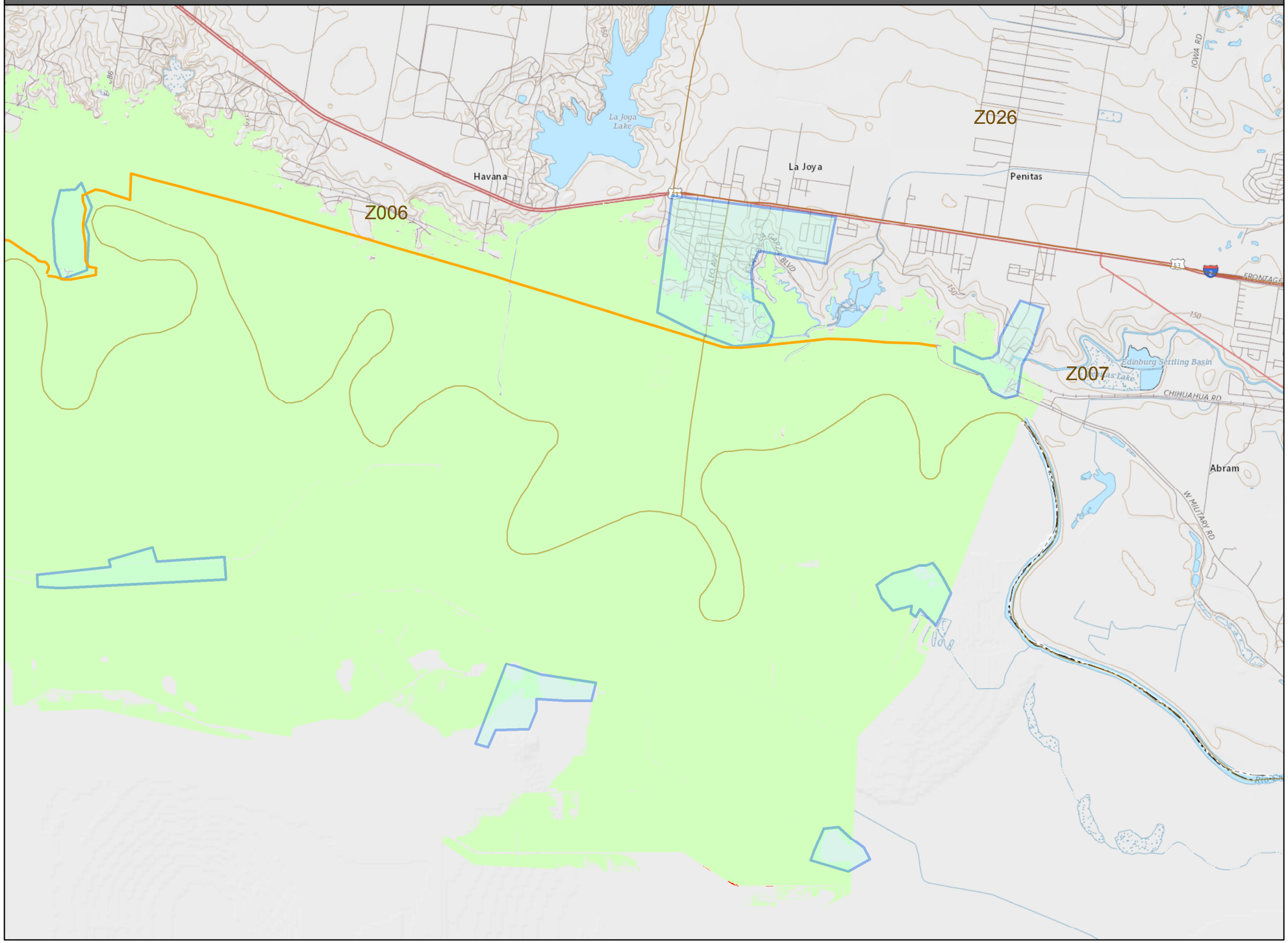
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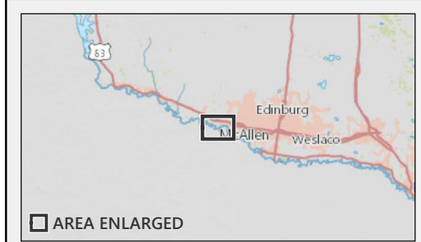
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ATTACHMENT B

HYDRAULICS DOCUMENTATION

- **Table B1: Bollard Wall Adjustment Factors Table**
- **Penitas to Hidalgo-Cameron County Line Duplicate Effective HEC-RAS Model**
- **Penitas to Hidalgo-Cameron County Line Corrected Effective HEC-RAS Model**
- **Penitas to Hidalgo-Cameron County Line Proposed HEC-RAS Model**
- **Falcon Dam to Penitas 2-D Calibration HEC-RAS Model (Electronic Data)**
- **Falcon Dam to Penitas 2-D Existing Conditions HEC-RAS Model (Electronic Data)**
- **Falcon Dam to Penitas 2-D Proposed Conditions HEC-RAS Model (Electronic Data)**

Table B1: Bollard Wall Adjustment Factors

2D SA Connection	Multiplier	Bollard Configuration	Weir Coefficient
FID-RGV1-01-1	9	Typical	3.1
FID-RGV1-01-2	4	Typical	3.1
FID-RGV1-01-3	9	Typical	3.1
FID-RGV1-01-4	9	Typical	3.1
FID-RGV1-01-5	9	Typical	3.1
FID-RGV1-01-6	6	Typical	3.1
FID-RGV1-01-7	9	Typical	3.1
FID-RGV1-01-8	9	Typical	3.1
FID-RGV1-01a-1	9	Typical	1.0
FID-RGV1-01a-10	8	Typical	3.1
FID-RGV1-01a-11	9	Typical	3.1
FID-RGV1-01a-12	9	Typical	3.1
FID-RGV1-01a-13	9	Typical	3.1
FID-RGV1-01a-14	9	Typical	3.1
FID-RGV1-01a-15	9	Typical	3.1
FID-RGV1-01a-16	9	Typical	3.1
FID-RGV1-01a-17	9	Typical	3.1
FID-RGV1-01a-18	9	Typical	3.1
FID-RGV1-01a-19	9	Typical	3.1
FID-RGV1-01a-2	9	Typical	3.1
FID-RGV1-01a-20	9	Typical	3.1
FID-RGV1-01a-21	9	Typical	3.1
FID-RGV1-01a-22	9	Typical	3.1
FID-RGV1-01a-23	9	Typical	3.1
FID-RGV1-01a-24	9	Typical	3.1
FID-RGV1-01a-25	9	Typical	3.1
FID-RGV1-01a-26	9	Typical	3.1
FID-RGV1-01a-27	9	Typical	3.1
FID-RGV1-01a-28	9	Typical	3.1
FID-RGV1-01a-29	9	Typical	3.1
FID-RGV1-01a-3	9	Typical	1.0
FID-RGV1-01a-30	9	Typical	3.1
FID-RGV1-01a-31	9	Typical	3.1
FID-RGV1-01a-32	9	Typical	3.1
FID-RGV1-01a-33	9	Typical	3.1
FID-RGV1-01a-34	9	Typical	3.1
FID-RGV1-01a-35	9	Typical	3.1
FID-RGV1-01a-36	9	Typical	3.1
FID-RGV1-01a-37	9	Typical	3.1
FID-RGV1-01a-38	9	Typical	3.1
FID-RGV1-01a-39	9	Typical	3.1
FID-RGV1-01a-4	9	Typical	3.1
FID-RGV1-01a-40	9	Typical	3.1
FID-RGV1-01a-41	9	Typical	3.1
FID-RGV1-01a-42	9	Typical	3.1

Table B1: Bollard Wall Adjustment Factors

2D SA Connection	Multiplier	Bollard Configuration	Weir Coefficient
FID-RGV1-01a-43	9	Typical	3.1
FID-RGV1-01a-44	9	Gap	3.1
FID-RGV1-01a-45	9	Typical	1.0
FID-RGV1-01a-46	9	Typical	1.0
FID-RGV1-01a-47	9	Typical	1.0
FID-RGV1-01a-48	9	Typical	1.0
FID-RGV1-01a-49	9	Typical	3.1
FID-RGV1-01a-5	9	Typical	3.1
FID-RGV1-01a-6	9	Typical	3.1
FID-RGV1-01a-7	9	Typical	3.1
FID-RGV1-01a-8	9	Typical	3.1
FID-RGV1-01a-9	9	Typical	3.1
FID-RGV1-01b-1	9	Typical	3.1
FID-RGV1-01b-2	9	Typical	3.1
FID-RGV1-01b-3	9	Typical	3.1
FID-RGV1-01b-4	9	Typical	1.0
FID-RGV1-01b-5	9	Typical	3.1
FID-RGV1-01c-1	9	Typical	3.1
FID-RGV1-01c-10	9	Typical	3.1
FID-RGV1-01c-11	9	Typical	3.1
FID-RGV1-01c-12	9	Typical	1.0
FID-RGV1-01c-13	9	Typical	1.0
FID-RGV1-01c-14	9	Typical	1.0
FID-RGV1-01c-15	9	Typical	1.0
FID-RGV1-01c-16	9	Typical	3.1
FID-RGV1-01c-17	9	Typical	3.1
FID-RGV1-01c-18	9	Typical	3.1
FID-RGV1-01c-19	9	Typical	3.1
FID-RGV1-01c-2	9	Typical	3.1
FID-RGV1-01c-3	9	Typical	3.1
FID-RGV1-01c-4	9	Typical	3.1
FID-RGV1-01c-5	9	Typical	3.1
FID-RGV1-01c-6	9	Typical	3.1
FID-RGV1-01c-7	9	Typical	3.1
FID-RGV1-01c-8	-	Fully Blocked	3.1
FID-RGV1-01c-9	9	Typical	3.1
FID-RGV1-02-1	8	Typical	3.1
FID-RGV1-02-2	8	Typical	3.1
FID-RGV1-02-3	8	Typical	3.1
FID-RGV1-02-4	8	Typical	3.1
FID-RGV1-03-1	8	Typical	3.1
FID-RGV1-03-2	8	Typical	1.0
FID-RGV1-03-3	8	Typical	3.1
FID-RGV2-01-1	9	Typical	1.0
FID-RGV2-01-2	-	Fully Blocked	1.0

Table B1: Bollard Wall Adjustment Factors

2D SA Connection	Multiplier	Bollard Configuration	Weir Coefficient
FID-RGV2-01-3	-	Fully Blocked	1.0
FID-RGV2-02-1	24	Rotated	1.0
FID-RGV2-03-1	24	Rotated	1.0
FID-RGV2-03-2	8	Typical	1.0
FID-RGV2-03-3	20	Typical, Gap	3.1
FID-RGV2-03-4	8	Typical	3.1
FID-RGV2-03-5	8	Typical	3.1
FID-RGV2-03-6	8	Typical	3.1
FID-RGV2-03-7	20	Typical	1.0
FID-RGV2-04-1	20	Typical, Gap	1.0
FID-RGV2-04-10	9	Typical	1.0
FID-RGV2-04-11	9	Typical	1.0
FID-RGV2-04-12	9	Typical	1.0
FID-RGV2-04-13	9	Typical	1.0
FID-RGV2-04-14	9	Typical	1.0
FID-RGV2-04-2	9	Typical	1.0
FID-RGV2-04-3	9	Typical	1.0
FID-RGV2-04-4	9	Typical	1.0
FID-RGV2-04-5	9	Typical	1.0
FID-RGV2-04-6	9	Typical	1.0
FID-RGV2-04-7	9	Typical	1.0
FID-RGV2-04-8	9	Typical	1.0
FID-RGV2-04-9	9	Typical	1.0
FID-RGV3-01-1	20	Typical	1.0
FID-RGV3-01-10	8	Typical	3.1
FID-RGV3-01-11	8	Typical	3.1
FID-RGV3-01-12	8	Typical	3.1
FID-RGV3-01-13	8	Typical	1.0
FID-RGV3-01-14	8	Typical	3.1
FID-RGV3-01-15	20	Rotated	1.0
FID-RGV3-01-16	20	Rotated, Gap	1.0
FID-RGV3-01-17	8	Typical	1.0
FID-RGV3-01-18	8	Typical	1.0
FID-RGV3-01-19	8	Typical	1.0
FID-RGV3-01-2	8	Typical	1.0
FID-RGV3-01-20	8	Typical	3.1
FID-RGV3-01-21	8	Typical	1.0
FID-RGV3-01-22	8	Typical	1.0
FID-RGV3-01-23	8	Typical	1.0
FID-RGV3-01-24	8	Typical	1.0
FID-RGV3-01-25	8	Typical	1.0
FID-RGV3-01-26	8	Typical	1.0
FID-RGV3-01-27	8	Typical	1.0
FID-RGV3-01-28	8	Typical	1.0
FID-RGV3-01-29	8	Typical	1.0

Table B1: Bollard Wall Adjustment Factors

2D SA Connection	Multiplier	Bollard Configuration	Weir Coefficient
FID-RGV3-01-3	8	Typical	1.0
FID-RGV3-01-30	8	Typical	1.0
FID-RGV3-01-31	8	Typical	1.0
FID-RGV3-01-32	8	Typical	1.0
FID-RGV3-01-33	8	Typical	1.0
FID-RGV3-01-34	8	Typical	1.0
FID-RGV3-01-35	8	Typical	1.0
FID-RGV3-01-36	8	Typical	1.0
FID-RGV3-01-37	8	Typical	1.0
FID-RGV3-01-38	8	Typical	1.0
FID-RGV3-01-39	8	Typical	1.0
FID-RGV3-01-4	8	Typical	3.1
FID-RGV3-01-40	8	Typical	1.0
FID-RGV3-01-41	8	Typical	1.0
FID-RGV3-01-42	8	Typical	1.0
FID-RGV3-01-43	8	Typical	1.0
FID-RGV3-01-44	8	Typical	1.0
FID-RGV3-01-45	8	Typical	1.0
FID-RGV3-01-46	8	Typical	1.0
FID-RGV3-01-47	8	Typical	1.0
FID-RGV3-01-48	8	Typical	1.0
FID-RGV3-01-5	8	Typical	3.1
FID-RGV3-01-6	8	Typical	1.0
FID-RGV3-01-7	8	Typical	1.0
FID-RGV3-01-8	8	Typical	1.0
FID-RGV3-01-9	8	Typical	1.0
FID-RGV3-02-1	8	Typical	1.0
FID-RGV3-02-10	8	Typical	3.1
FID-RGV3-02-11	8	Typical	3.1
FID-RGV3-02-12	8	Typical	3.1
FID-RGV3-02-2	8	Typical	1.0
FID-RGV3-02-3	8	Typical	1.0
FID-RGV3-02-4	8	Typical	1.0
FID-RGV3-02-5	8	Typical	1.0
FID-RGV3-02-6	8	Typical	1.0
FID-RGV3-02-7	8	Typical	1.0
FID-RGV3-02-8	8	Typical	1.0
FID-RGV3-02-9	8	Typical	3.1
FID-RGV4-01-1	9	Typical	1.0
FID-RGV4-01-2	9	Typical	1.0
FID-RGV4-01-3	20	Typical	1.0
FID-RGV4-01-4	20	Typical, Gap	1.0
FID-RGV4-01-5	20	Typical	1.0
FID-RGV4-01-6	20	Rotated	1.0
FID-RGV4-01-7	9	Typical	1.0

Table B1: Bollard Wall Adjustment Factors

2D SA Connection	Multiplier	Bollard Configuration	Weir Coefficient
FID-RGV4-02-1	20	Rotated	3.1
FID-RGV4-03-1	20	Rotated	3.1
FID-RGV4-03-10	20	Rotated	3.1
FID-RGV4-03-11	20	Rotated	3.1
FID-RGV4-03-12	20	Rotated	3.1
FID-RGV4-03-13	20	Rotated, Gap	2.6
FID-RGV4-03-14	-	Gap	2.6
FID-RGV4-03-15	20	Rotated, Gap	1.0
FID-RGV4-03-16	20	Rotated	1.0
FID-RGV4-03-2	20	Rotated	3.1
FID-RGV4-03-3	21	Rotated	3.1
FID-RGV4-03-4	22	Rotated	3.1
FID-RGV4-03-5	23	Rotated	3.1
FID-RGV4-03-6	24	Rotated	1.0
FID-RGV4-03-7	25	Rotated	3.1
FID-RGV4-03-8	26	Rotated	3.1
FID-RGV4-03-9	27	Rotated	1.0
FID-RGV4-04-1	28	Rotated	1.0
FID-RGV4-04-10	8	Typical	3.1
FID-RGV4-04-11	8	Typical	3.1
FID-RGV4-04-12	8	Typical, Gap	3.1
FID-RGV4-04-13	8	Typical	3.1
FID-RGV4-04-14	8	Typical	3.1
FID-RGV4-04-15	8	Typical	3.1
FID-RGV4-04-16	8	Typical	3.1
FID-RGV4-04-17	8	Typical	3.1
FID-RGV4-04-18	8	Typical	3.1
FID-RGV4-04-19	8	Typical	3.1
FID-RGV4-04-2	20	Rotated	1.0
FID-RGV4-04-20	8	Typical	3.1
FID-RGV4-04-21	8	Typical	3.1
FID-RGV4-04-22	8	Typical	3.1
FID-RGV4-04-23	8	Typical	3.1
FID-RGV4-04-24	8	Typical	1.0
FID-RGV4-04-25	8	Typical	1.0
FID-RGV4-04-26	8	Typical, Gap	1.0
FID-RGV4-04-3	20	Typical	3.1
FID-RGV4-04-4	8	Typical	3.1
FID-RGV4-04-5	8	Typical	3.1
FID-RGV4-04-6	8	Typical	3.1
FID-RGV4-04-7	8	Typical	3.1
FID-RGV4-04-8	8	Typical	3.1
FID-RGV4-04-9	8	Typical	3.1
FID-RGV5-01-1	8	Typical	1.0
FID-RGV5-01-10	8	Typical	3.1

Table B1: Bollard Wall Adjustment Factors

2D SA Connection	Multiplier	Bollard Configuration	Weir Coefficient
FID-RGV5-01-11	8	Typical	3.1
FID-RGV5-01-12	8	Typical	3.1
FID-RGV5-01-13	8	Typical	3.1
FID-RGV5-01-14	8	Typical	3.1
FID-RGV5-01-15	8	Typical	3.1
FID-RGV5-01-16	8	Typical	1.0
FID-RGV5-01-17	8	Typical	3.1
FID-RGV5-01-18	8	Typical	1.0
FID-RGV5-01-19	8	Typical	1.0
FID-RGV5-01-2	8	Typical	3.1
FID-RGV5-01-20	8	Typical	3.1
FID-RGV5-01-21	8	Typical	1.0
FID-RGV5-01-22	8	Typical	1.0
FID-RGV5-01-23	8	Typical	1.0
FID-RGV5-01-24	8	Typical	1.0
FID-RGV5-01-25	8	Typical	1.0
FID-RGV5-01-26	8	Typical	1.0
FID-RGV5-01-27	8	Typical	1.0
FID-RGV5-01-28	8	Typical	3.1
FID-RGV5-01-29	8	Typical	3.1
FID-RGV5-01-3	8	Typical	3.1
FID-RGV5-01-30	8	Typical, Gap	3.1
FID-RGV5-01-31	8	Typical	3.1
FID-RGV5-01-32	8	Typical	3.1
FID-RGV5-01-33	8	Typical	3.1
FID-RGV5-01-34	8	Typical	3.1
FID-RGV5-01-35	24	Rotated	3.1
FID-RGV5-01-36	24	Rotated	3.1
FID-RGV5-01-37	-	Gap	1.0
FID-RGV5-01-38	-	Gap	1.0
FID-RGV5-01-39	8	Typical	3.1
FID-RGV5-01-4	8	Typical	3.1
FID-RGV5-01-40	8	Typical	3.1
FID-RGV5-01-41	8	Typical	3.1
FID-RGV5-01-42	8	Typical	3.1
FID-RGV5-01-43	8	Typical, Gap	3.1
FID-RGV5-01-44	8	Typical	3.1
FID-RGV5-01-5	8	Typical	3.1
FID-RGV5-01-6	8	Typical	3.1
FID-RGV5-01-7	8	Typical	3.1
FID-RGV5-01-8	8	Typical	3.1
FID-RGV5-01-9	8	Typical	3.1
FID-RGV6-01-1	8	Typical	3.1
FID-RGV6-01-10	50	Typical	1.0
FID-RGV6-01-2	8	Typical	1.0

Table B1: Bollard Wall Adjustment Factors

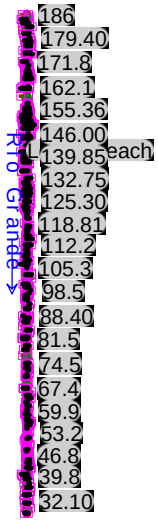
2D SA Connection	Multiplier	Bollard Configuration	Weir Coefficient
FID-RGV6-01-3	8	Typical	3.1
FID-RGV6-01-4	8	Typical	3.1
FID-RGV6-01-5	8	Typical	3.1
FID-RGV6-01-6	8	Typical	3.1
FID-RGV6-01-7	8	Typical	3.1
FID-RGV6-01-8	8	Typical	3.1
FID-RGV6-01-9	8	Typical	3.1
FID-RGV6-02-1	-	Fully Blocked	1.0
FID-RGV6-03-1	9	Typical	3.1
FID-RGV6-03-2	9	Typical	3.1
FID-RGV6-03-3	9	Typical	3.1
FID-RGV6-03-4		Gap	1.0
FID-RGV6-03-5	20	Typical	1.0
FID-RGV6-03-6	9	Typical	3.1
FID-RGV6-03-7	-	Fully Blocked	1.0
FID-RGV6-04-1	8	Typical	3.1
FID-RGV6-04-10	8	Typical	3.1
FID-RGV6-04-11	8	Typical	3.1
FID-RGV6-04-12	8	Typical	3.1
FID-RGV6-04-13	8	Typical	3.1
FID-RGV6-04-14	8	Typical	3.1
FID-RGV6-04-15	8	Typical	3.1
FID-RGV6-04-16	8	Typical	3.1
FID-RGV6-04-17	8	Typical, Gap	3.1
FID-RGV6-04-18	8	Typical	3.1
FID-RGV6-04-19	8	Typical	3.1
FID-RGV6-04-2	8	Typical	3.1
FID-RGV6-04-20	8	Typical	3.1
FID-RGV6-04-21	8	Typical	3.1
FID-RGV6-04-22	8	Typical	3.1
FID-RGV6-04-23	8	Typical	3.1
FID-RGV6-04-24	8	Typical	3.1
FID-RGV6-04-25	8	Typical	3.1
FID-RGV6-04-3	8	Typical	3.1
FID-RGV6-04-4	8	Typical	3.1
FID-RGV6-04-5	8	Typical	3.1
FID-RGV6-04-6	8	Typical	3.1
FID-RGV6-04-7	8	Typical	3.1
FID-RGV6-04-8	8	Typical	3.1
FID-RGV6-04-9	8	Typical	3.1
FID-RGV7-01-1	9	Typical	3.1
FID-RGV7-01-2	9	Typical	3.1
FID-RGV7-01-3	9	Typical	3.1
FID-RGV7-01-4	9	Typical	3.1
FID-RGV7-01-5	9	Typical	3.1

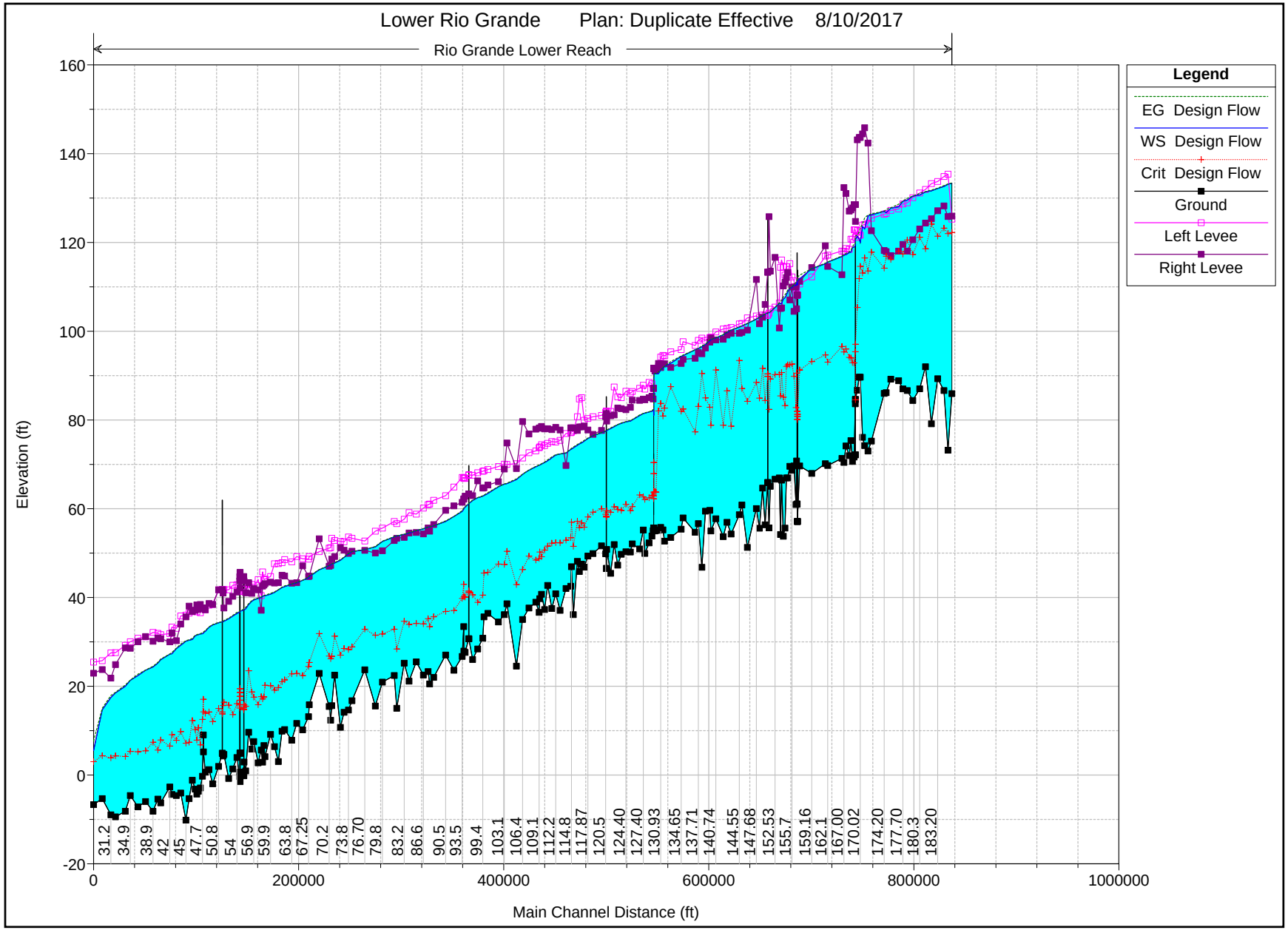
Table B1: Bollard Wall Adjustment Factors

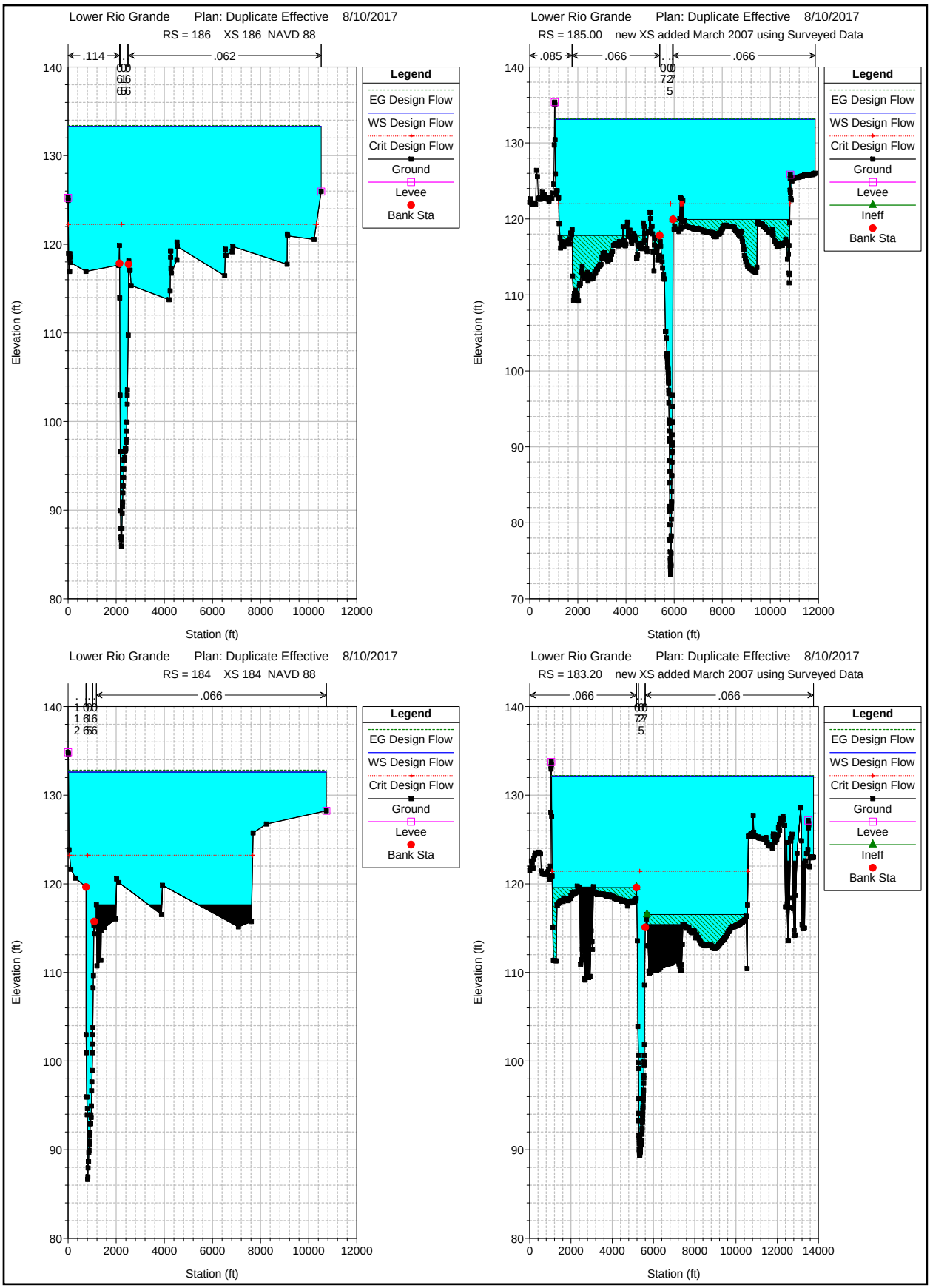
2D SA Connection	Multiplier	Bollard Configuration	Weir Coefficient
FID-RGV7-01-6	9	Typical	3.1
FID-RGV7-01-7	9	Typical	3.1
FID-RGV7-01-8	9	Typical	3.1
FID-RGV7-01-9	9	Typical	3.1

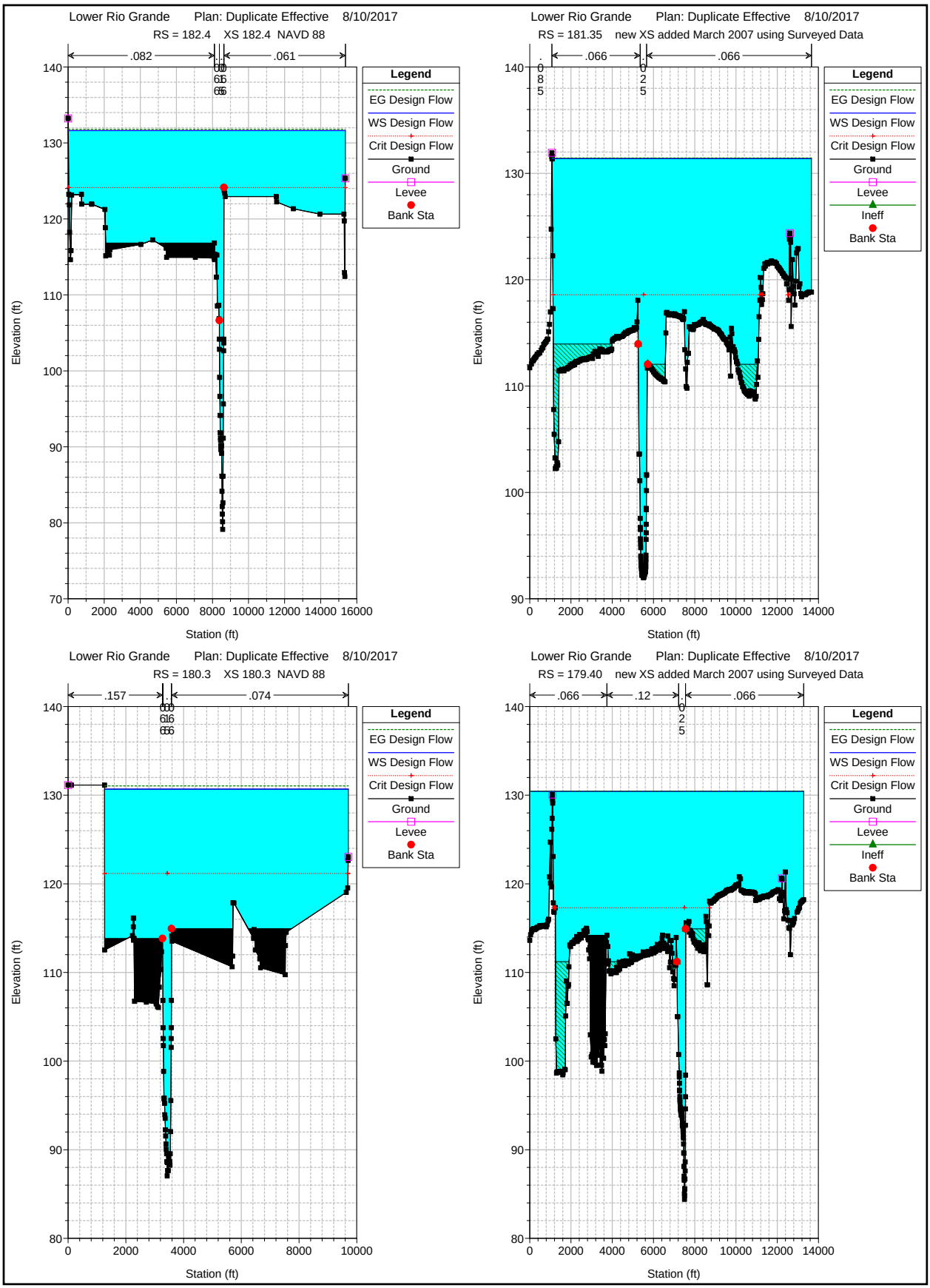
- **Penitas to Hidalgo-Cameron County Line Duplicate Effective HEC-RAS Model**

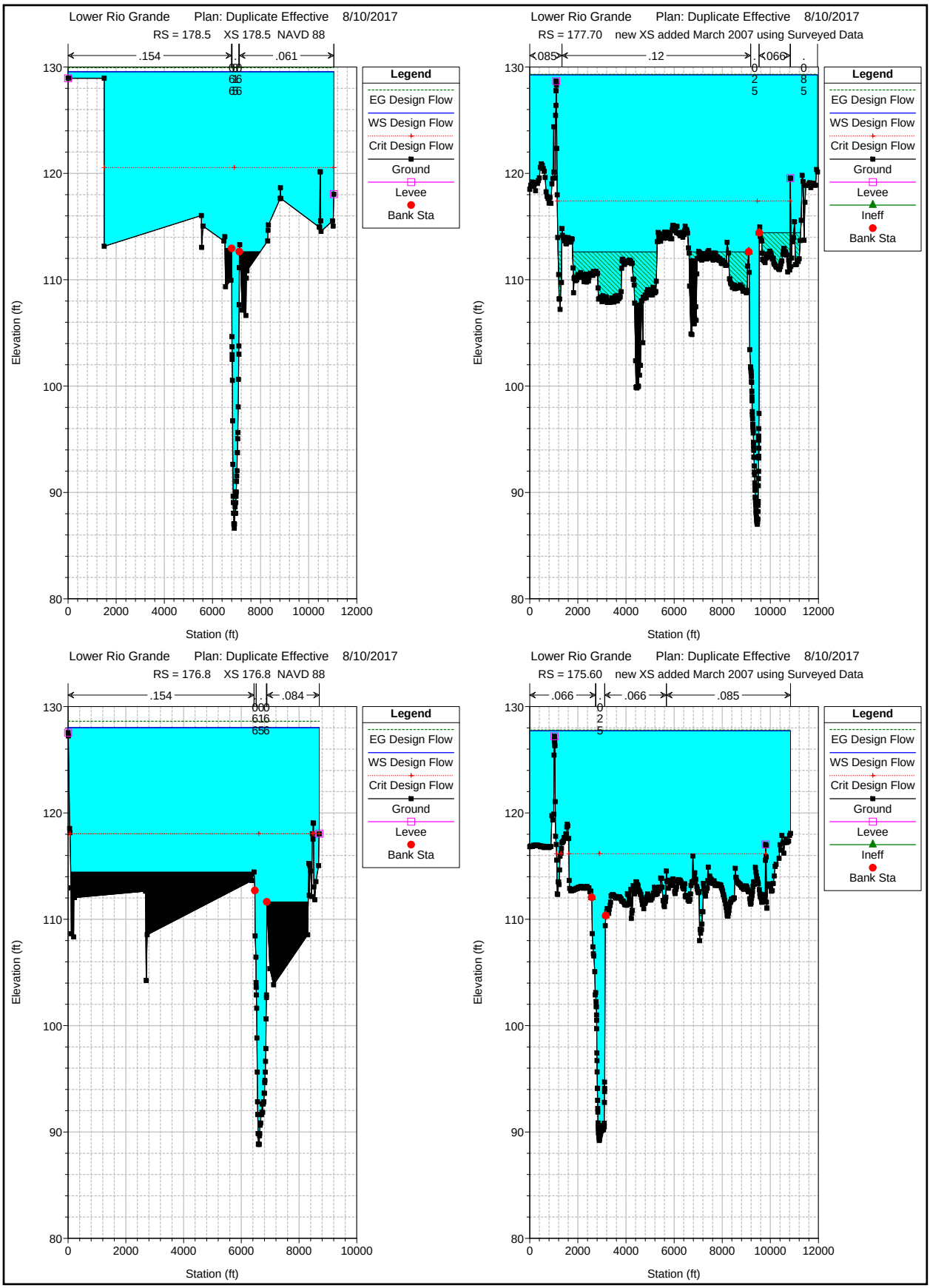
Duplicate Effective HEC-RAS Model

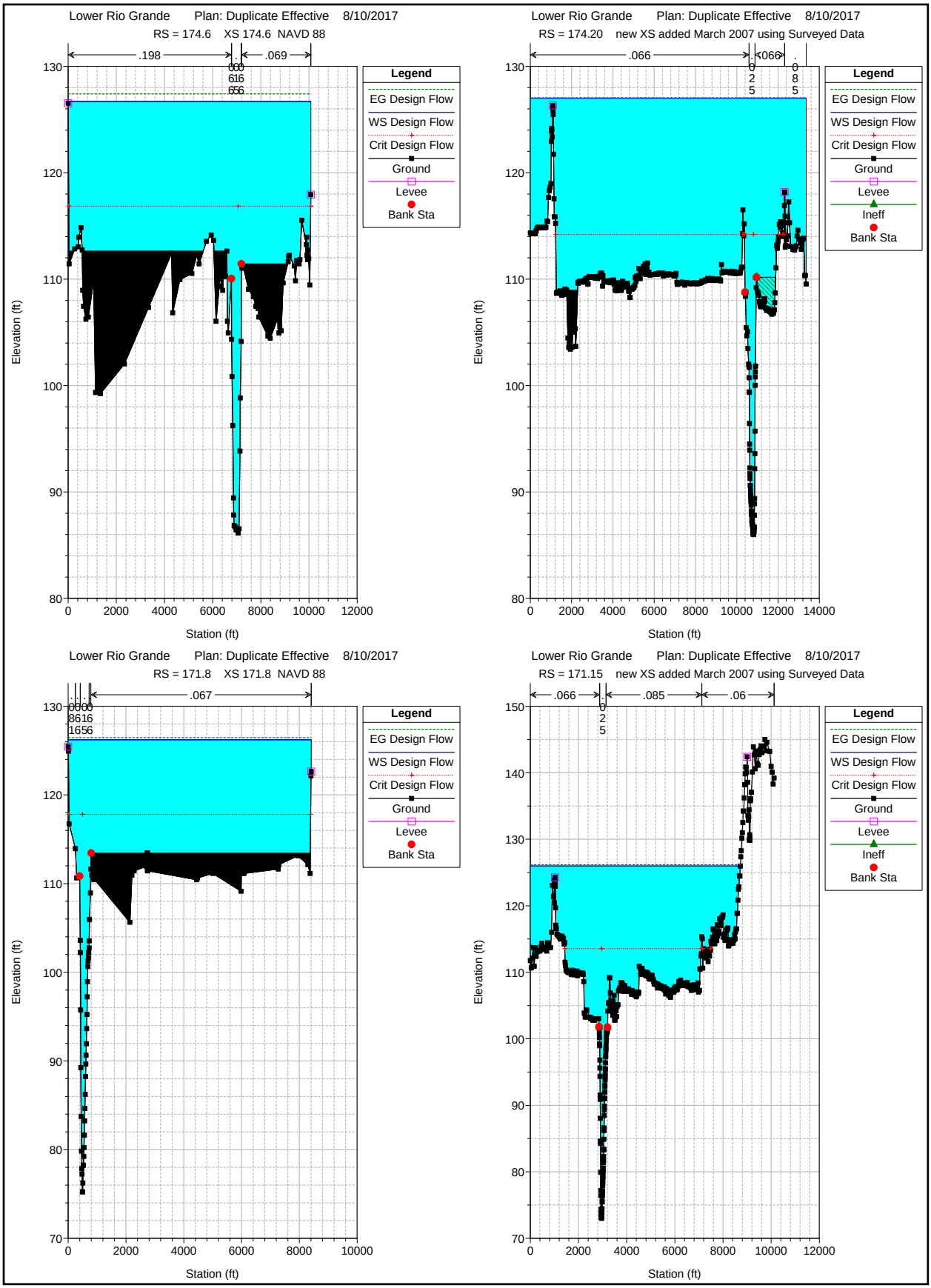


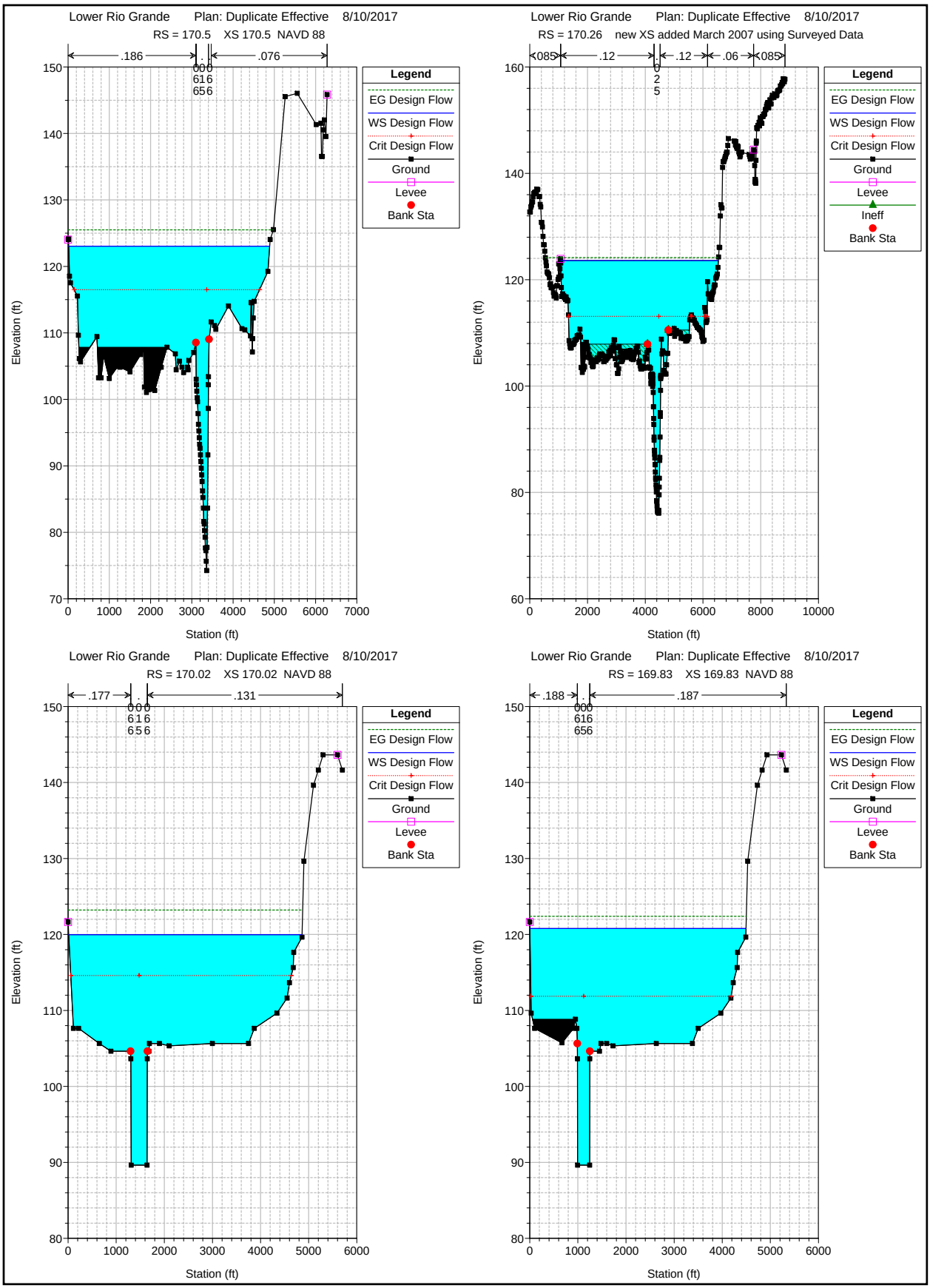

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
Rio Grande Lower Reach
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Left Levee
Right Levee
Elevation (ft)
Main Channel Distance (ft)
160
140
120
100
80
60
40
20
0
-20
0
200000
400000
600000
800000
1000000
31.2
34.9
38.9
42
45
47.7
50.8
54
56.9
59.9
63.8
67.25
70.2
73.8
76.70
79.8
83.2
86.6
90.5
93.5
99.4
103.1
106.4
109.1
112.2
114.8
117.87
120.5
124.40
127.40
130.93
134.65
137.71
140.74
144.55
147.68
152.53
155.7
159.16
162.1
167.00
170.02
174.20
177.70
180.3
183.20

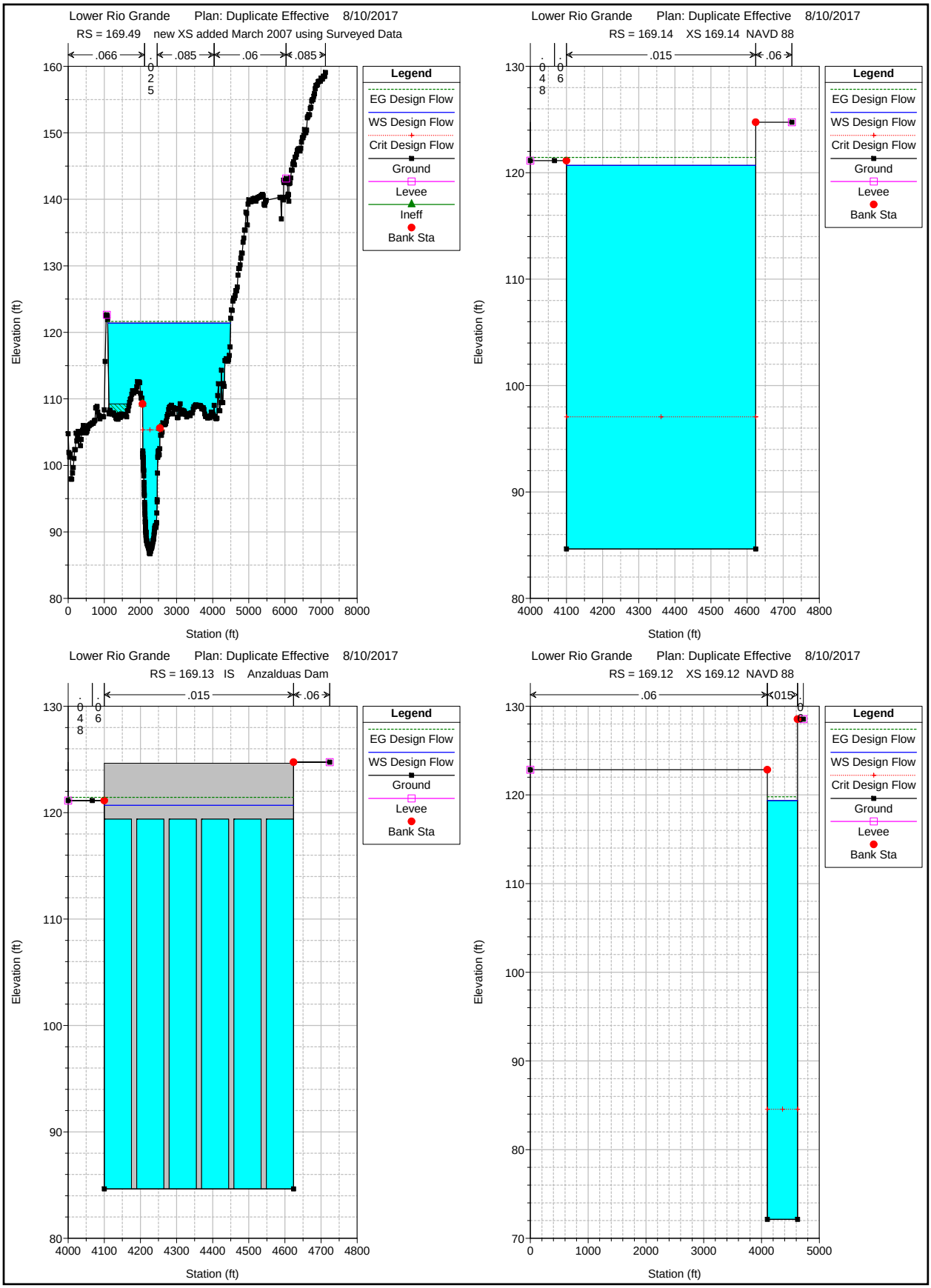

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 186 XS 186 NAVD 88
.114
.062
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 185.00 new XS added March 2007 using Surveyed Data
.085
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 184 XS 184 NAVD 88
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 183.20 new XS added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

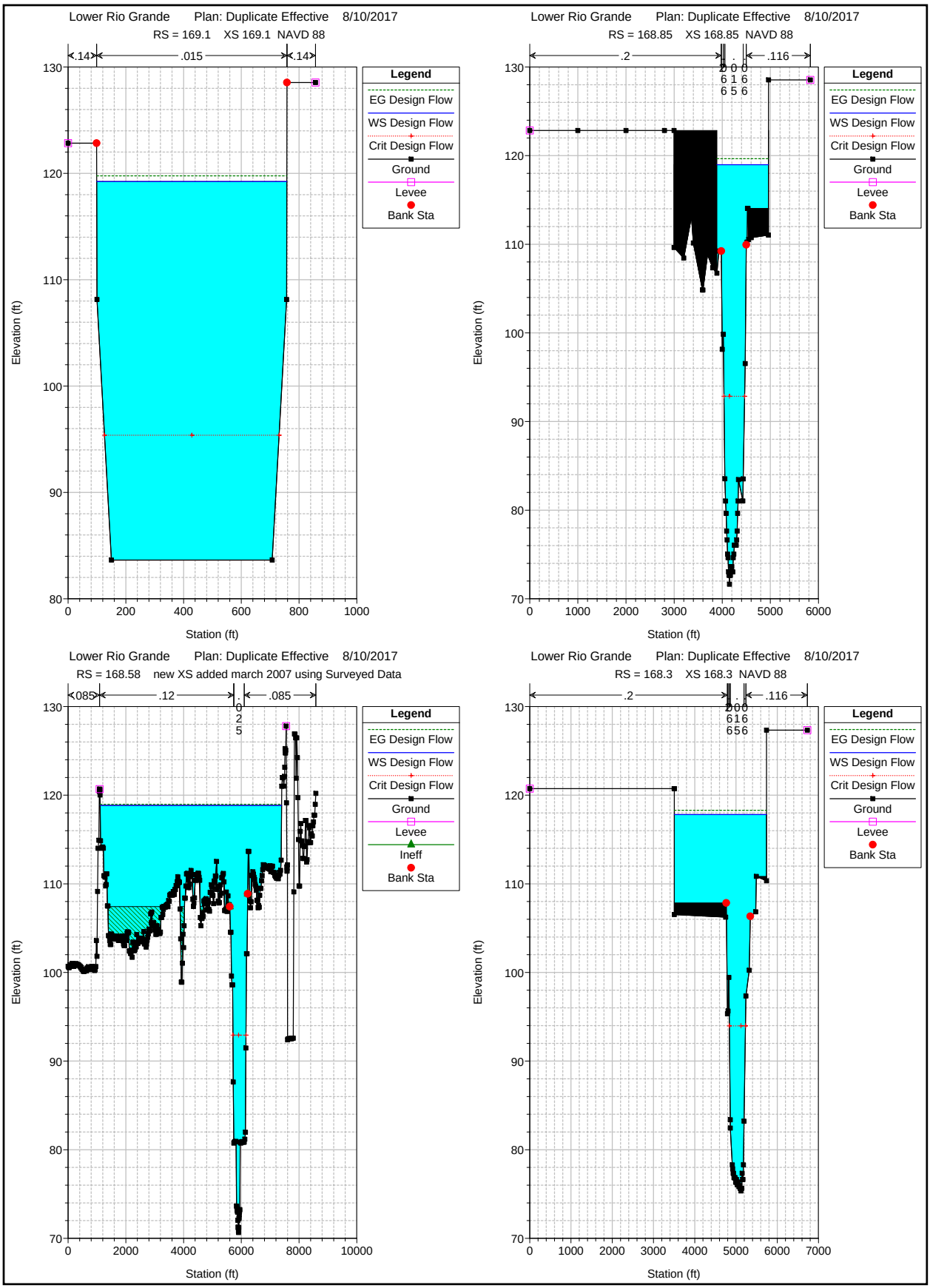

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 182.4 XS 182.4 NAVD 88
.082
.061
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 181.35 new XS added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 180.3 XS 180.3 NAVD 88
.157
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 179.40 new XS added March 2007 using Surveyed Data
.066
.12
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

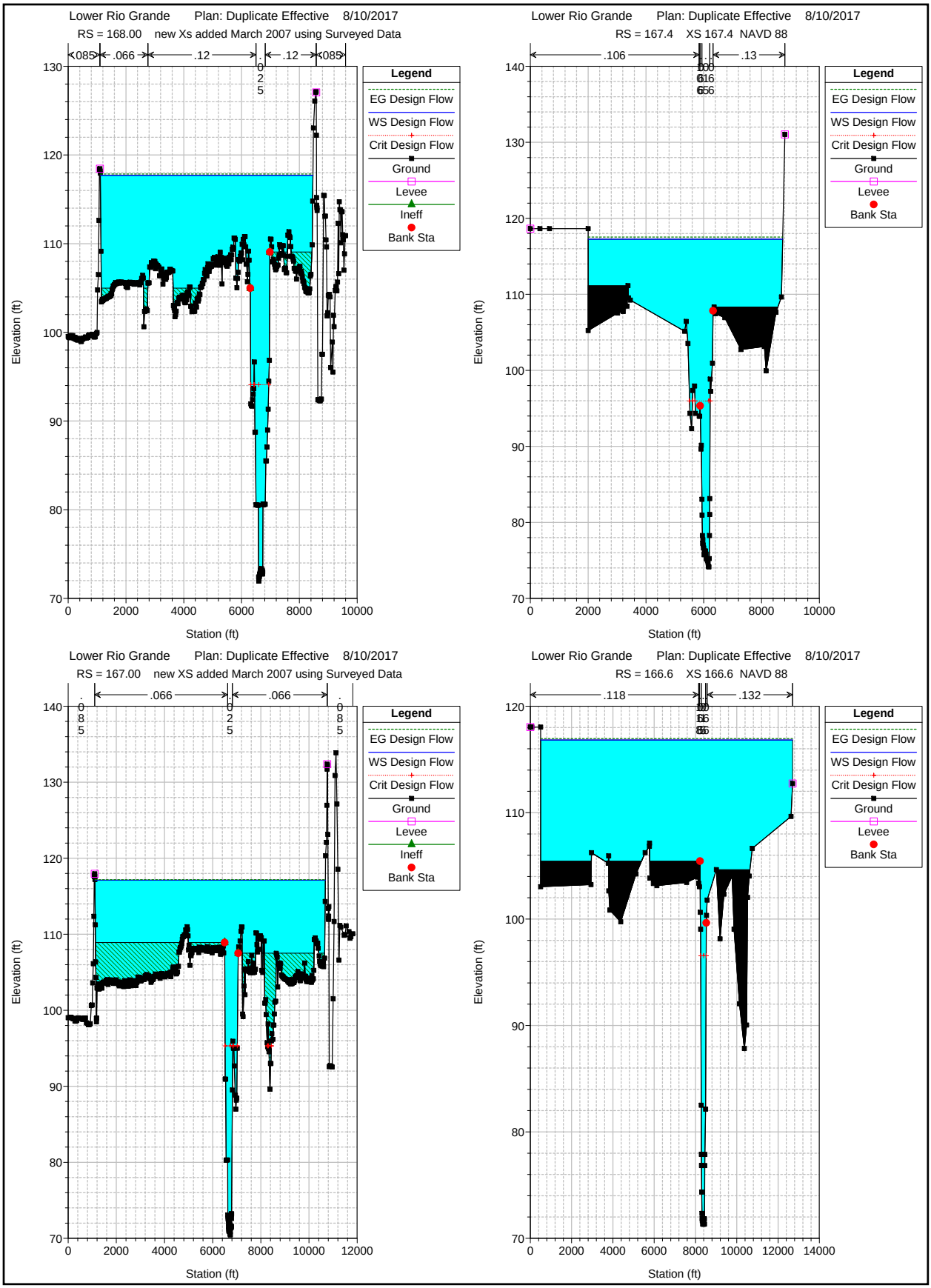

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 178.5 XS 178.5 NAVD 88
.154
.061
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 177.70 new XS added March 2007 using Surveyed Data
.085
.12
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 176.8 XS 176.8 NAVD 88
.154
.084
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 175.60 new XS added March 2007 using Surveyed Data
.066
.066
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

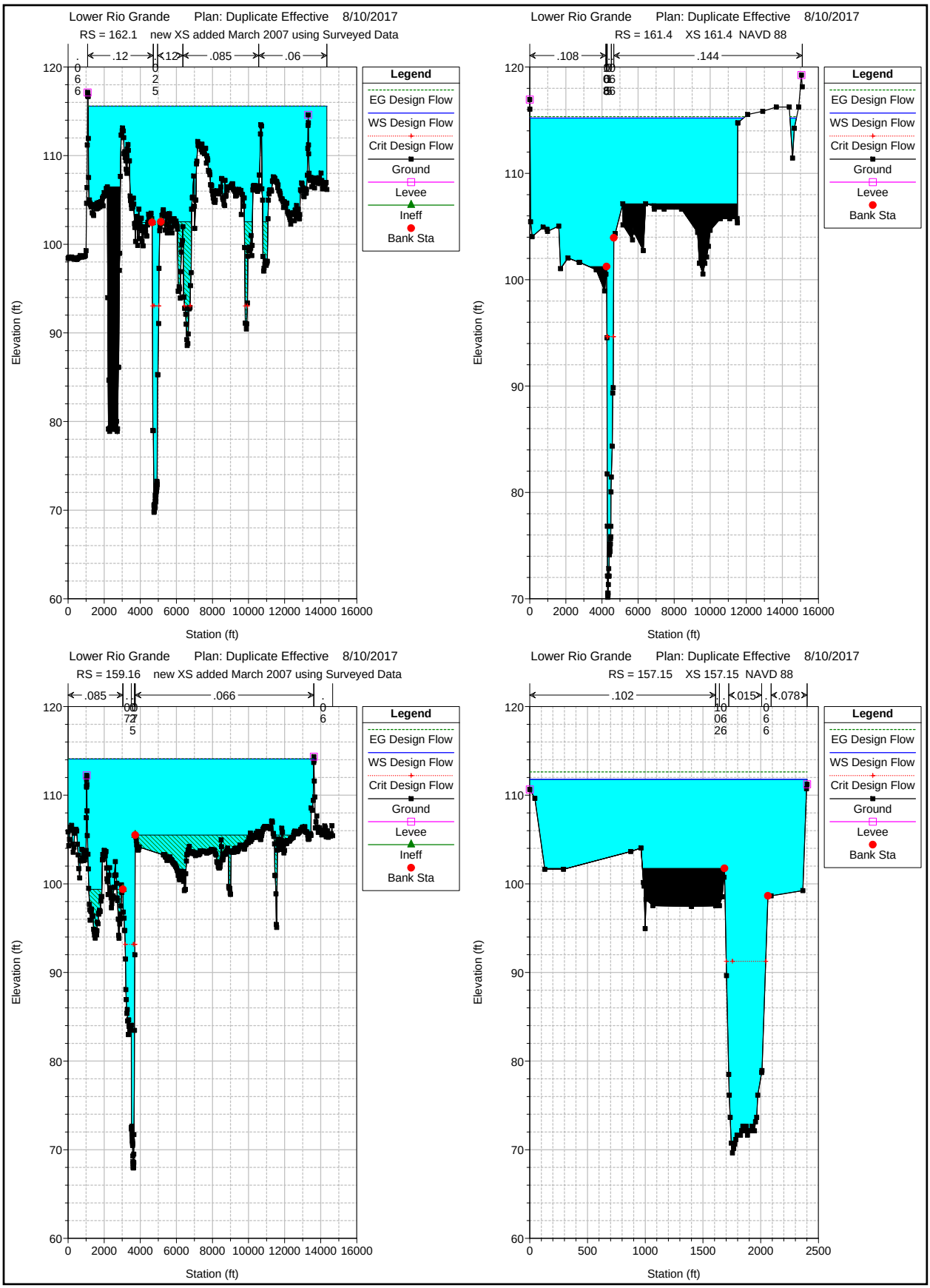

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 174.6 XS 174.6 NAVD 88
.198
.069
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 174.20 new XS added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 171.8 XS 171.8 NAVD 88
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 171.15 new XS added March 2007 using Surveyed Data
.066
.085
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

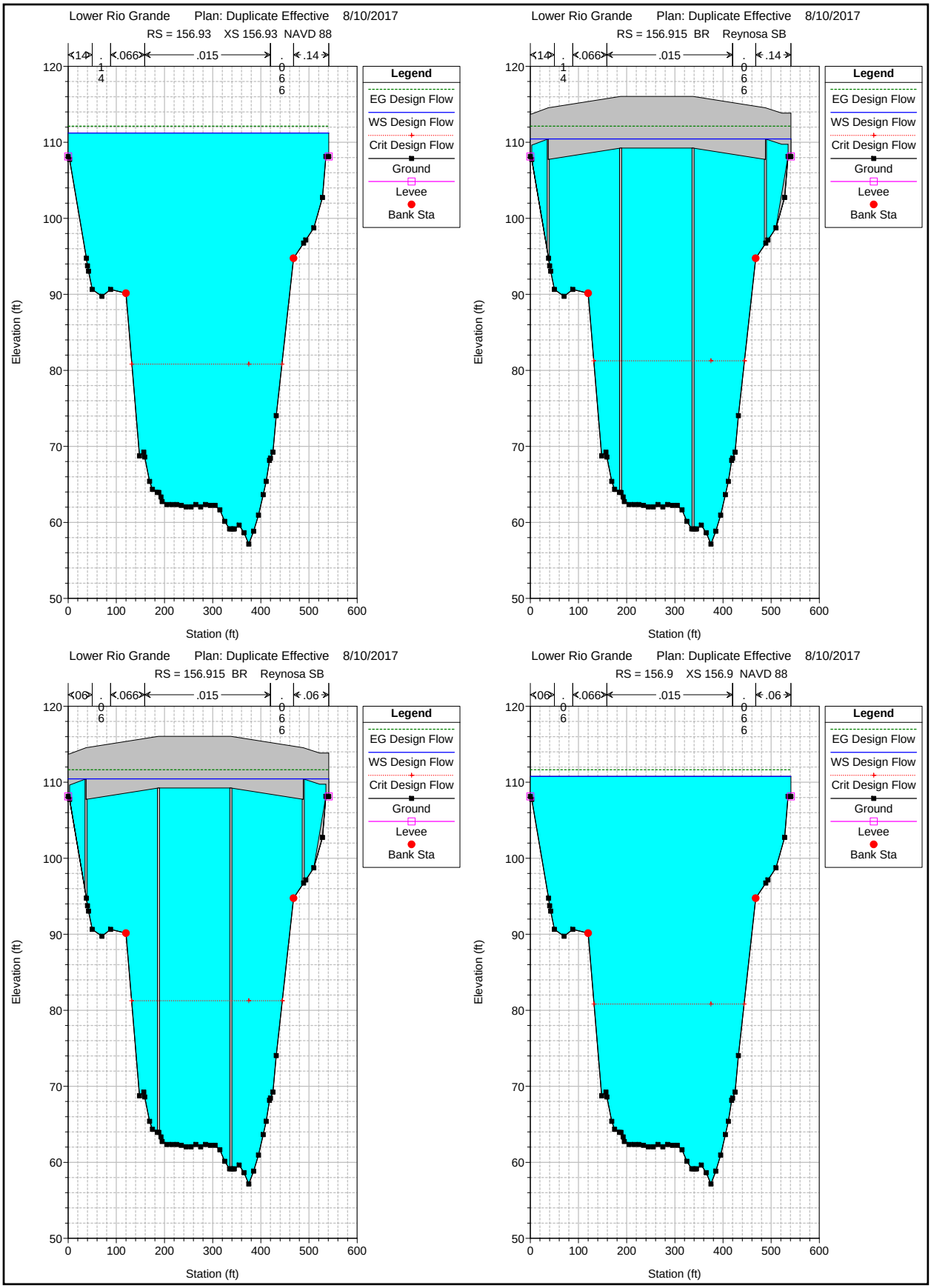

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 170.5 XS 170.5 NAVD 88
.186
.000
.616
.656
.076
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 170.26 new XS added March 2007 using Surveyed Data
.085
.12
.025
.12
.06
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 170.02 XS 170.02 NAVD 88
.177
.000
.616
.656
.131
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 169.83 XS 169.83 NAVD 88
.188
.000
.616
.656
.187
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

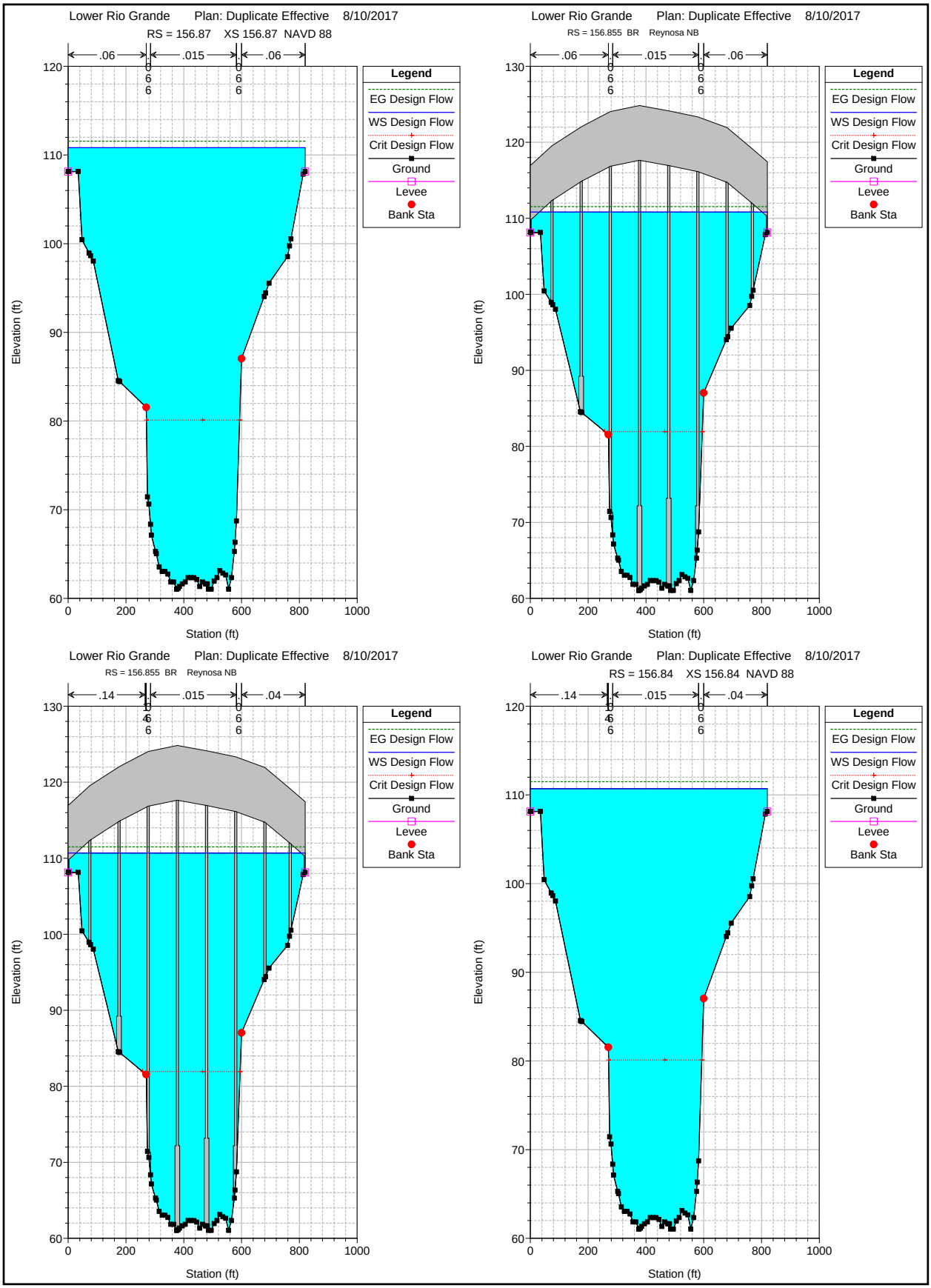

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 169.49 new XS added March 2007 using Surveyed Data
.066
.025
.085
.06
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 169.14 XS 169.14 NAVD 88
.048
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 169.13 IS Anzalduas Dam
.048
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 169.12 XS 169.12 NAVD 88
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

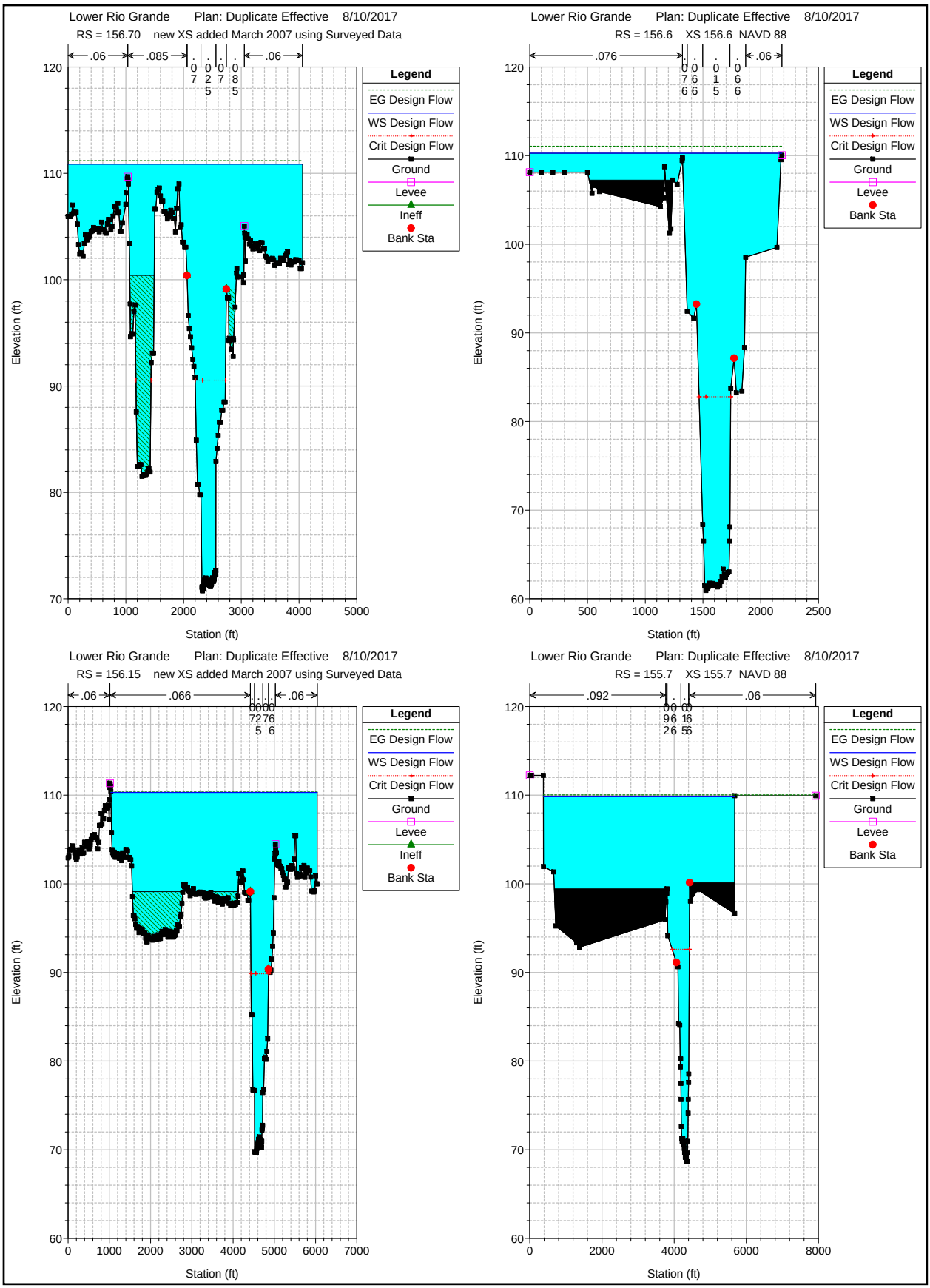

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 169.1 XS 169.1 NAVD 88
.14
.015
.14
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 168.85 XS 168.85 NAVD 88
.2
.116
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 168.58 new XS added march 2007 using Surveyed Data
.085
.12
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 168.3 XS 168.3 NAVD 88
.2
.116
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

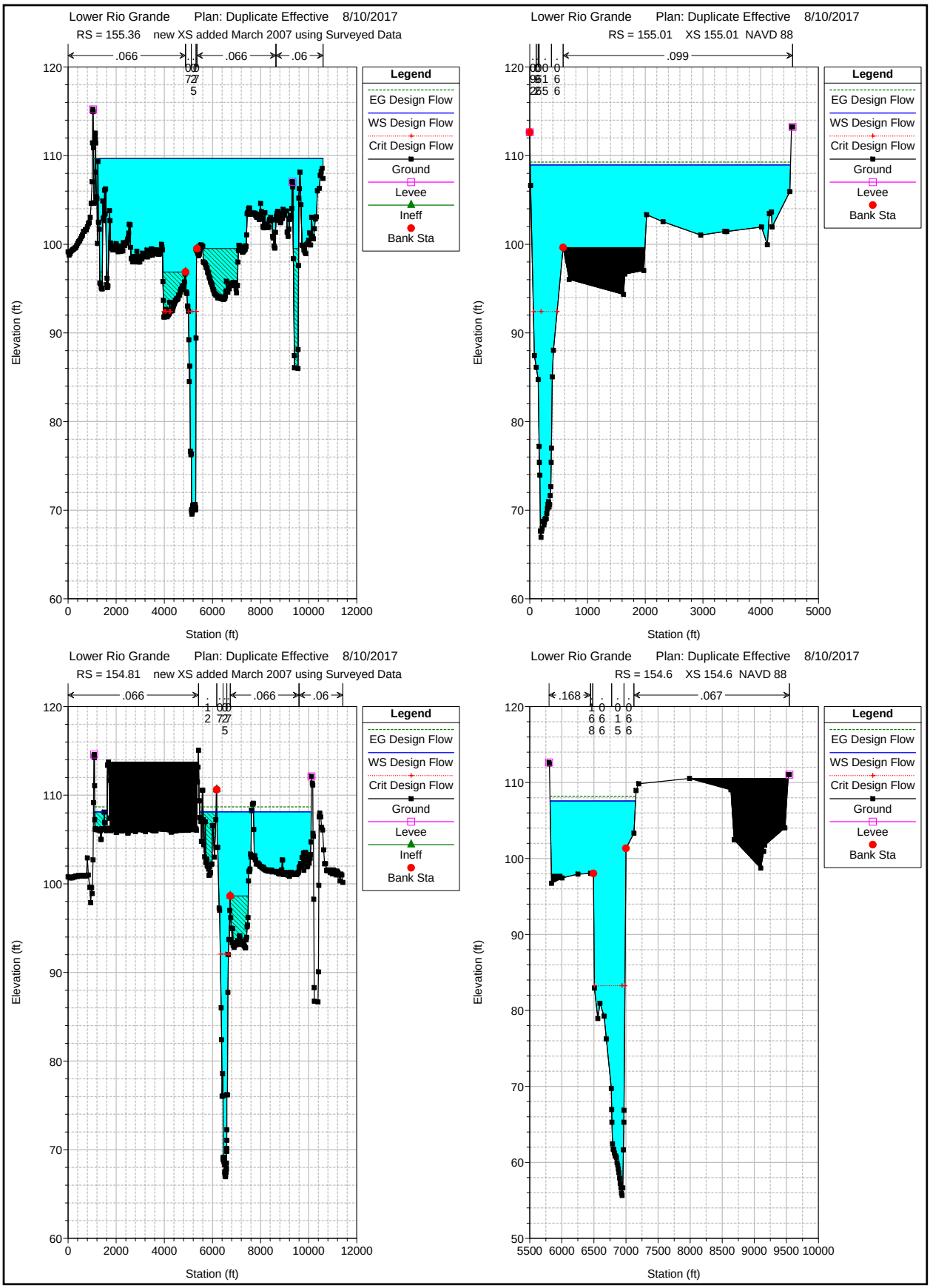

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 168.00 new Xs added March 2007 using Surveyed Data
.085
.066
.12
.025
.12
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 167.4 XS 167.4 NAVD 88
.106
.13
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 167.00 new XS added March 2007 using Surveyed Data
.085
.066
.025
.066
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 166.6 XS 166.6 NAVD 88
.118
.132
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

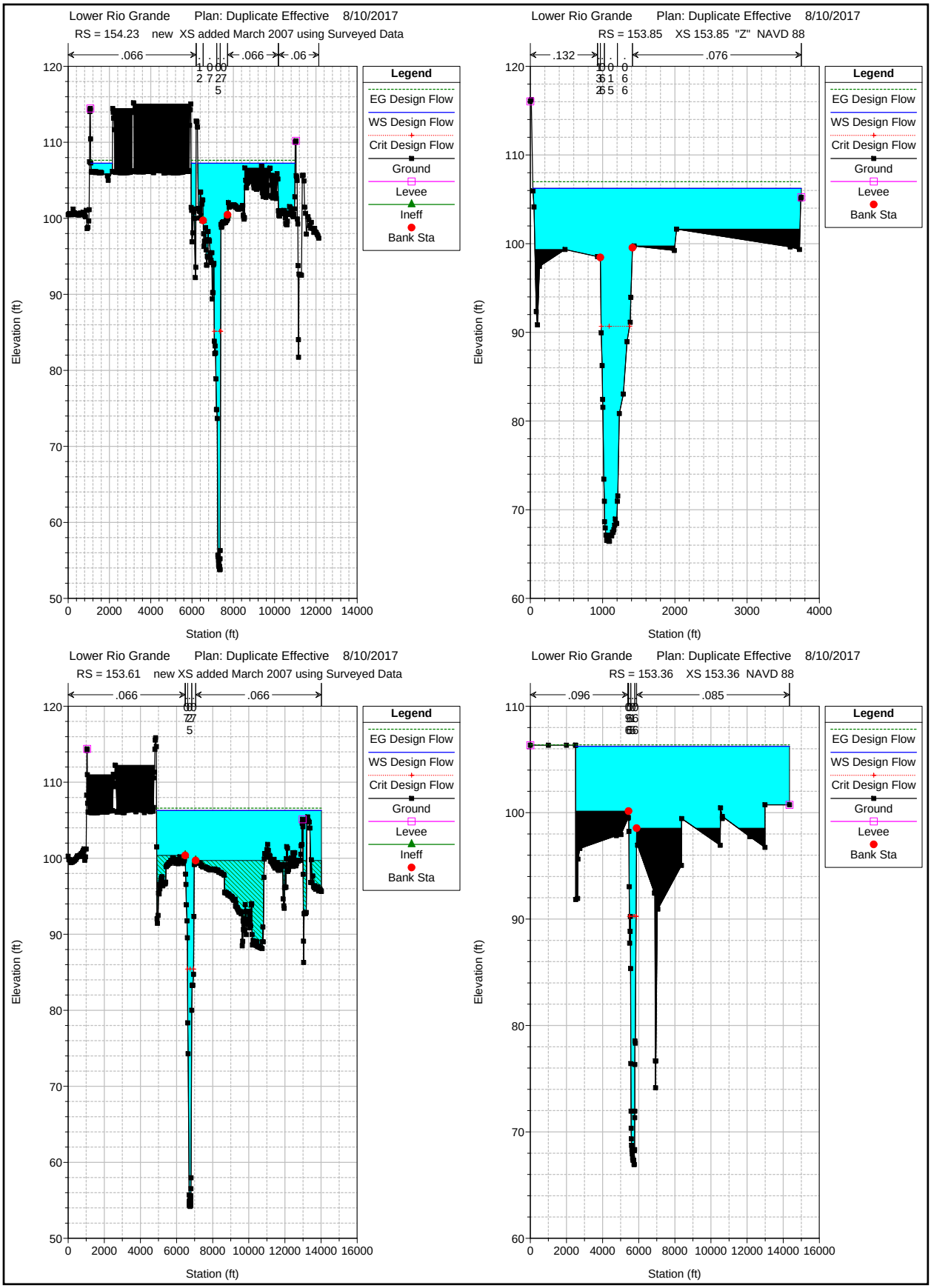

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 162.1 new XS added March 2007 using Surveyed Data
.12
.12
.085
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 161.4 XS 161.4 NAVD 88
.108
.144
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 159.16 new XS added March 2007 using Surveyed Data
.085
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 157.15 XS 157.15 NAVD 88
.102
.015
.078
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

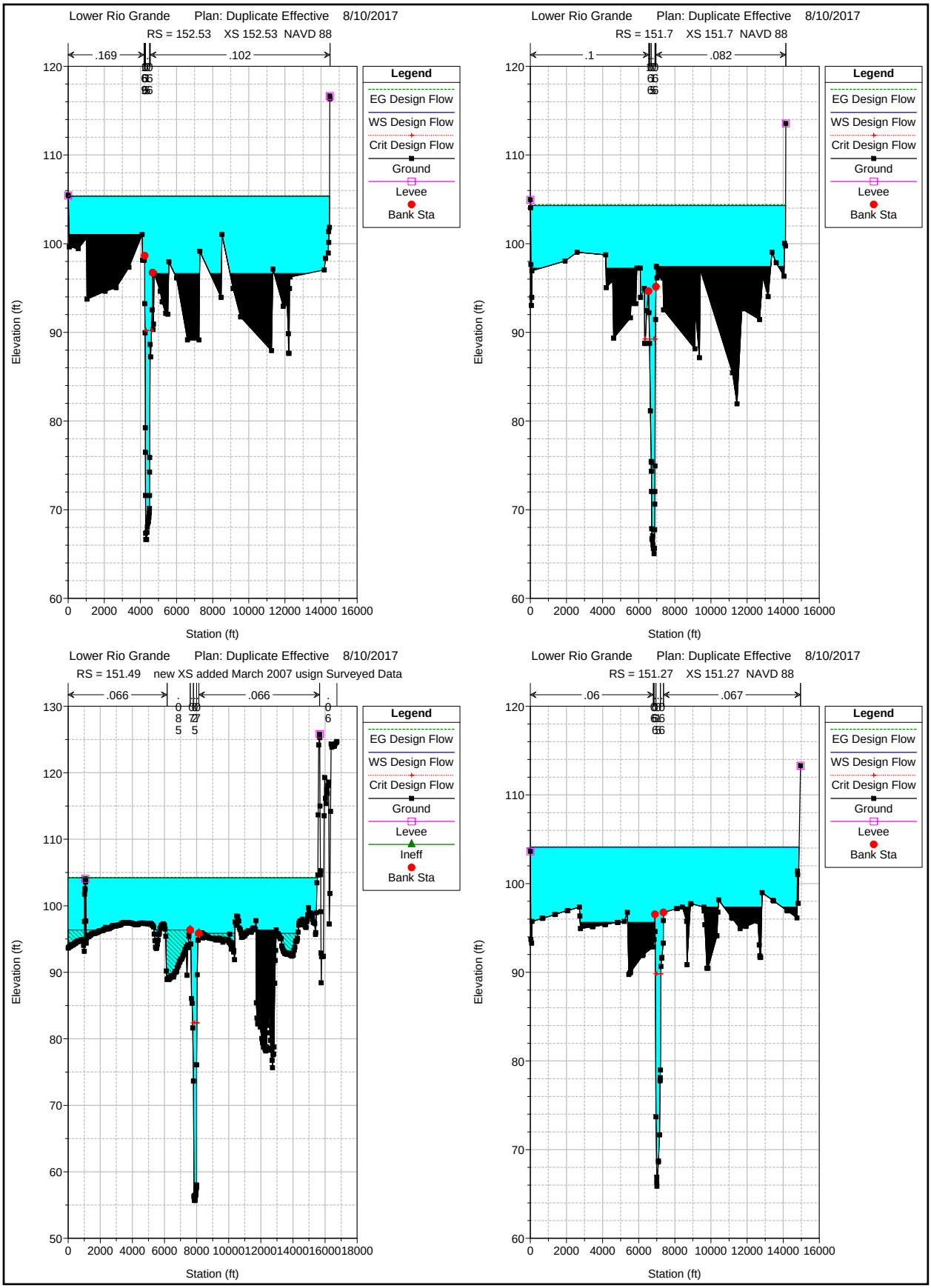

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.93 XS 156.93 NAVD 88
.14 .14 .066 .015 .066 .14
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.915 BR Reynosa SB
.14 .14 .066 .015 .066 .14
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.915 BR Reynosa SB
.06 .06 .066 .015 .066 .06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.9 XS 156.9 NAVD 88
.06 .06 .066 .015 .066 .06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

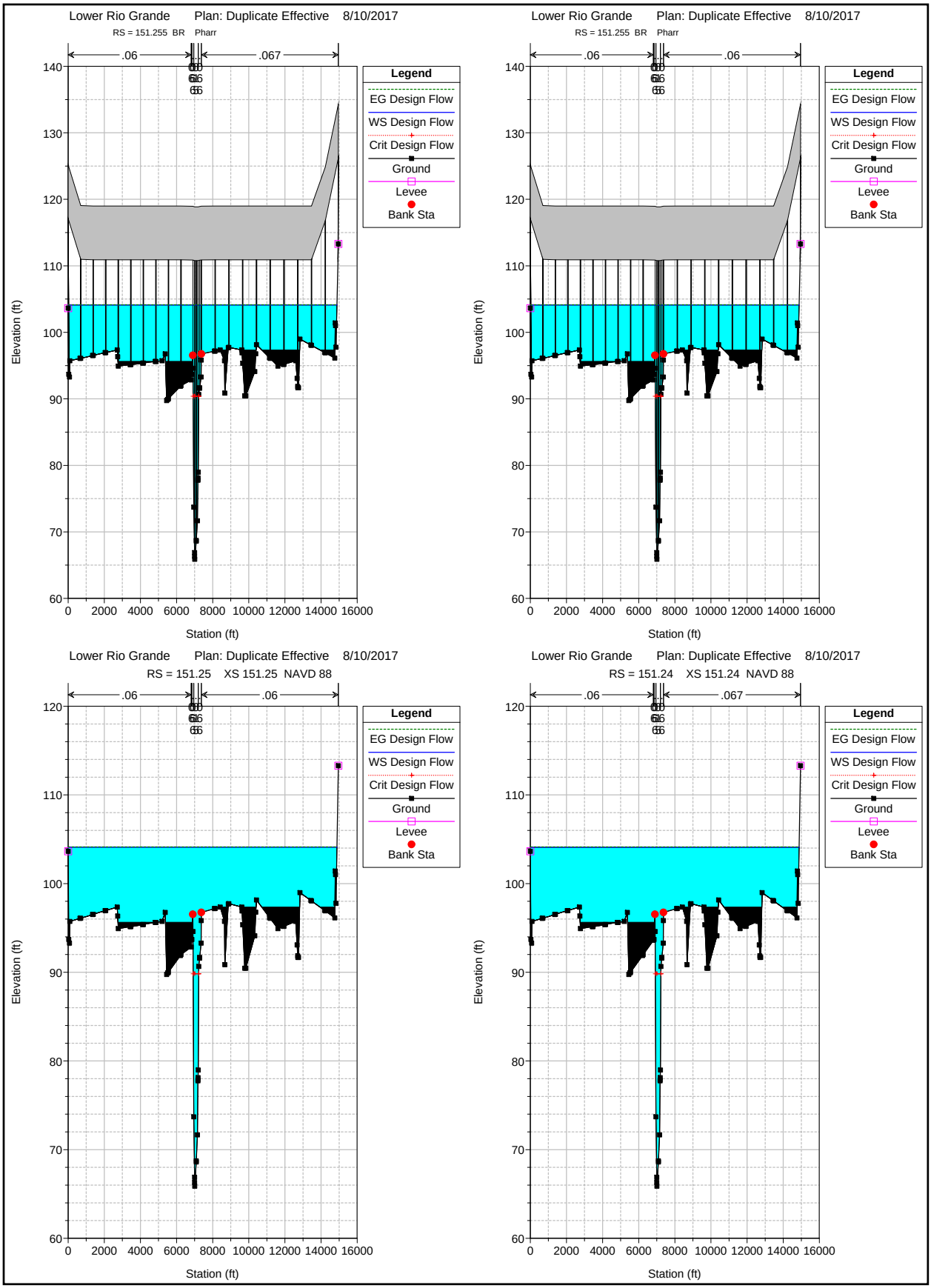

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.87 XS 156.87 NAVD 88
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.855 BR Reynosa NB
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.855 BR Reynosa NB
.14
.015
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.84 XS 156.84 NAVD 88
.14
.015
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

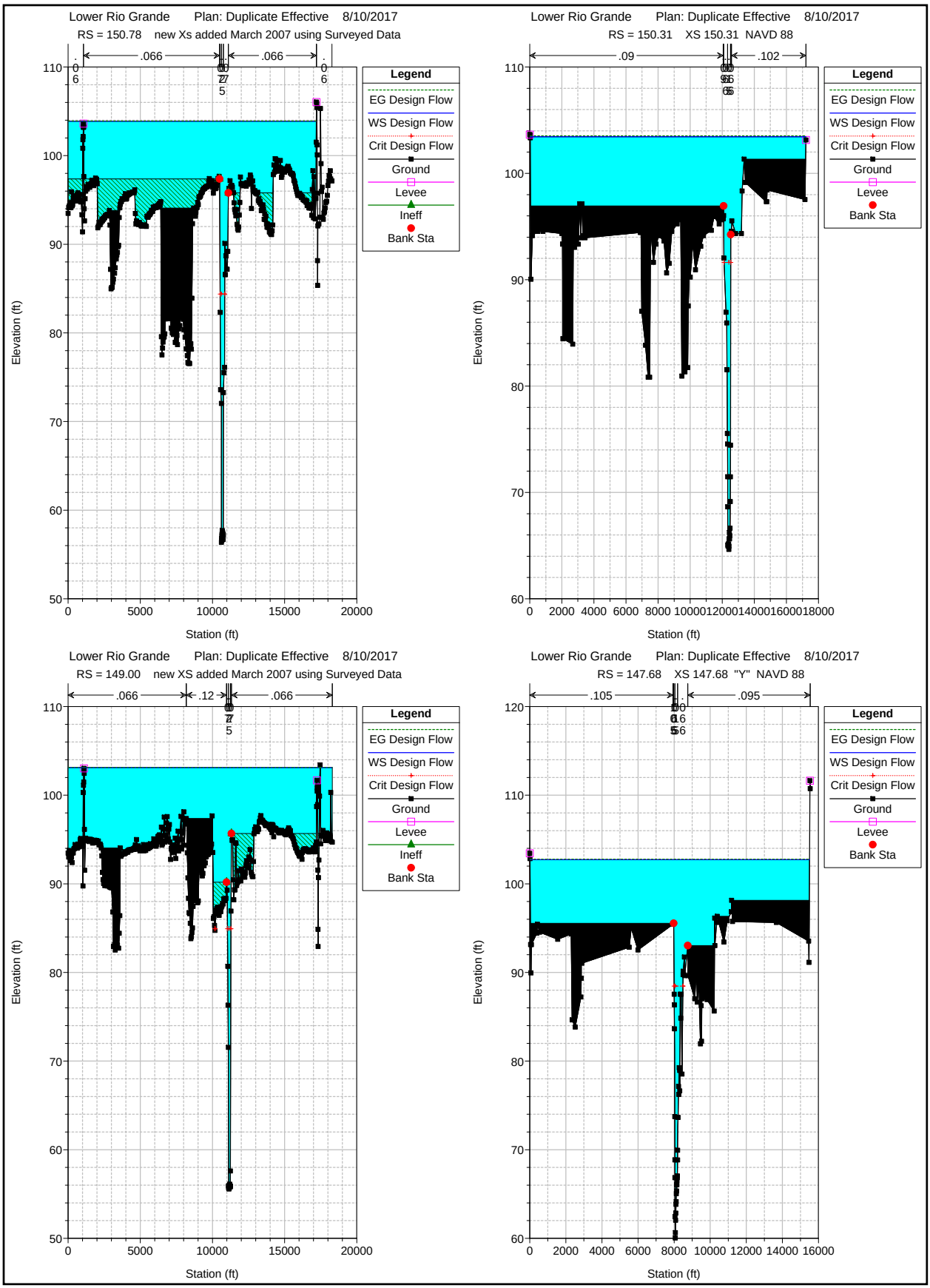

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.70 new XS added March 2007 using Surveyed Data
.06
.085
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.6 XS 156.6 NAVD 88
.076
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 156.15 new XS added March 2007 using Surveyed Data
.06
.066
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 155.7 XS 155.7 NAVD 88
.092
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

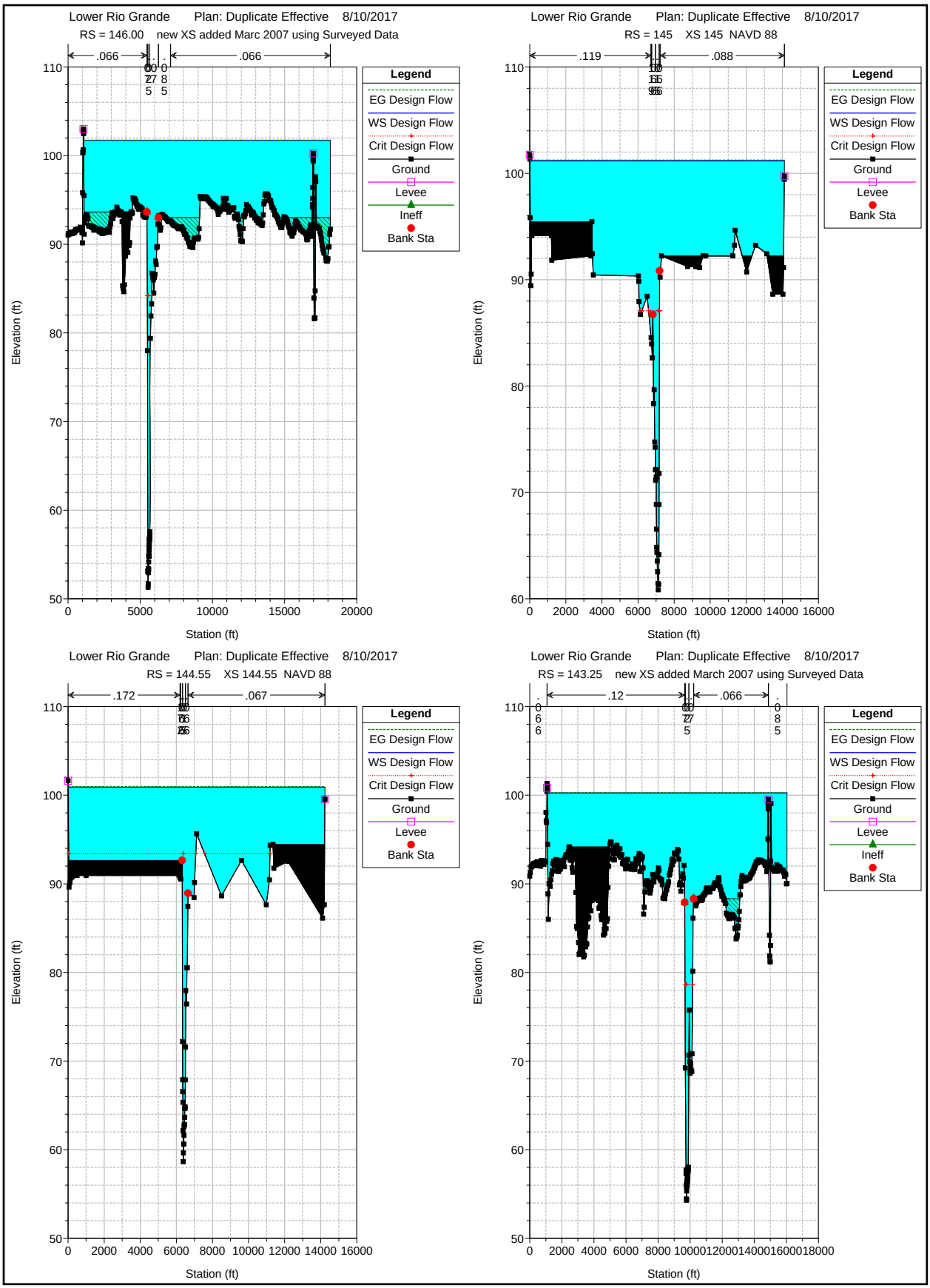

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 155.36 new XS added March 2007 using Surveyed Data
.066
.066
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 155.01 XS 155.01 NAVD 88
.099
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 154.81 new XS added March 2007 using Surveyed Data
.066
.066
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 154.6 XS 154.6 NAVD 88
.168
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

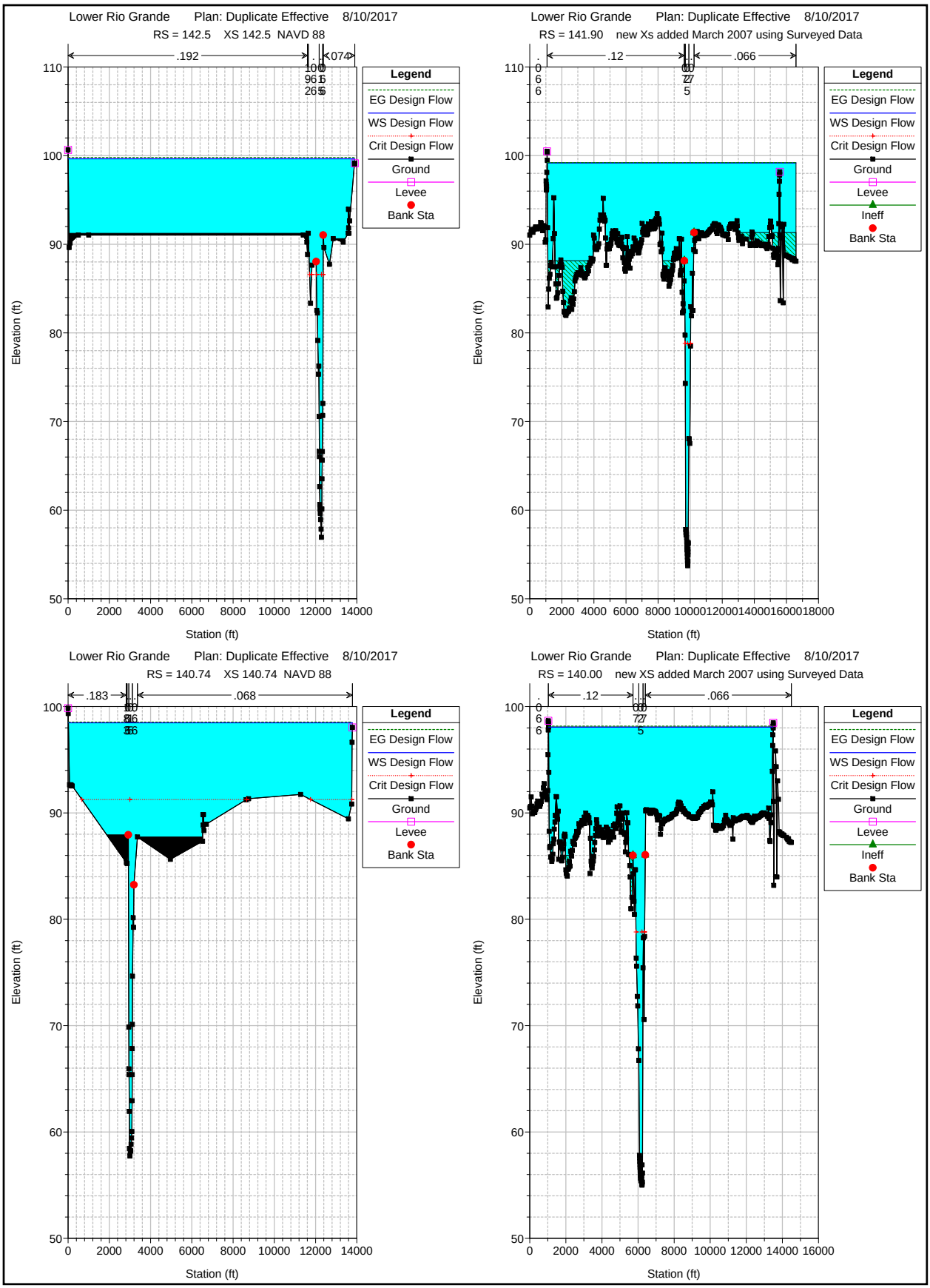

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 154.23 new XS added March 2007 using Surveyed Data
.066
.066
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 153.85 XS 153.85 "Z" NAVD 88
.132
.076
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 153.61 new XS added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 153.36 XS 153.36 NAVD 88
.096
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

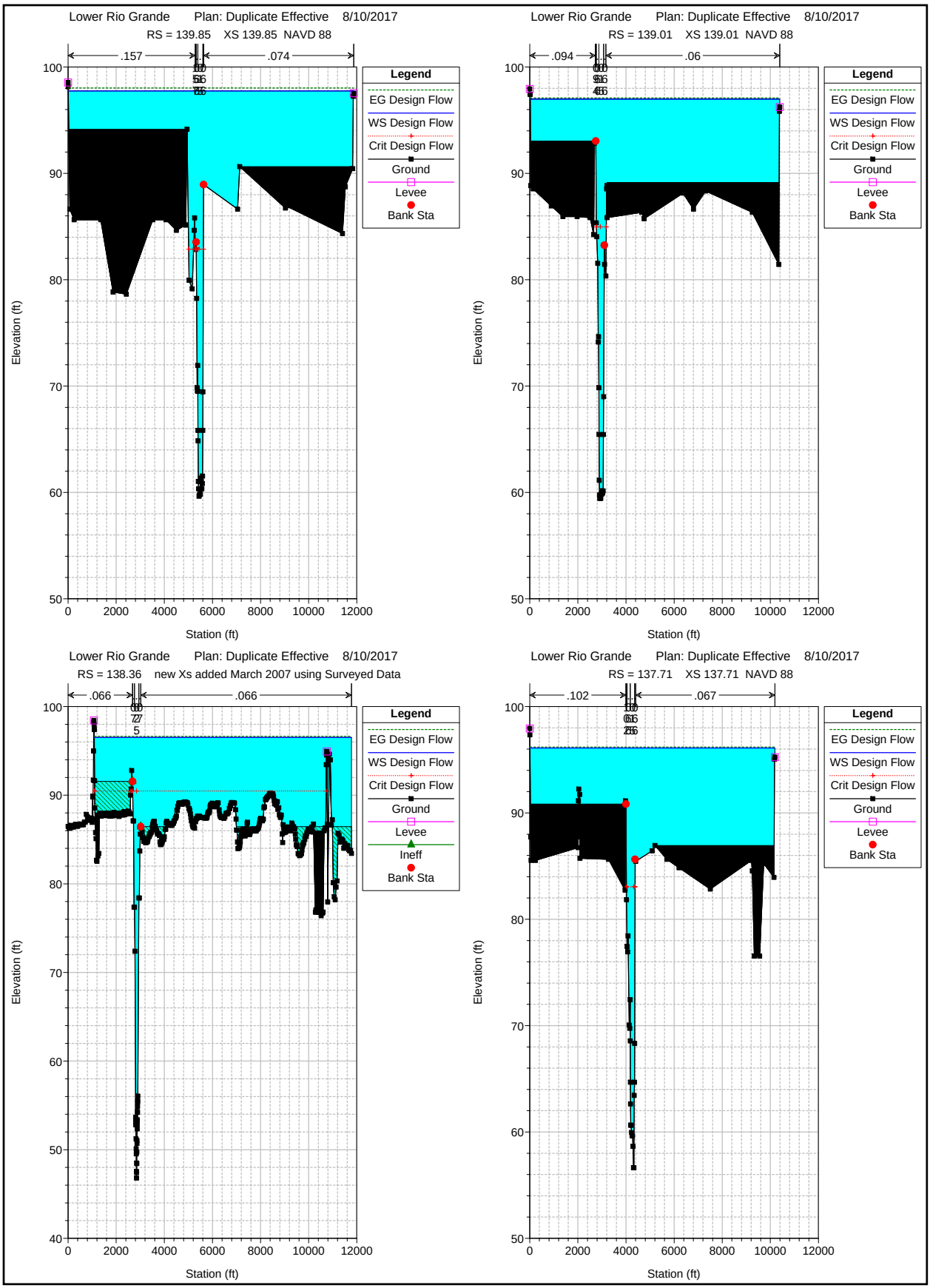

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 152.53 XS 152.53 NAVD 88
.169
.102
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 151.7 XS 151.7 NAVD 88
.1
.082
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 151.49 new XS added March 2007 usign Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 151.27 XS 151.27 NAVD 88
.06
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

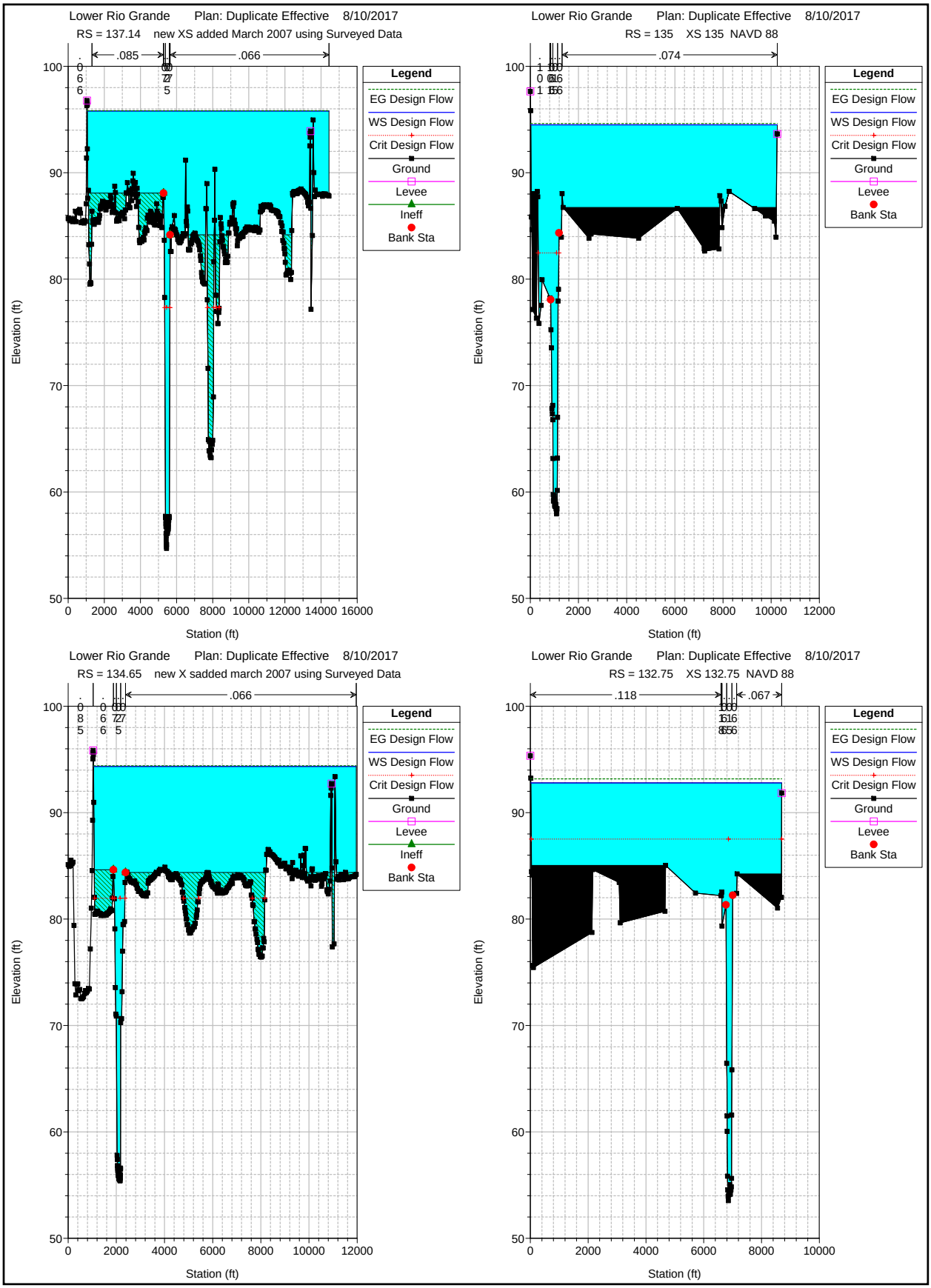

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 151.255 BR Pharr
.06
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 151.255 BR Pharr
.06
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 151.25 XS 151.25 NAVD 88
.06
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 151.24 XS 151.24 NAVD 88
.06
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

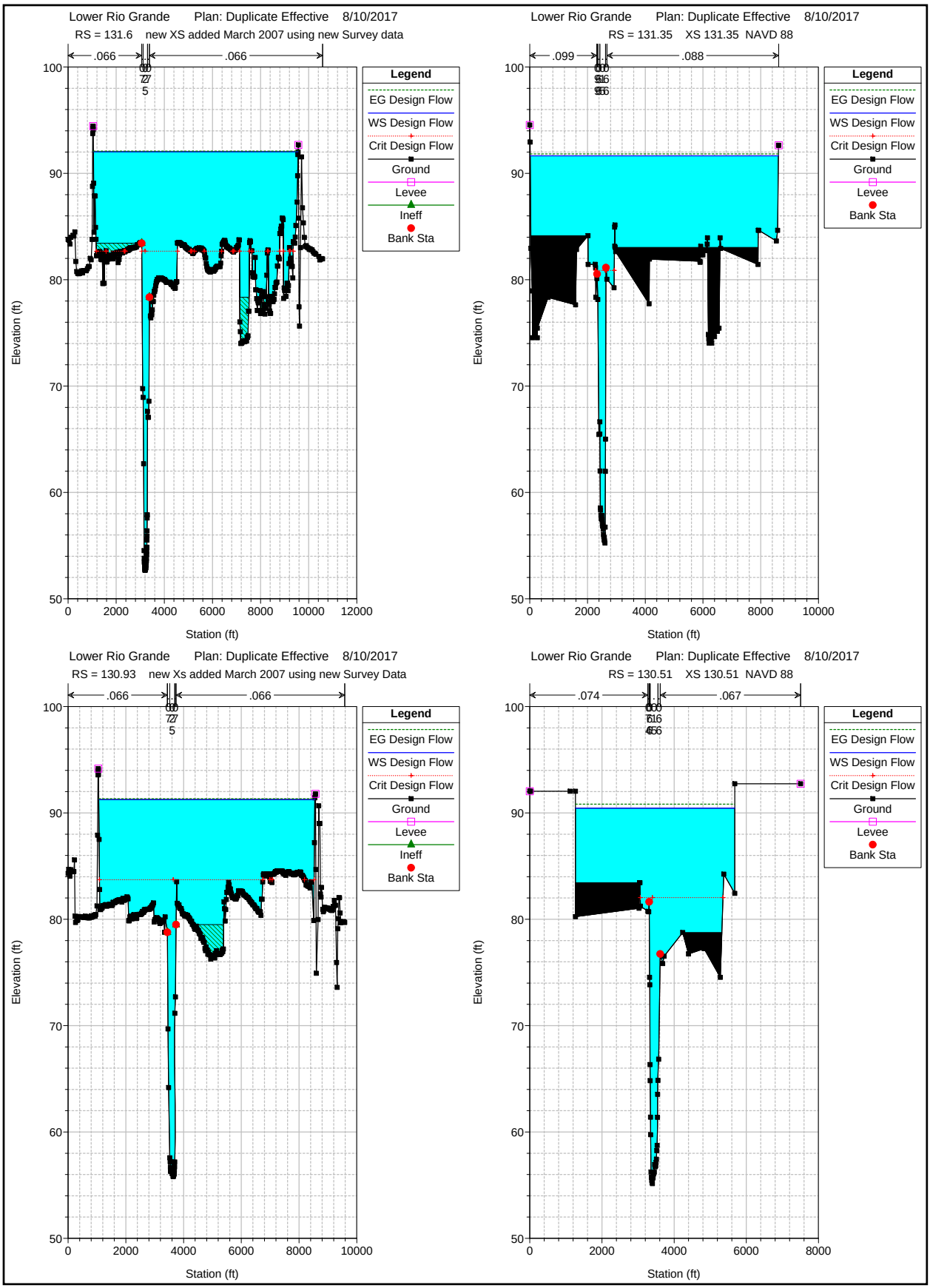

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 150.78 new Xs added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 150.31 XS 150.31 NAVD 88
.09
.102
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 149.00 new XS added March 2007 using Surveyed Data
.066
.12
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 147.68 XS 147.68 "Y" NAVD 88
.105
.095
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

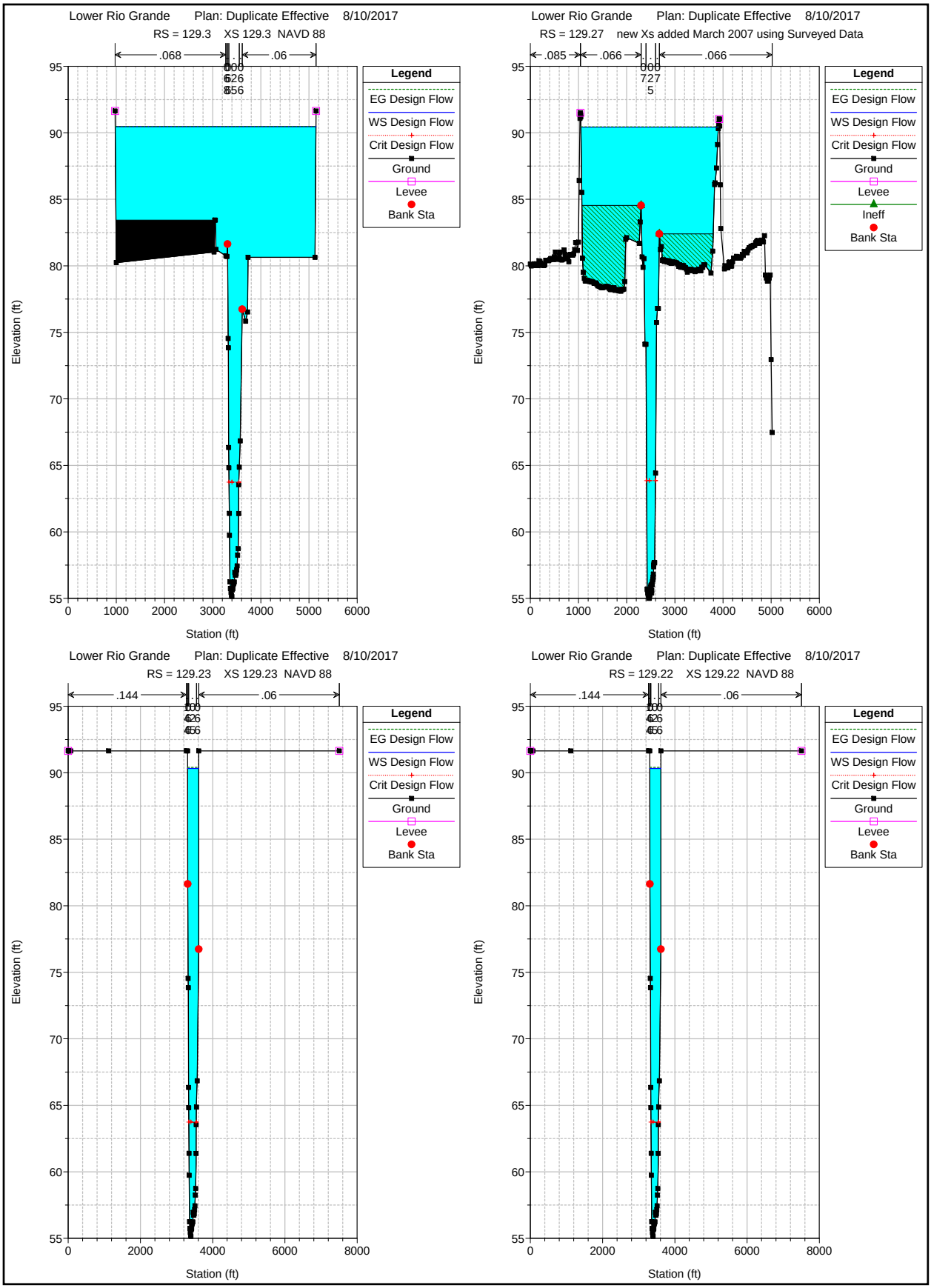

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 146.00 new XS added Marc 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 145 XS 145 NAVD 88
.119
.088
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 144.55 XS 144.55 NAVD 88
.172
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 143.25 new XS added March 2007 using Surveyed Data
.12
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

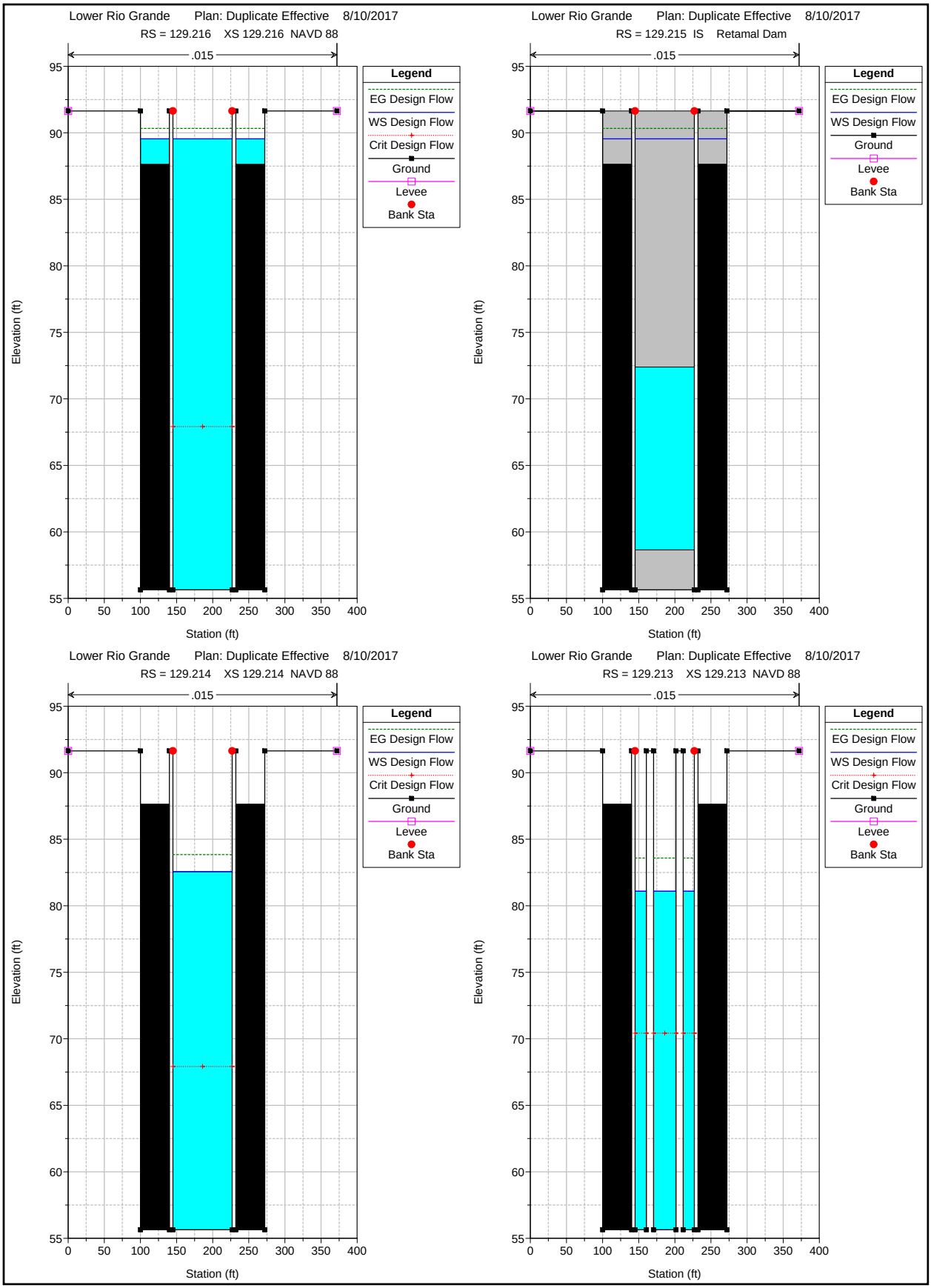

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 142.5 XS 142.5 NAVD 88
.192
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 141.90 new Xs added March 2007 using Surveyed Data
.12
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 140.74 XS 140.74 NAVD 88
.183
.068
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 140.00 new XS added March 2007 using Surveyed Data
.12
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

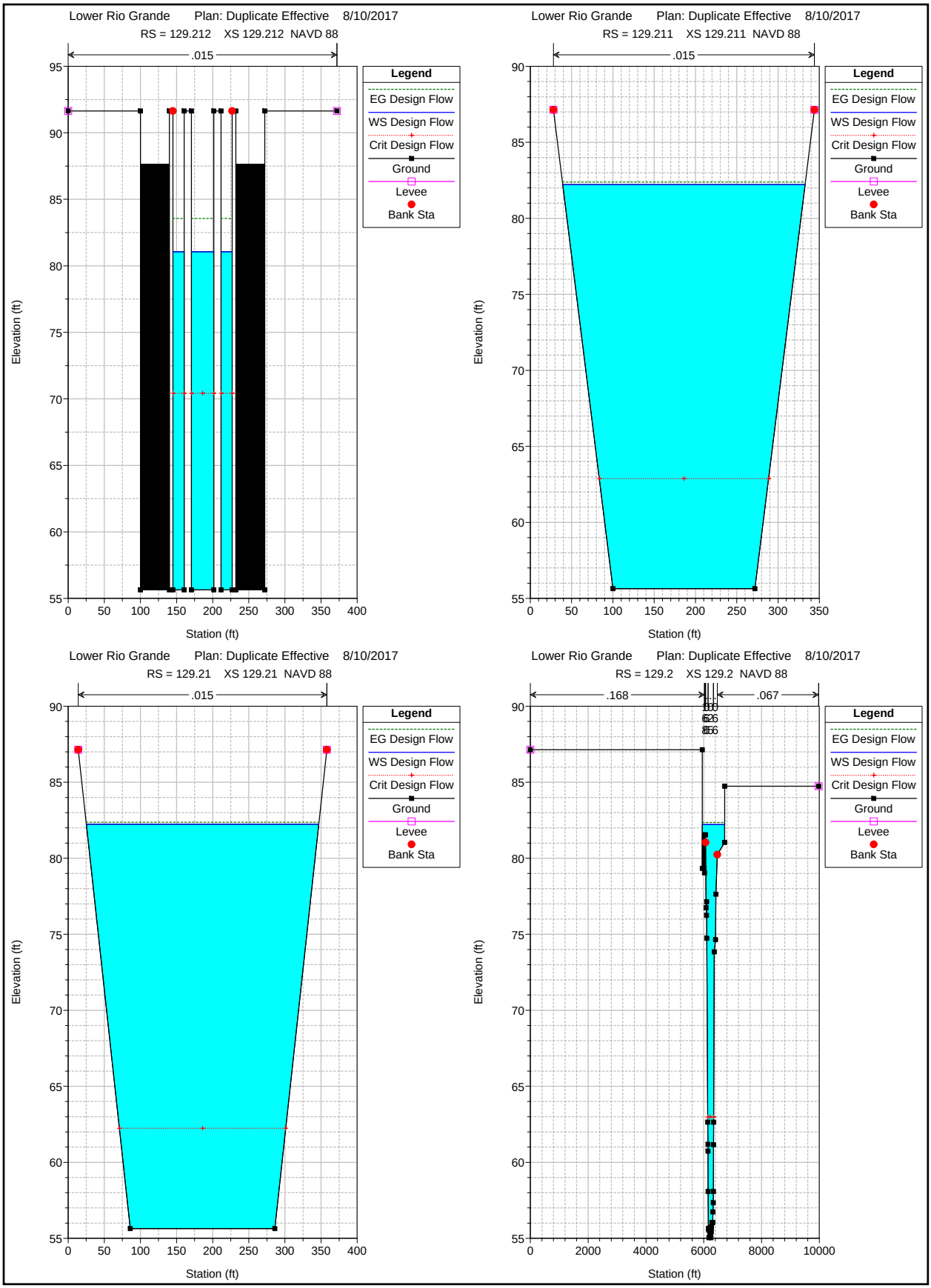

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 139.85 XS 139.85 NAVD 88
.157
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 139.01 XS 139.01 NAVD 88
.094
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 138.36 new Xs added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 137.71 XS 137.71 NAVD 88
.102
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

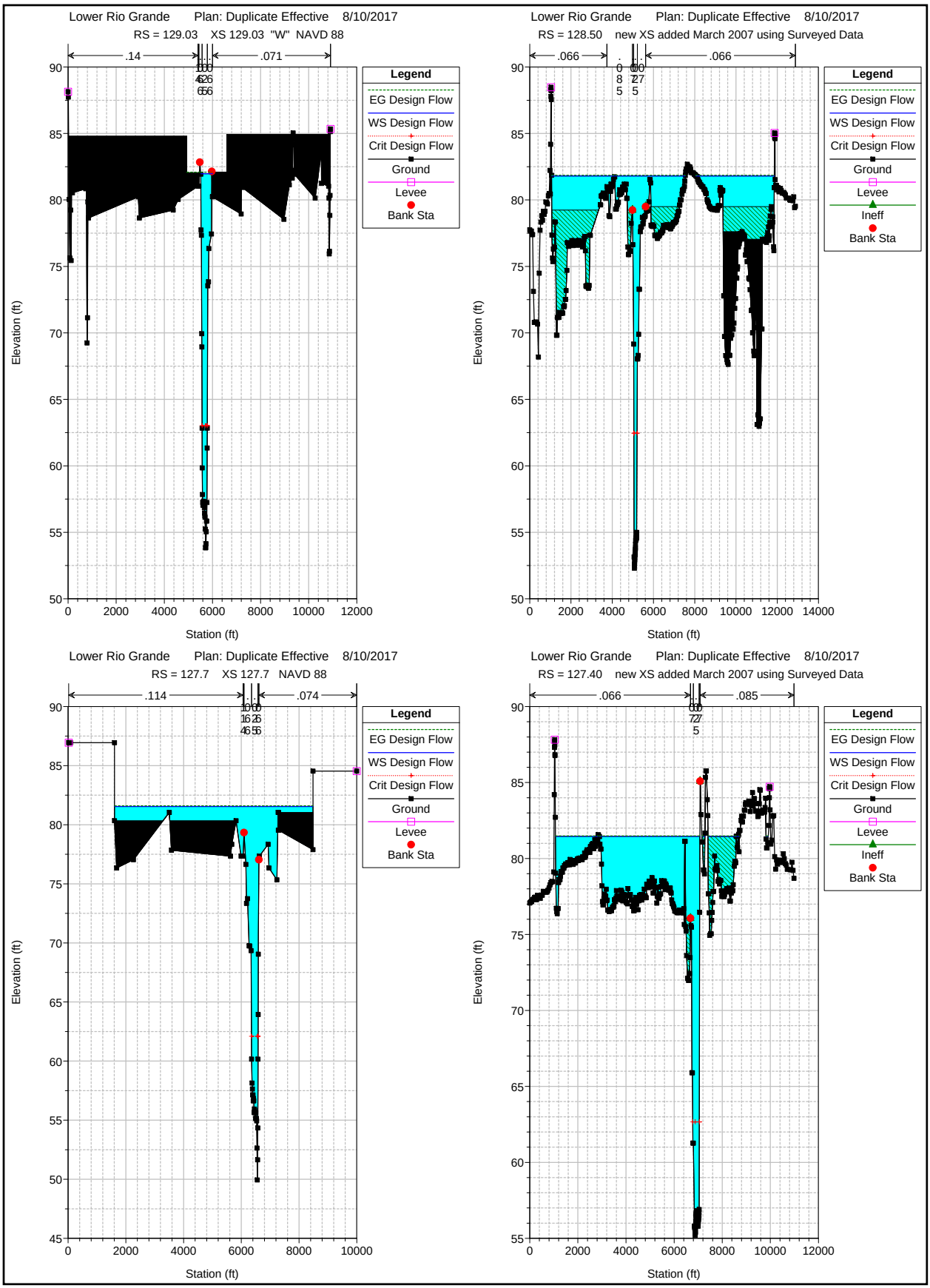

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 137.14 new XS added March 2007 using Surveyed Data
.085
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 135 XS 135 NAVD 88
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 134.65 new X sadded march 2007 using Surveyed Data
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 132.75 XS 132.75 NAVD 88
.118
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

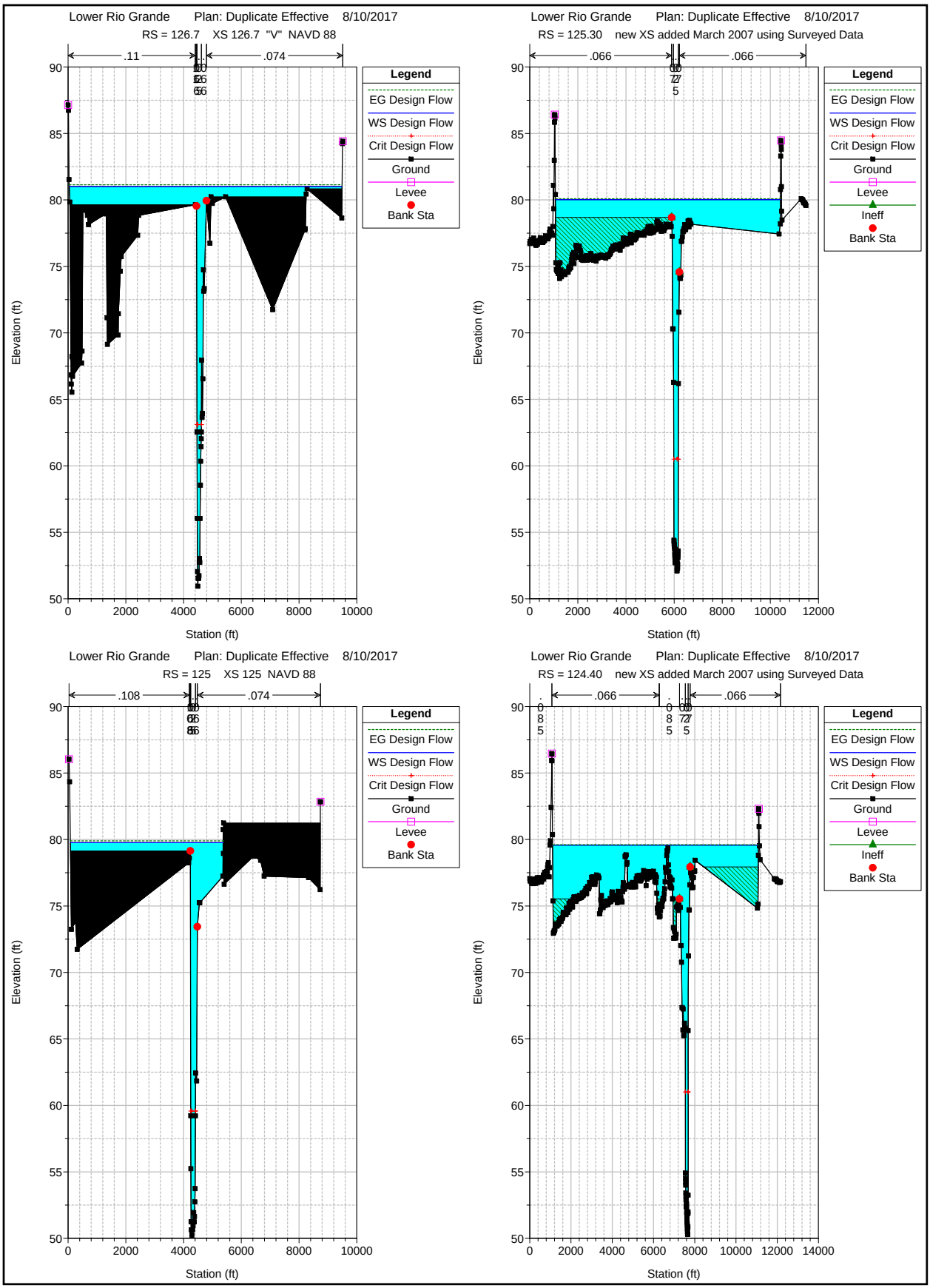

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 131.6 new XS added March 2007 using new Survey data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 131.35 XS 131.35 NAVD 88
.099
.088
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 130.93 new Xs added March 2007 using new Survey Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 130.51 XS 130.51 NAVD 88
.074
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

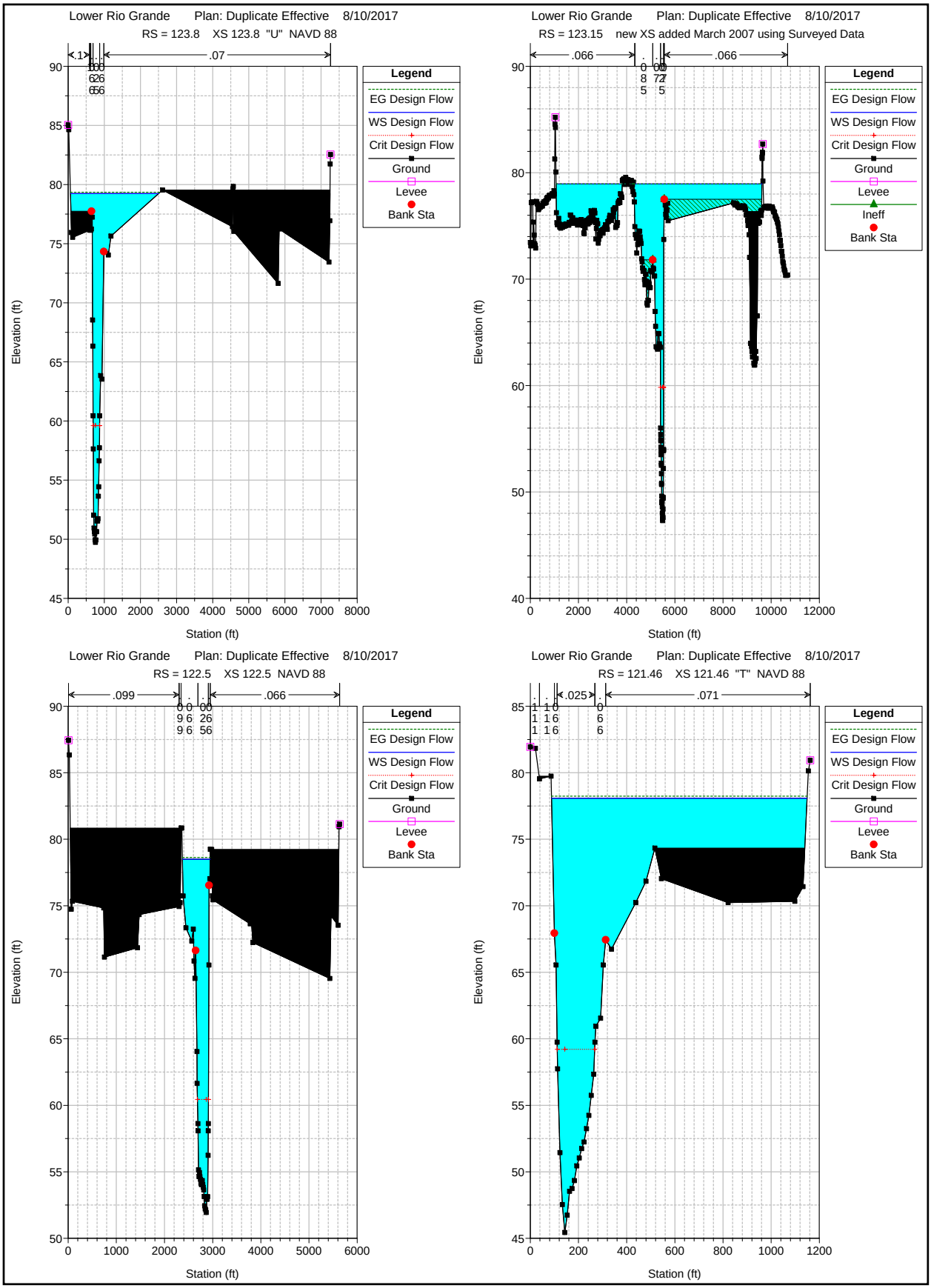

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.3 XS 129.3 NAVD 88
.068
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.27 new Xs added March 2007 using Surveyed Data
.085
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.23 XS 129.23 NAVD 88
.144
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.22 XS 129.22 NAVD 88
.144
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

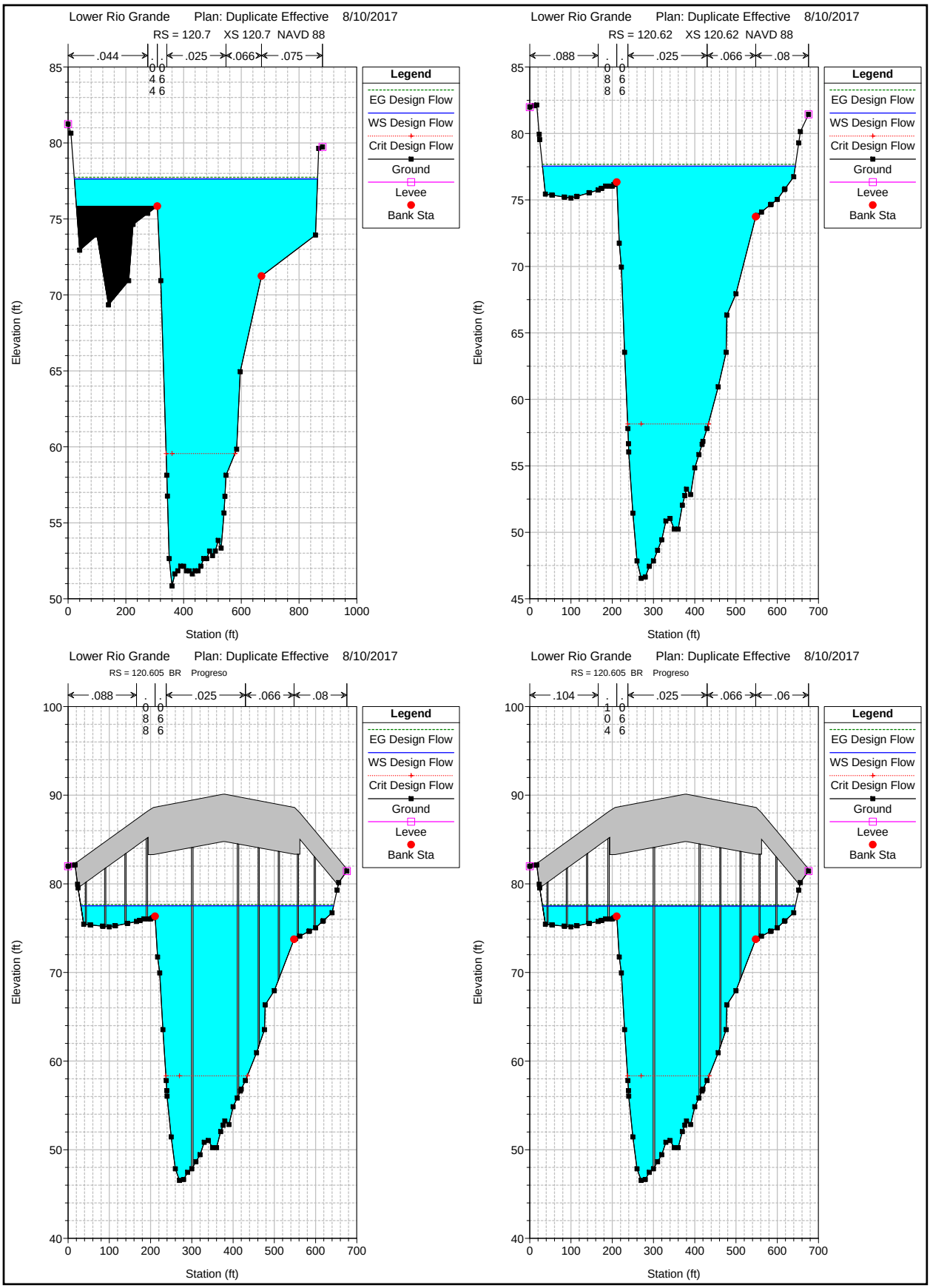

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.216 XS 129.216 NAVD 88
.015
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.215 IS Retamal Dam
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.214 XS 129.214 NAVD 88
.015
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.213 XS 129.213 NAVD 88
.015
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

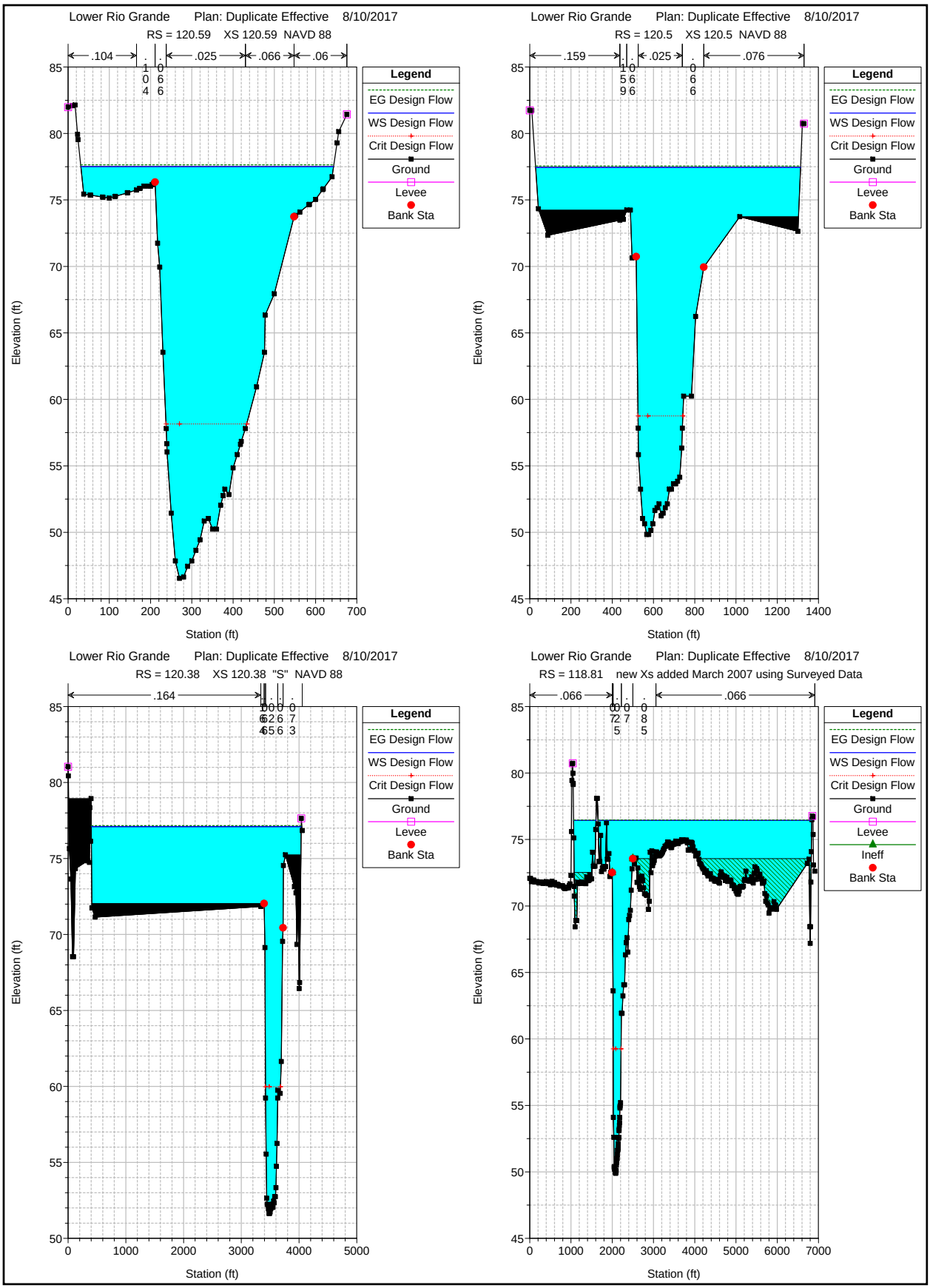

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.212 XS 129.212 NAVD 88
.015
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.211 XS 129.211 NAVD 88
.015
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.21 XS 129.21 NAVD 88
.015
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.2 XS 129.2 NAVD 88
.168
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

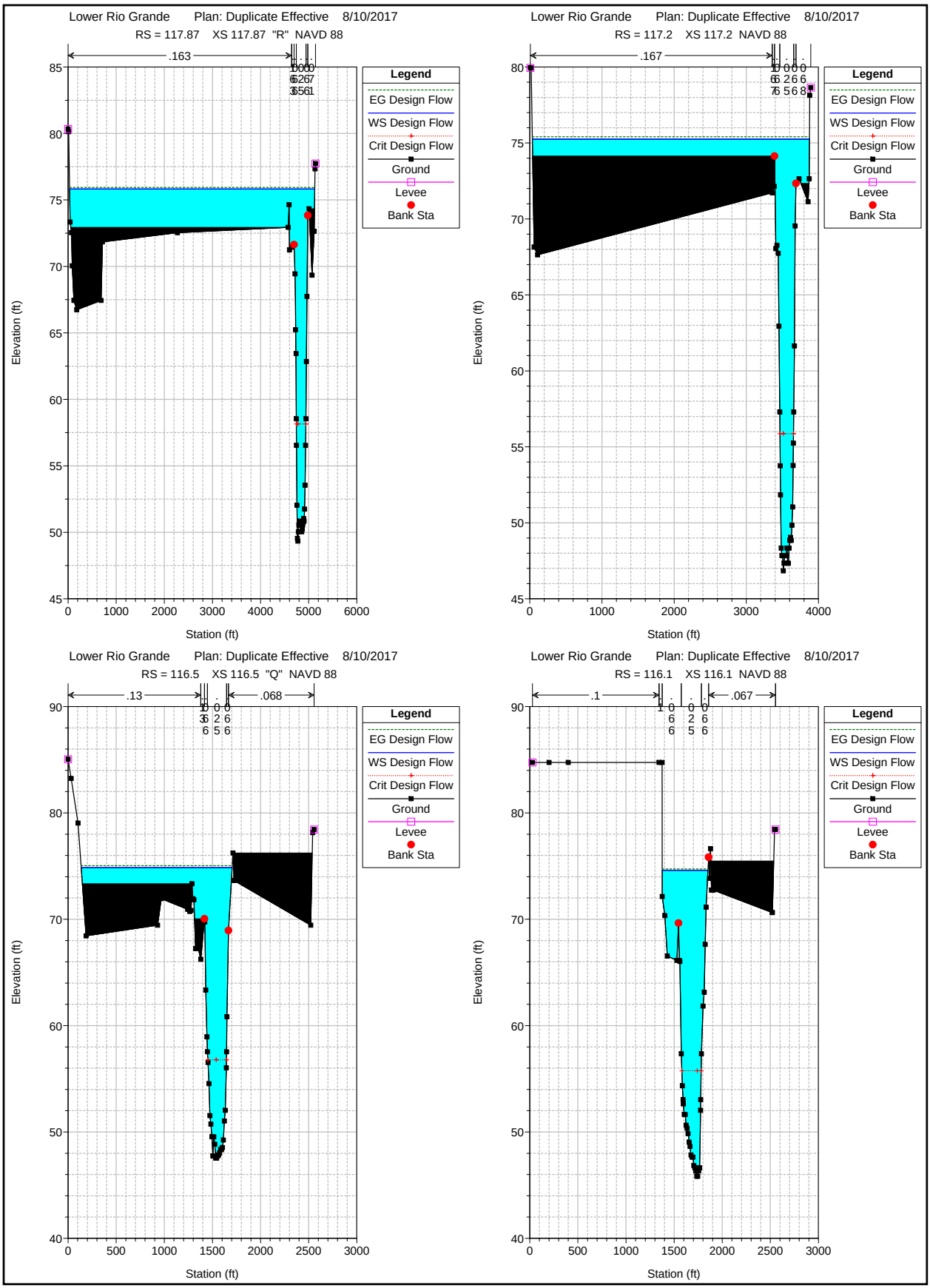

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 129.03 XS 129.03 "W" NAVD 88
.14
.071
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 128.50 new XS added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 127.7 XS 127.7 NAVD 88
.114
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 127.40 new XS added March 2007 using Surveyed Data
.066
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

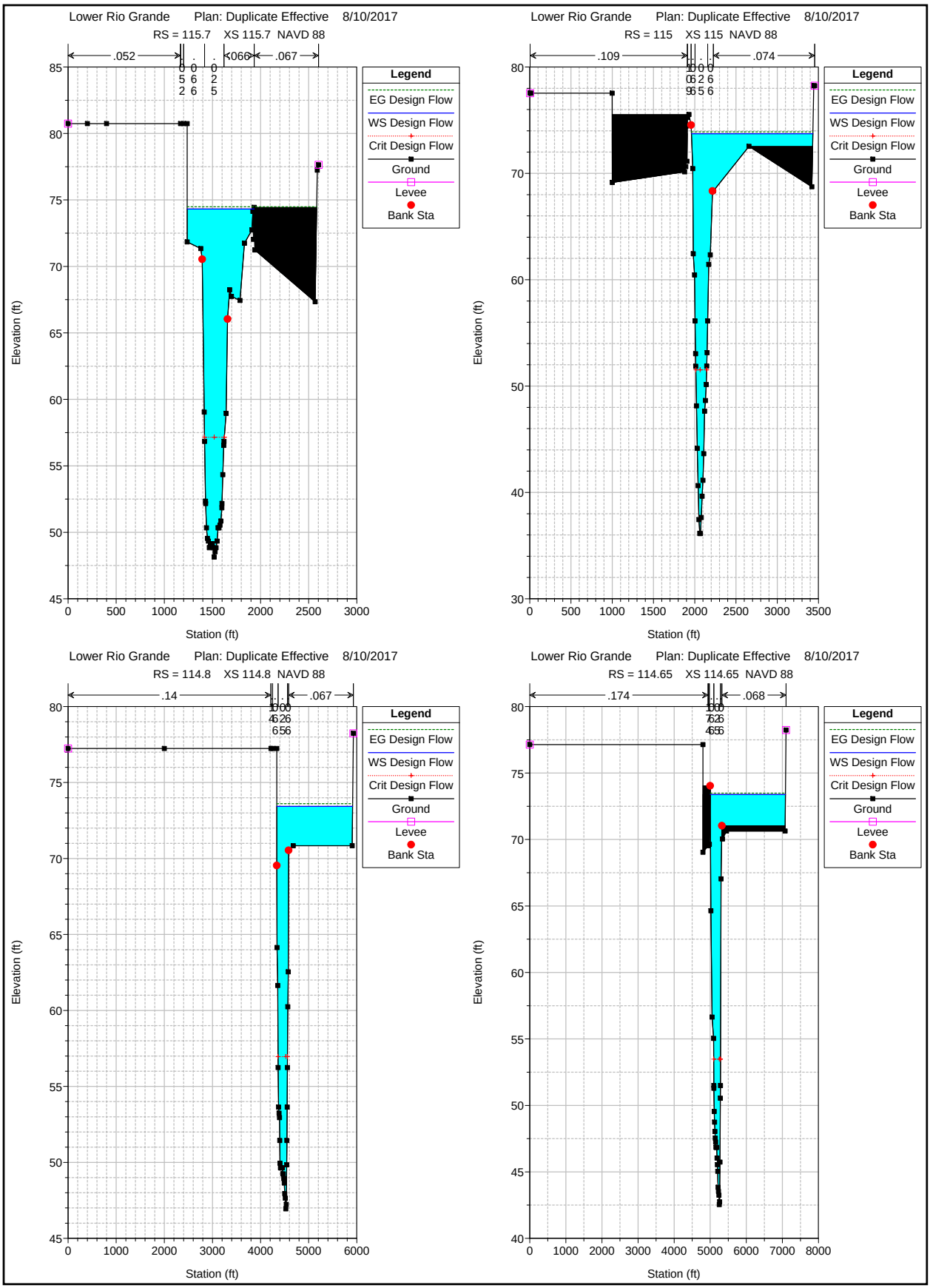

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 126.7 XS 126.7 "V" NAVD 88
.11
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 125.30 new XS added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 125 XS 125 NAVD 88
.108
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 124.40 new XS added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

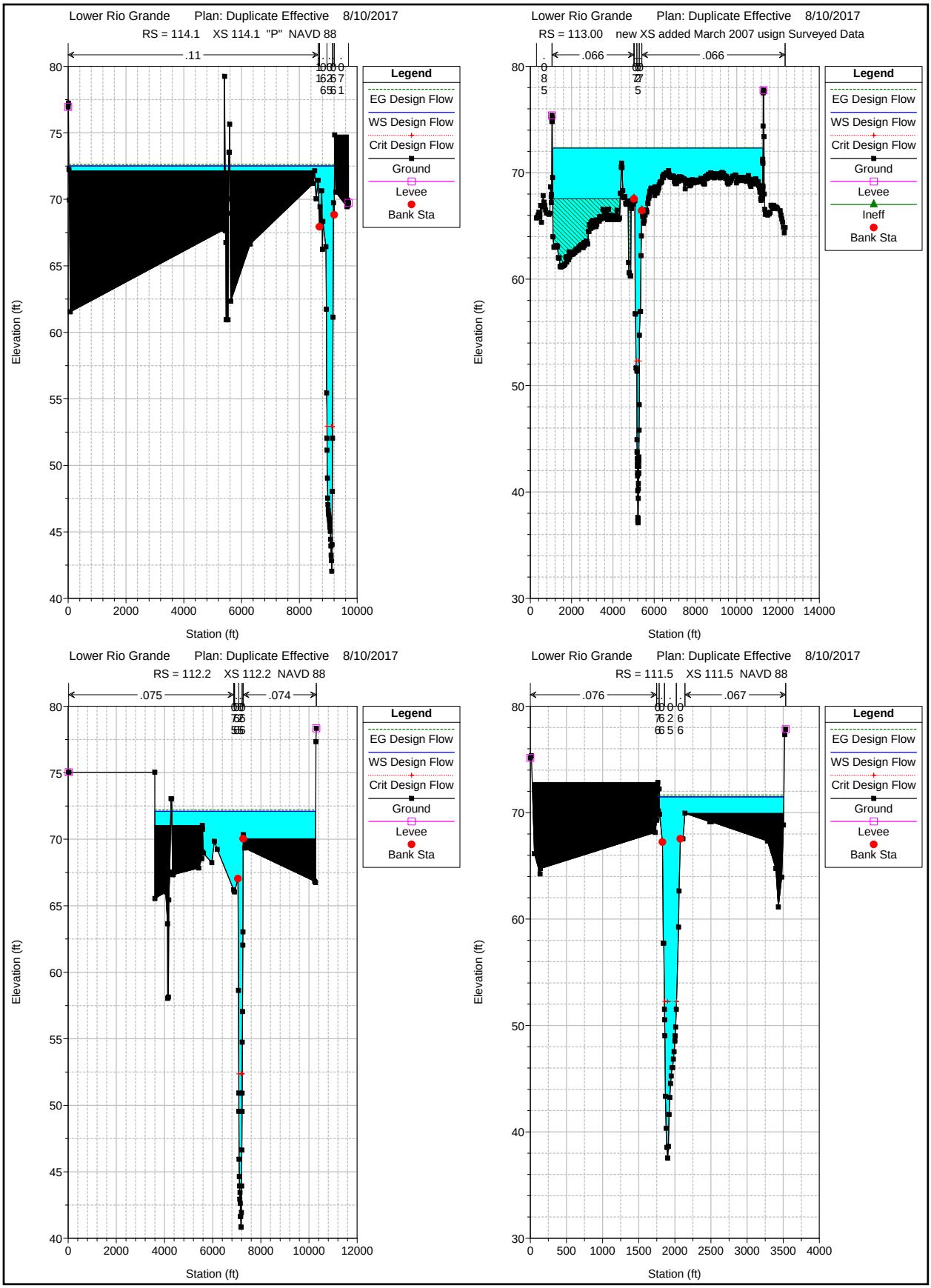

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 123.8 XS 123.8 "U" NAVD 88
.1
.07
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 123.15 new XS added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 122.5 XS 122.5 NAVD 88
.099
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 121.46 XS 121.46 "T" NAVD 88
.025
.071
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

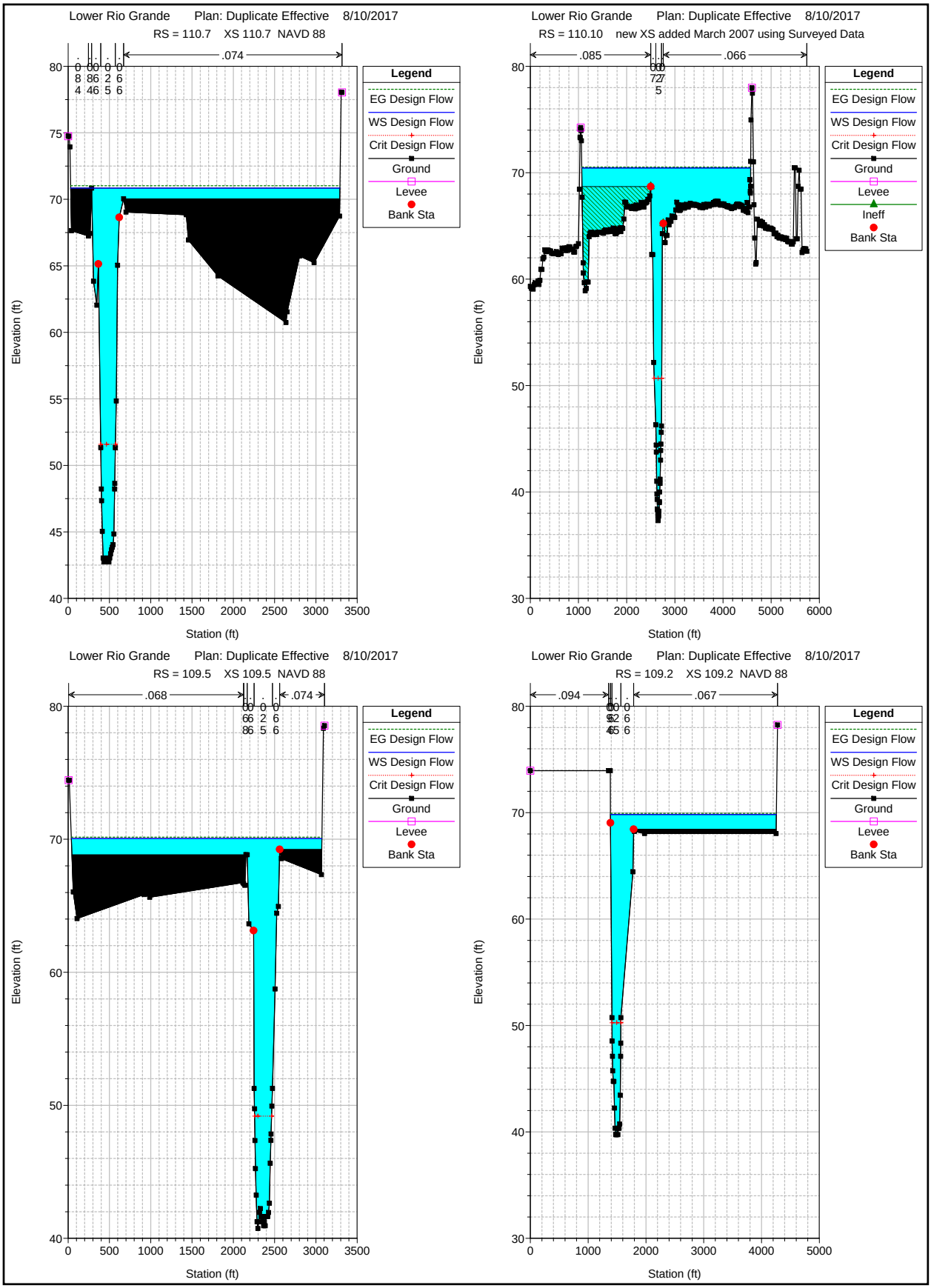

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 120.7 XS 120.7 NAVD 88
.044
.025
.066
.075
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 120.62 XS 120.62 NAVD 88
.088
.025
.066
.08
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 120.605 BR Progreso
.088
.025
.066
.08
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 120.605 BR Progreso
.104
.025
.066
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

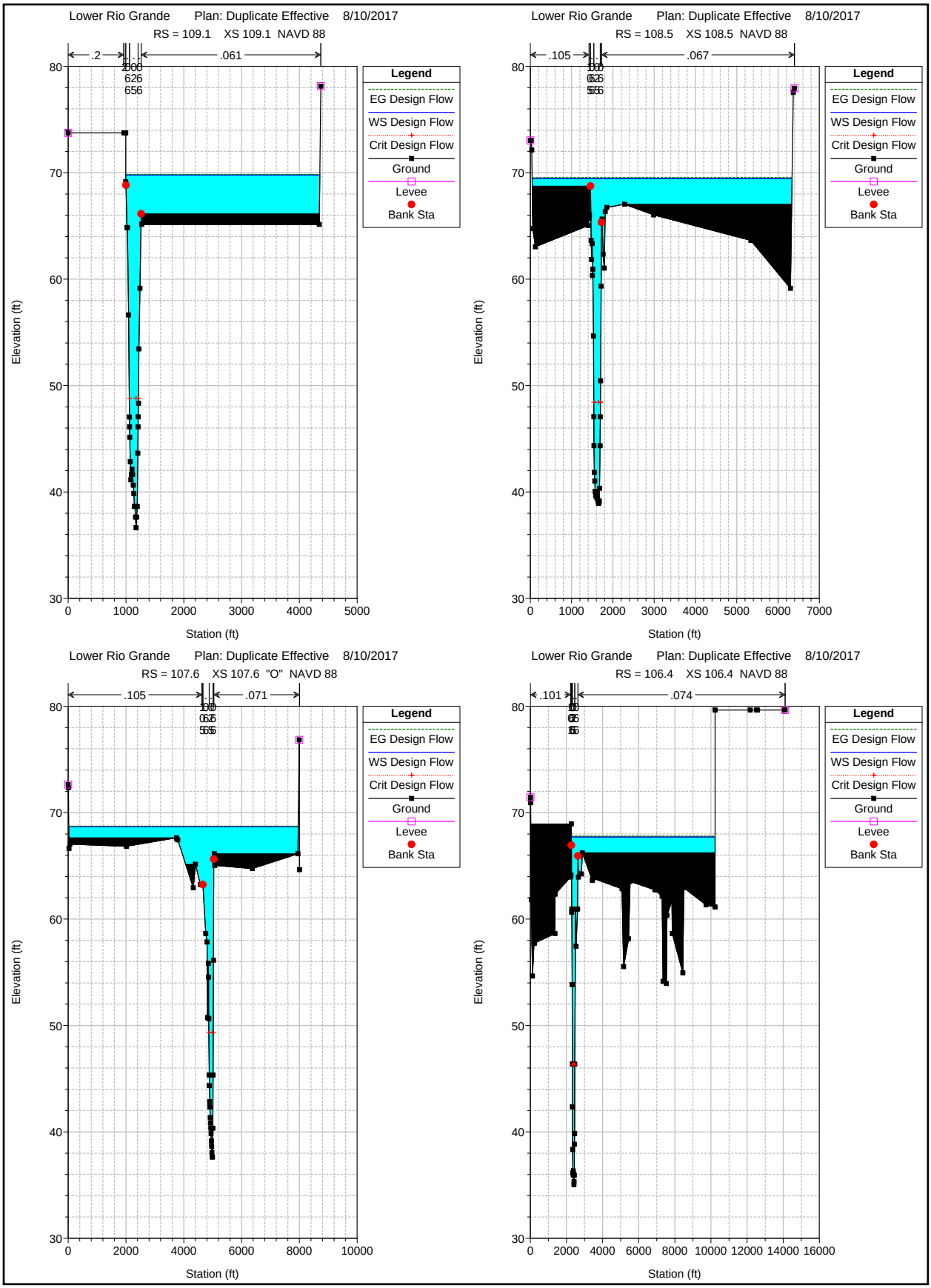

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 120.59 XS 120.59 NAVD 88
.104
.025
.066
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 120.5 XS 120.5 NAVD 88
.159
.025
.076
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 120.38 XS 120.38 "S" NAVD 88
.164
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 118.81 new Xs added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

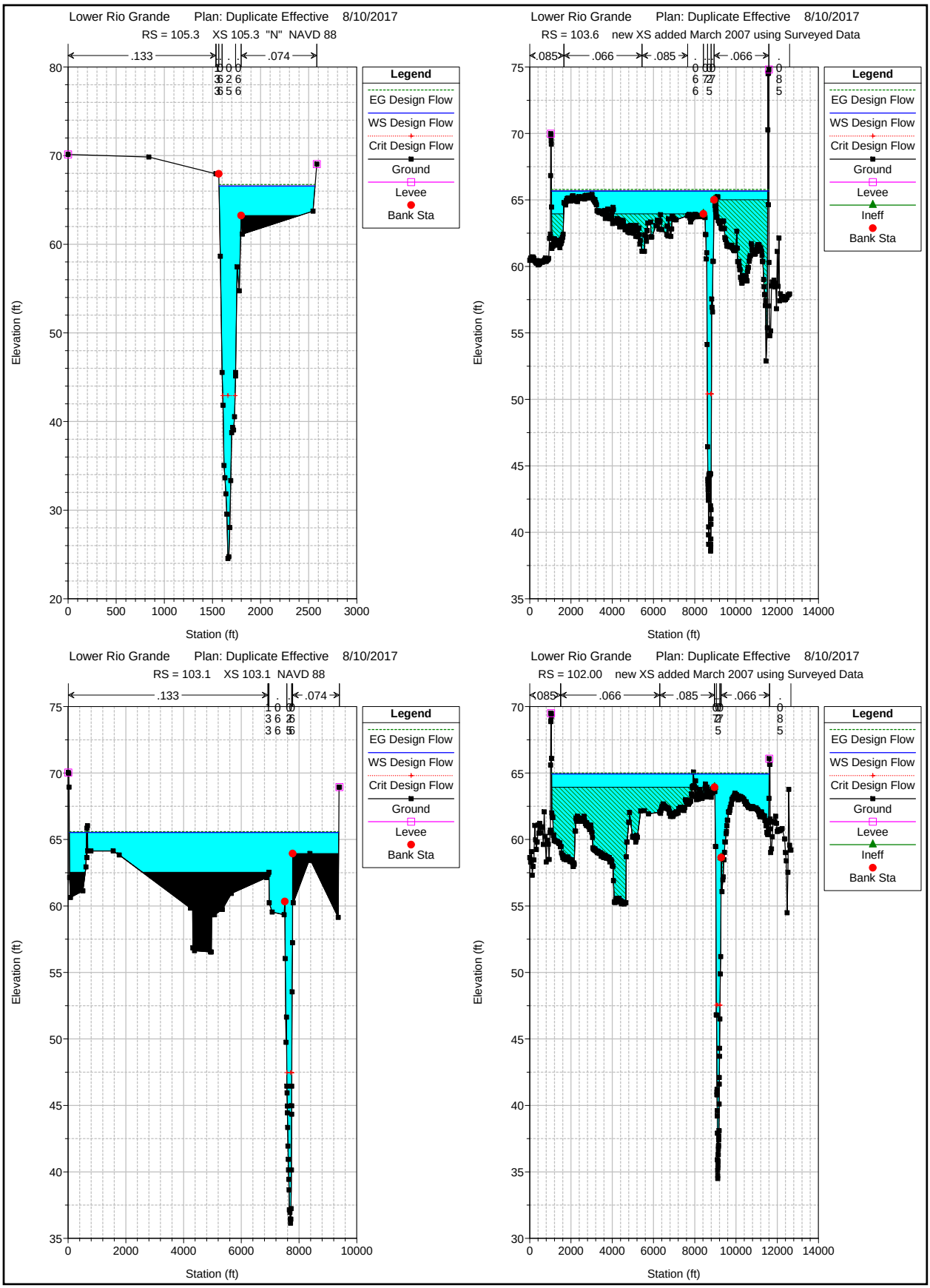

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 117.87 XS 117.87 "R" NAVD 88
.163
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 117.2 XS 117.2 NAVD 88
.167
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 116.5 XS 116.5 "Q" NAVD 88
.13
.068
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 116.1 XS 116.1 NAVD 88
.1
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

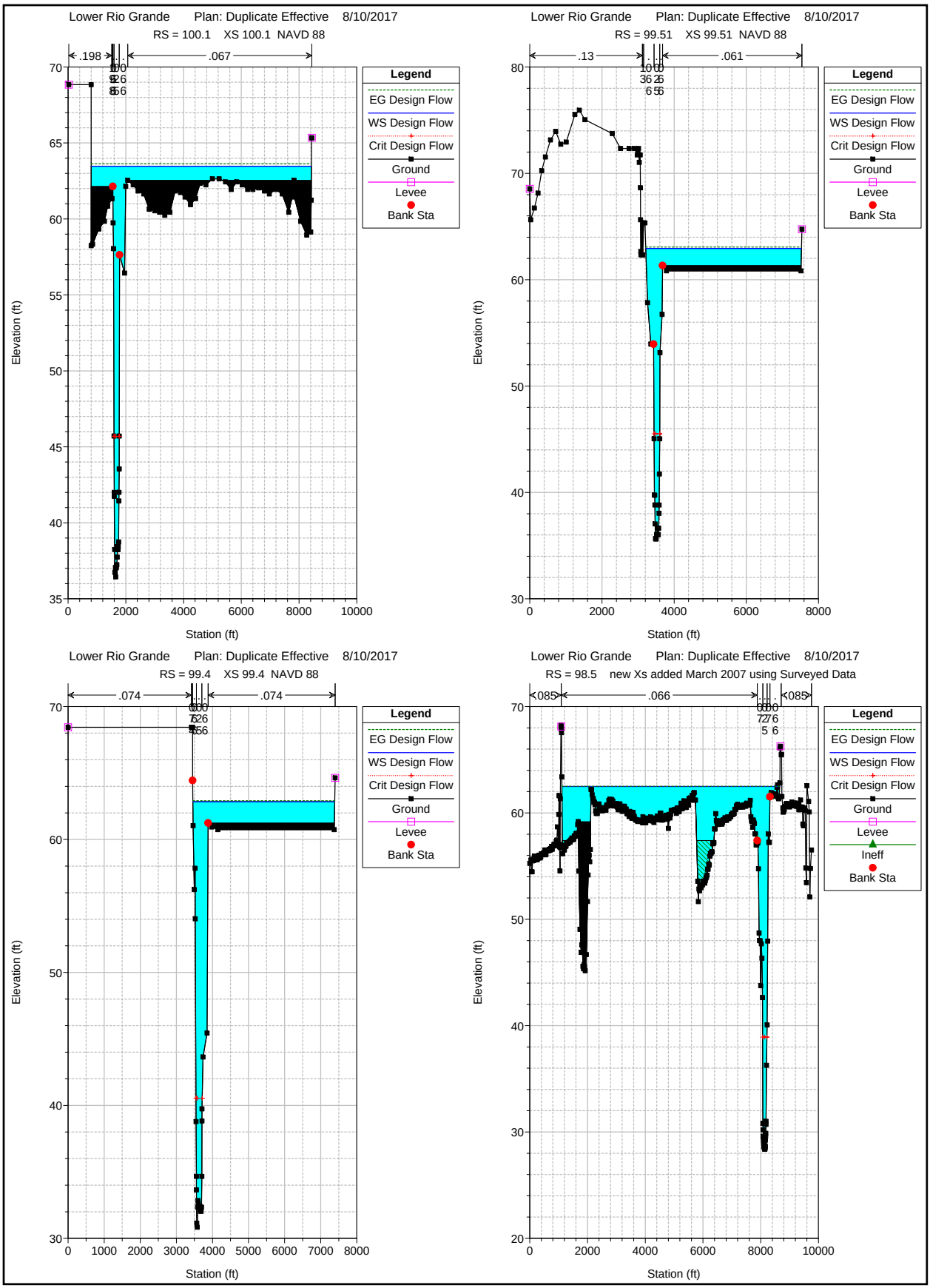

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 115.7 XS 115.7 NAVD 88
.052
.066
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 115 XS 115 NAVD 88
.109
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 114.8 XS 114.8 NAVD 88
.14
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 114.65 XS 114.65 NAVD 88
.174
.068
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

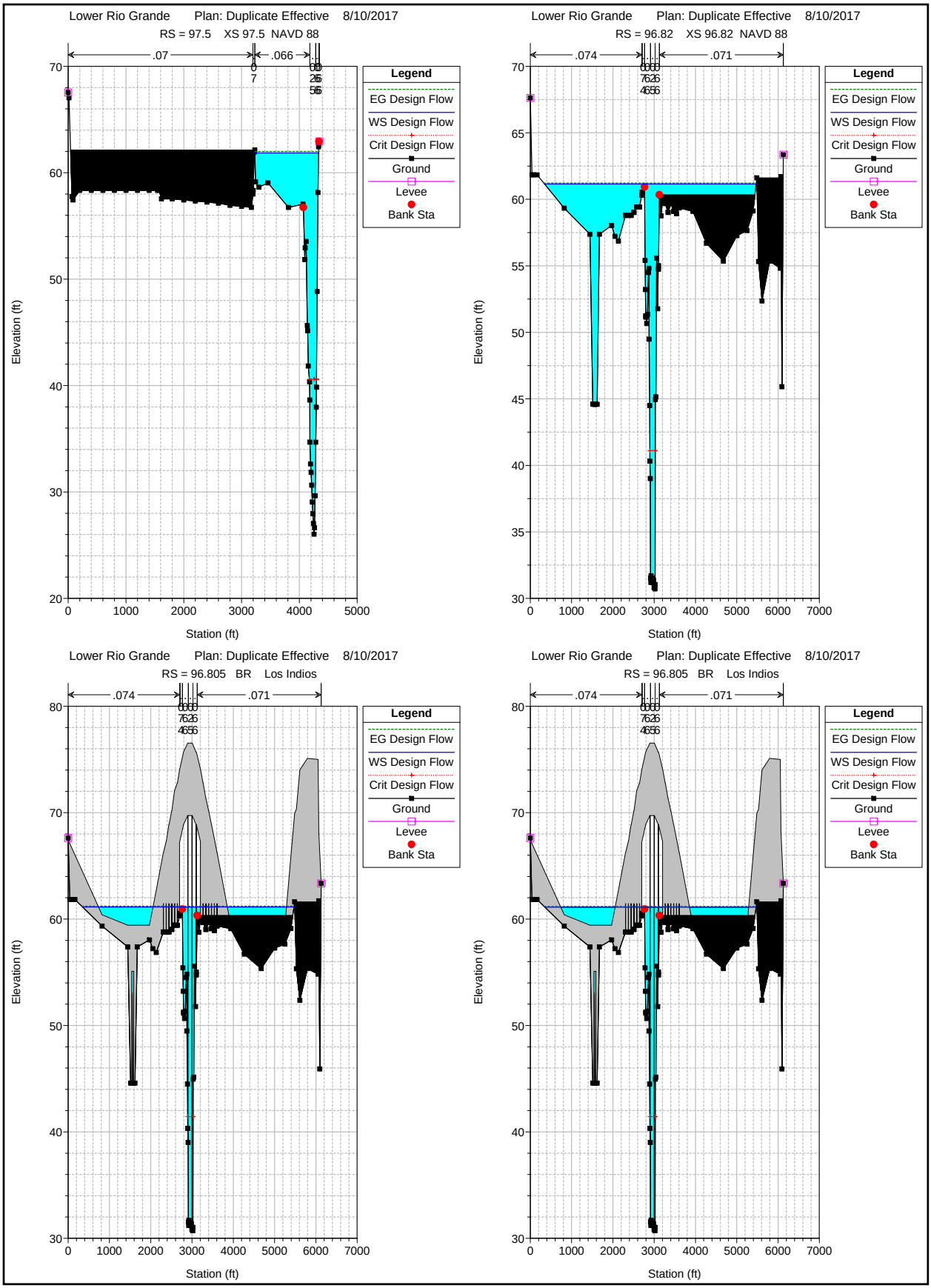

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 114.1 XS 114.1 "P" NAVD 88
.11
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 113.00 new XS added March 2007 usign Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 112.2 XS 112.2 NAVD 88
.075
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 111.5 XS 111.5 NAVD 88
.076
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

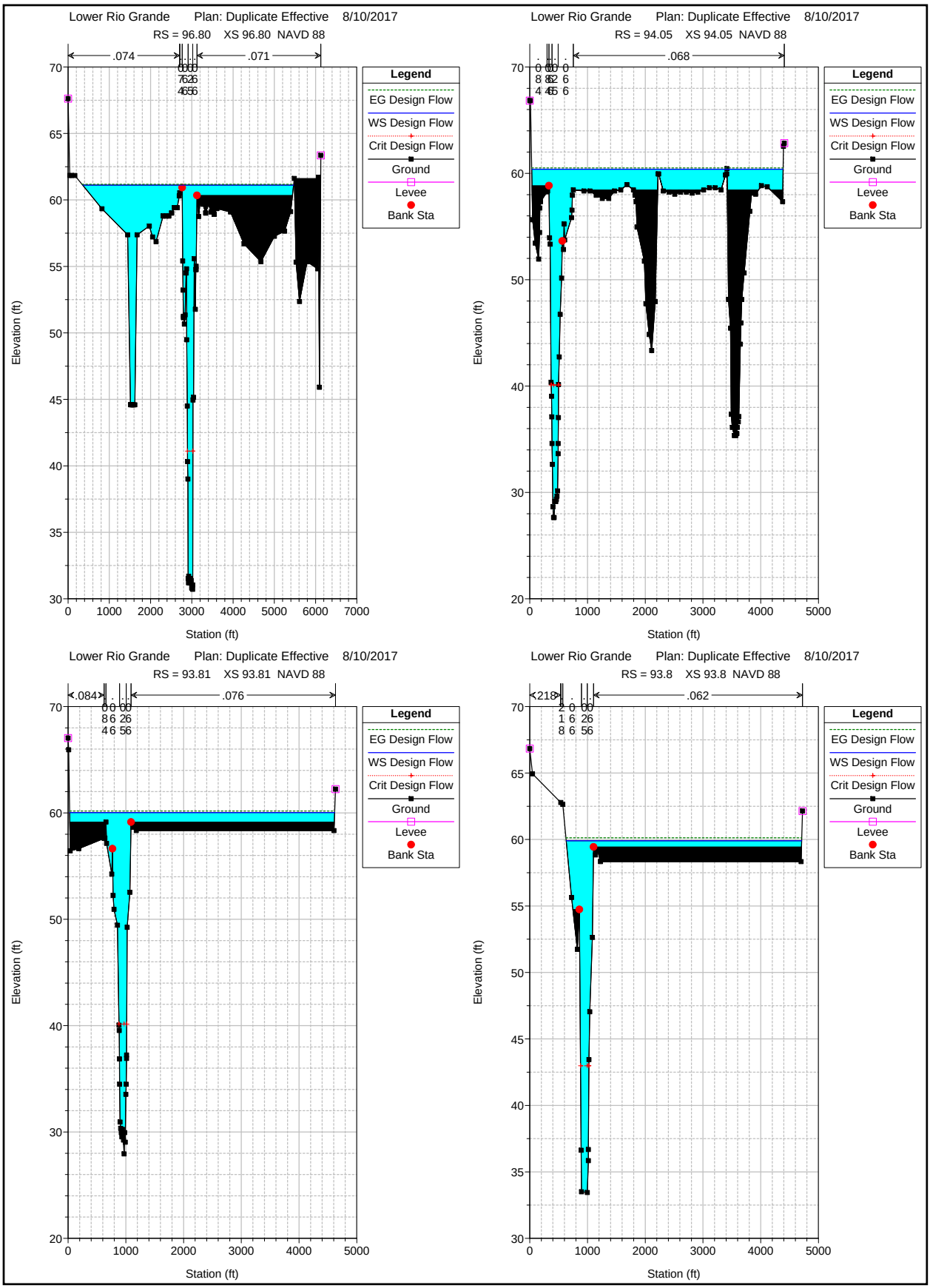

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 110.7 XS 110.7 NAVD 88
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 110.10 new XS added March 2007 using Surveyed Data
.085
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 109.5 XS 109.5 NAVD 88
.068
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 109.2 XS 109.2 NAVD 88
.094
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

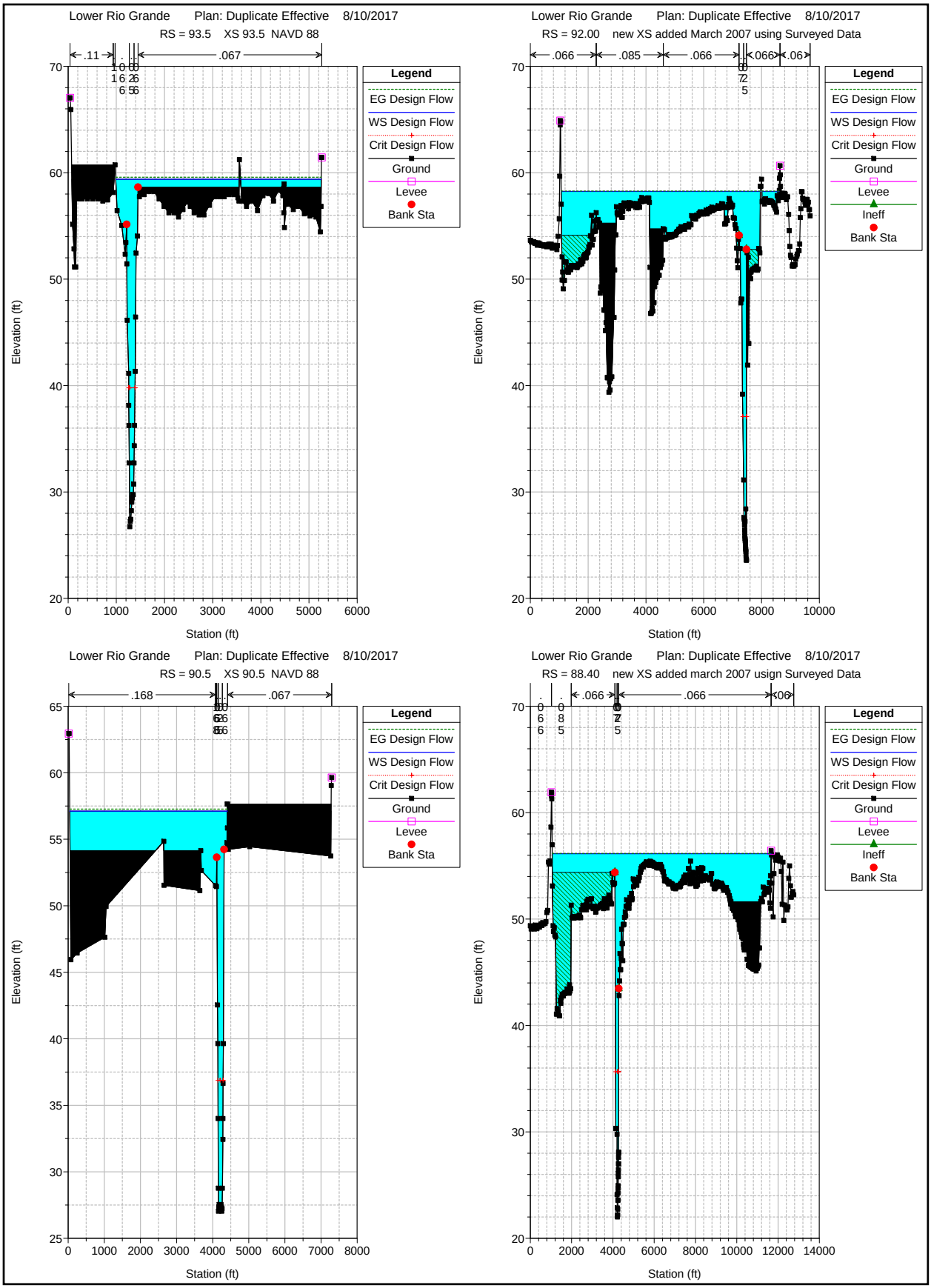

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 109.1 XS 109.1 NAVD 88
.2
.061
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 108.5 XS 108.5 NAVD 88
.105
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 107.6 XS 107.6 "O" NAVD 88
.105
.071
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 106.4 XS 106.4 NAVD 88
.101
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

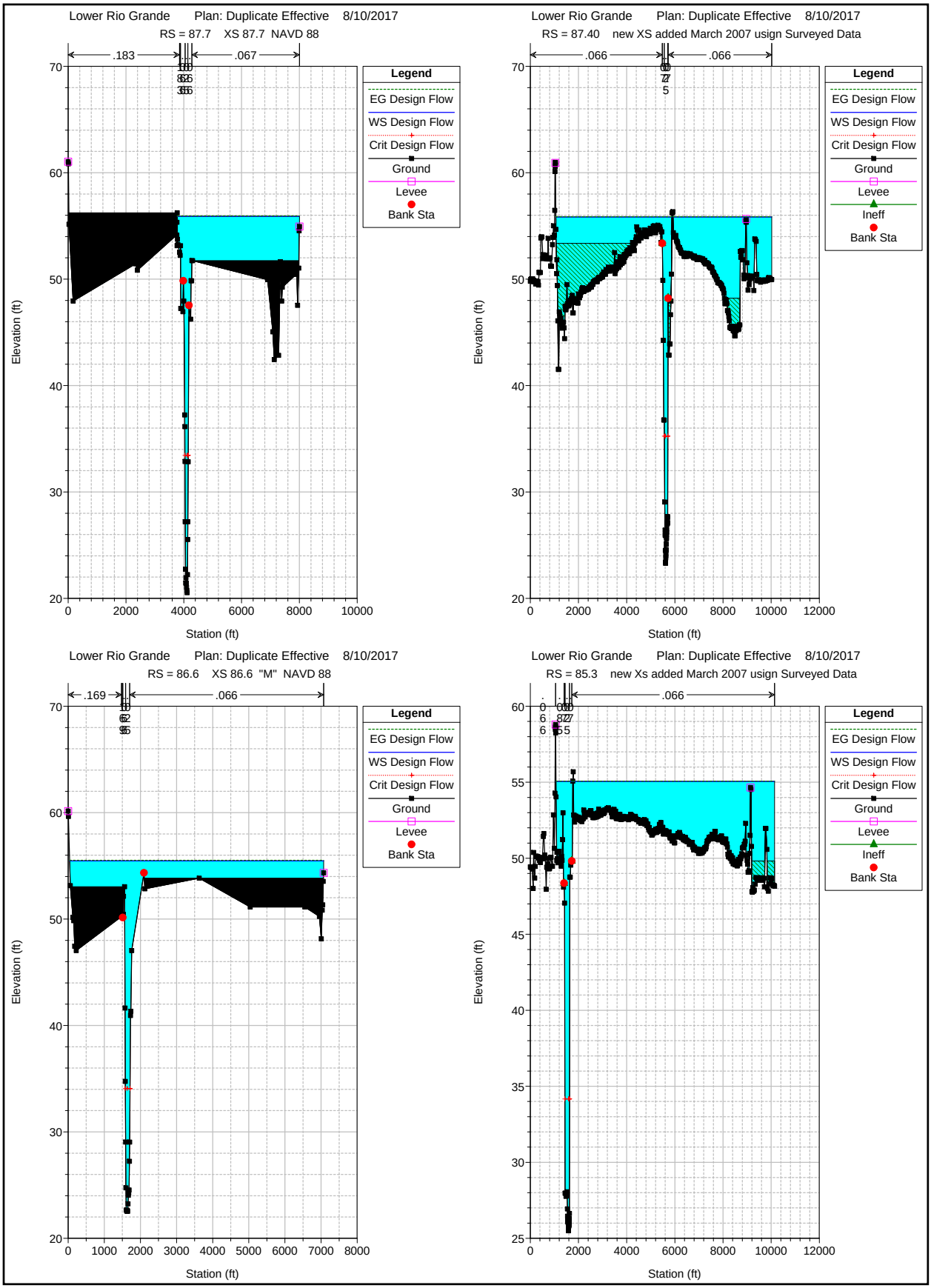

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 105.3 XS 105.3 "N" NAVD 88
.133
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 103.6 new XS added March 2007 using Surveyed Data
.085
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 103.1 XS 103.1 NAVD 88
.133
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 102.00 new XS added March 2007 using Surveyed Data
085
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

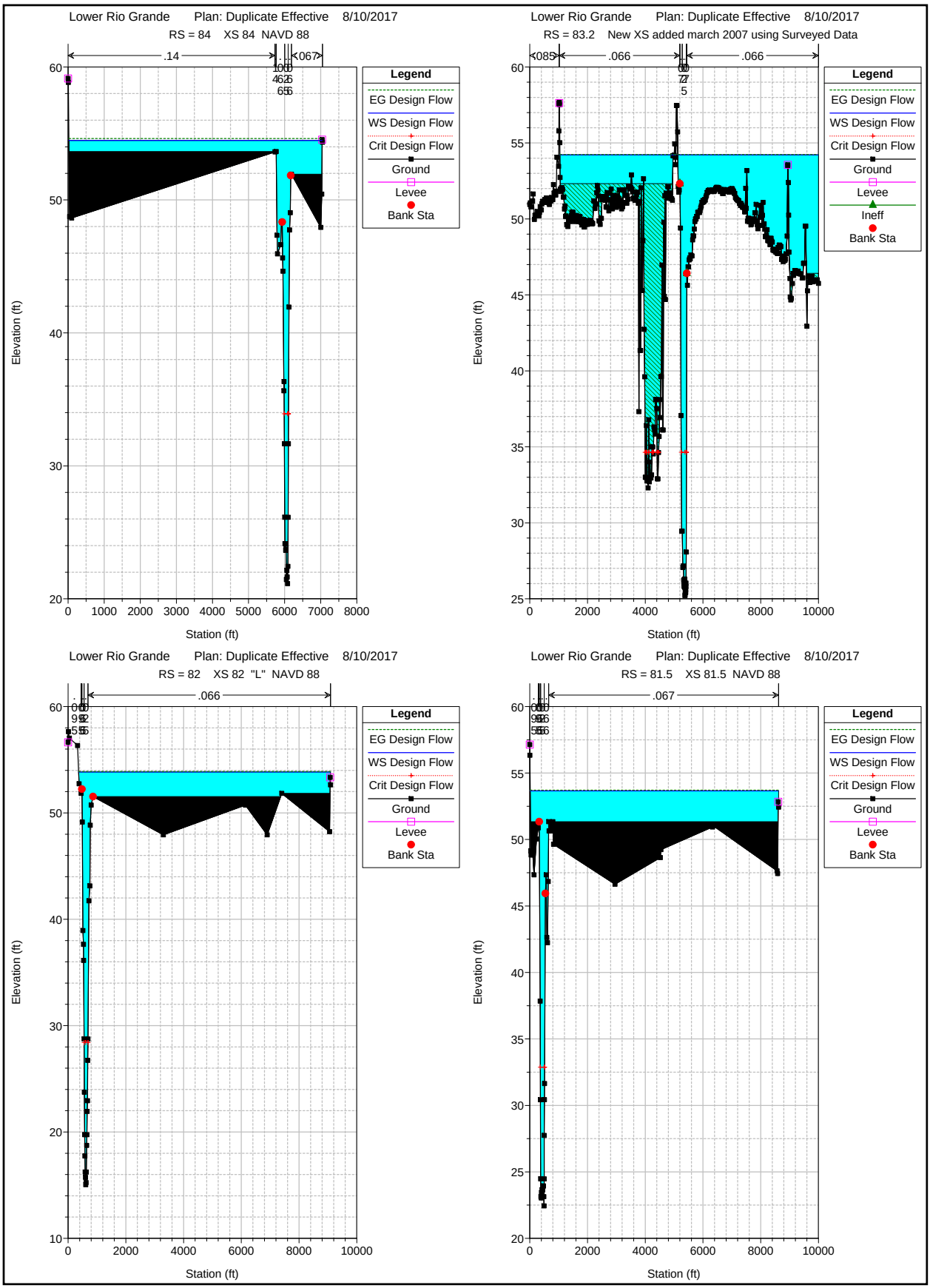

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 100.1 XS 100.1 NAVD 88
.198
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 99.51 XS 99.51 NAVD 88
.13
.061
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 99.4 XS 99.4 NAVD 88
.074
.074
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 98.5 new Xs added March 2007 using Surveyed Data
.085
.066
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

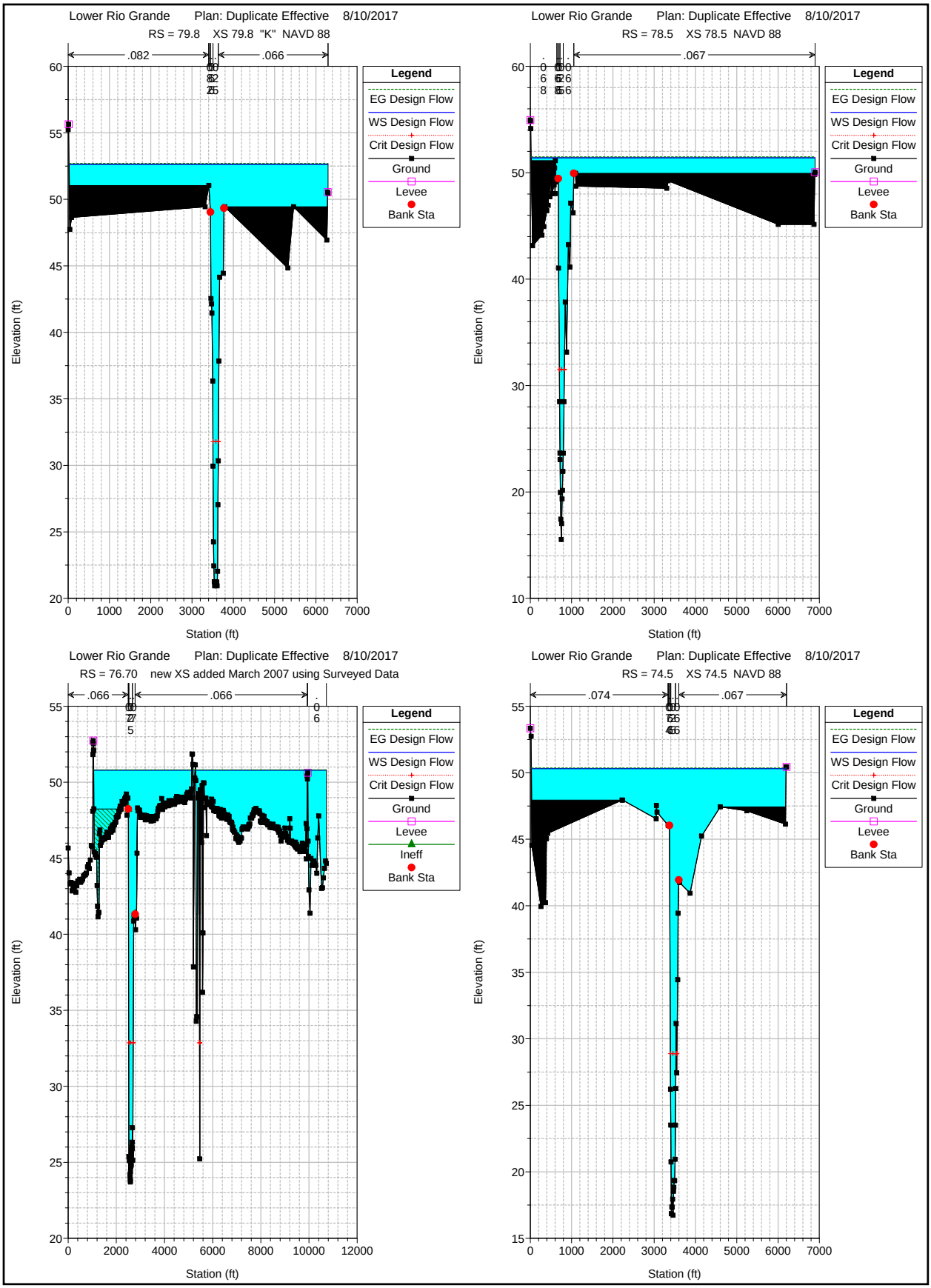

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 97.5 XS 97.5 NAVD 88
.07
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 96.82 XS 96.82 NAVD 88
.074
.071
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 96.805 BR Los Indios
.074
.071
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 96.805 BR Los Indios
.074
.071
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

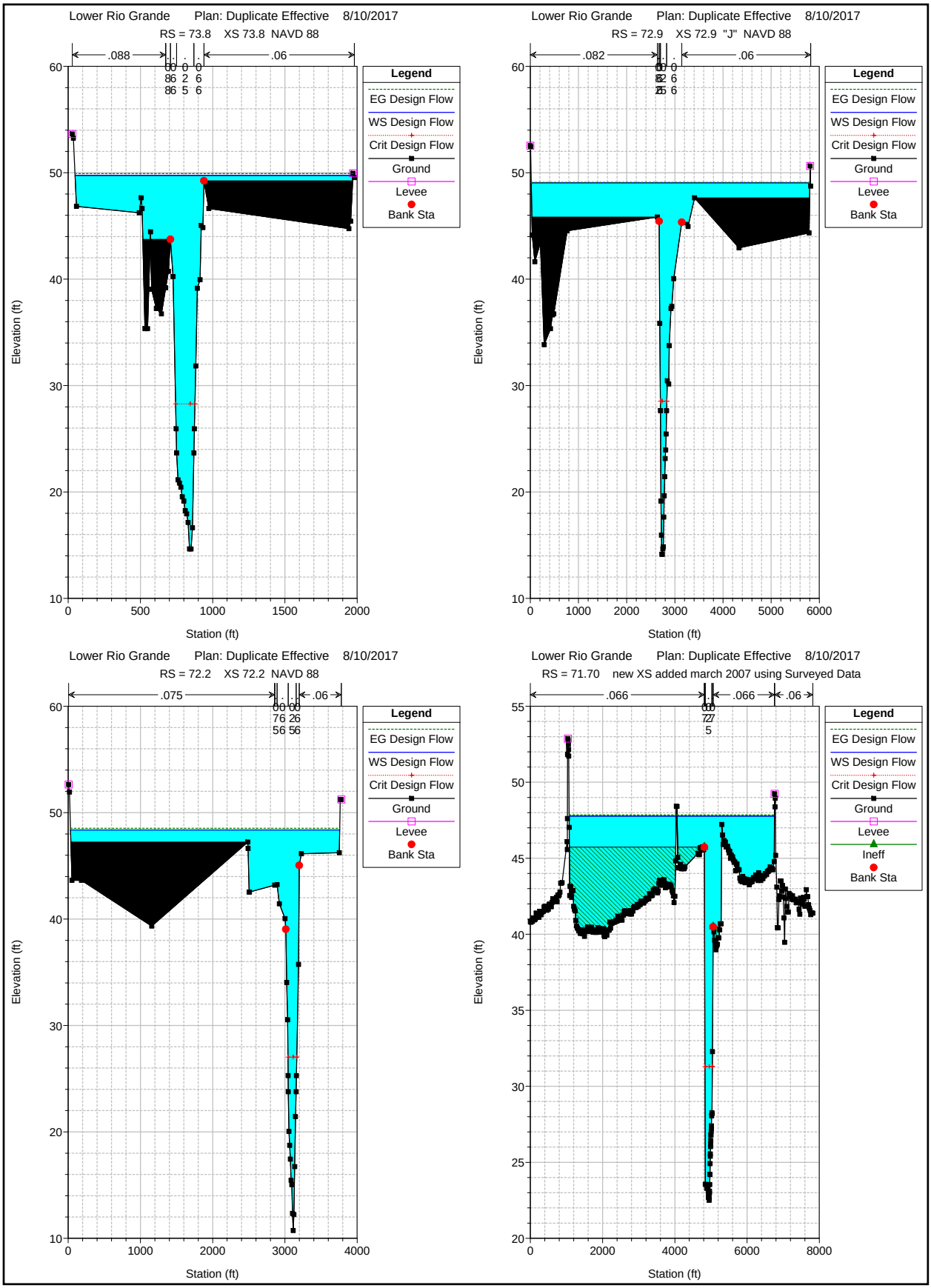

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 96.80 XS 96.80 NAVD 88
.074
.071
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 94.05 XS 94.05 NAVD 88
.068
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 93.81 XS 93.81 NAVD 88
.084
.076
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 93.8 XS 93.8 NAVD 88
.218
.062
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

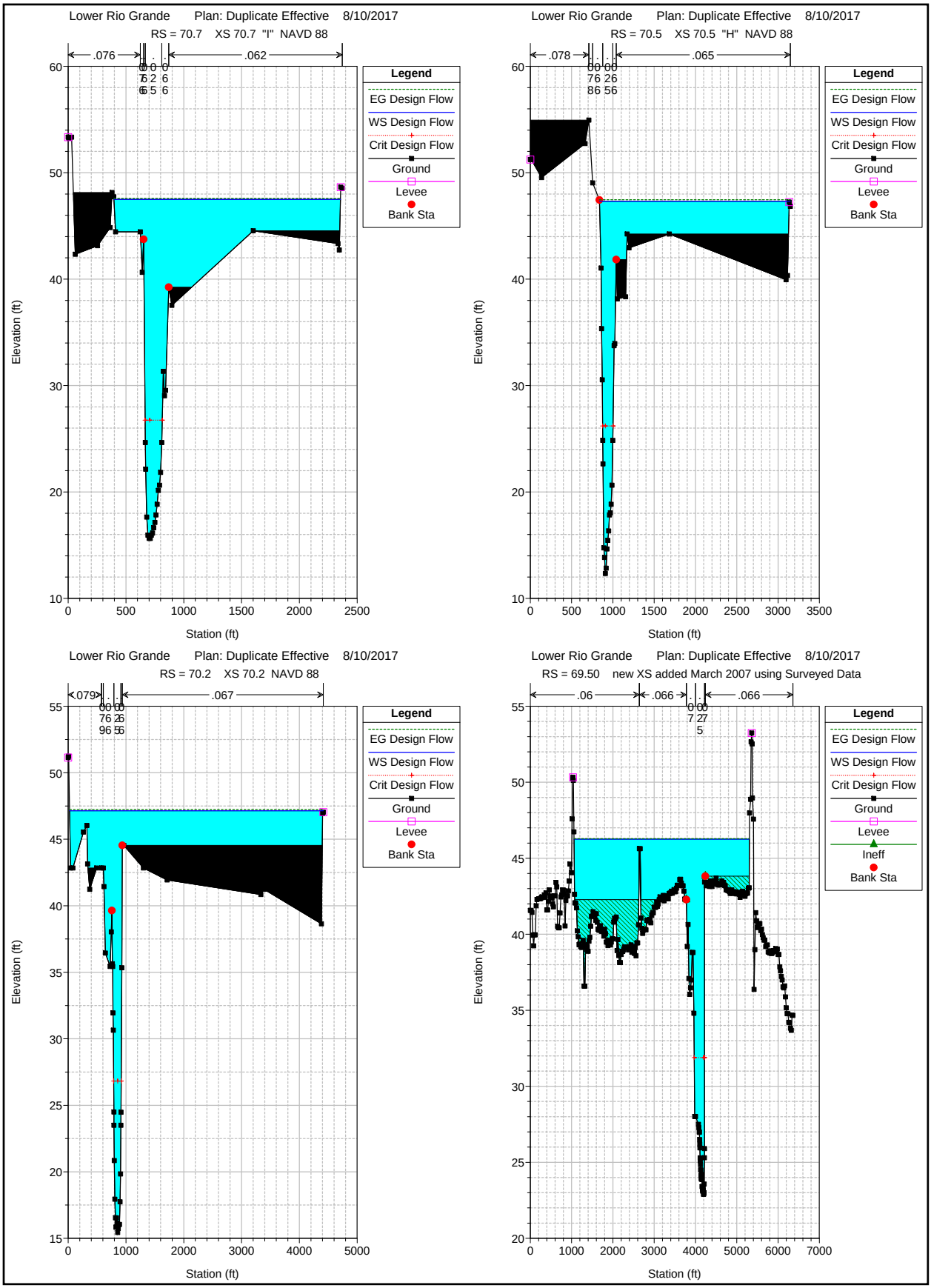

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 93.5 XS 93.5 NAVD 88
.11
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 92.00 new XS added March 2007 using Surveyed Data
.066
.085
.066
.066
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 90.5 XS 90.5 NAVD 88
.168
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 88.40 new XS added march 2007 usign Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

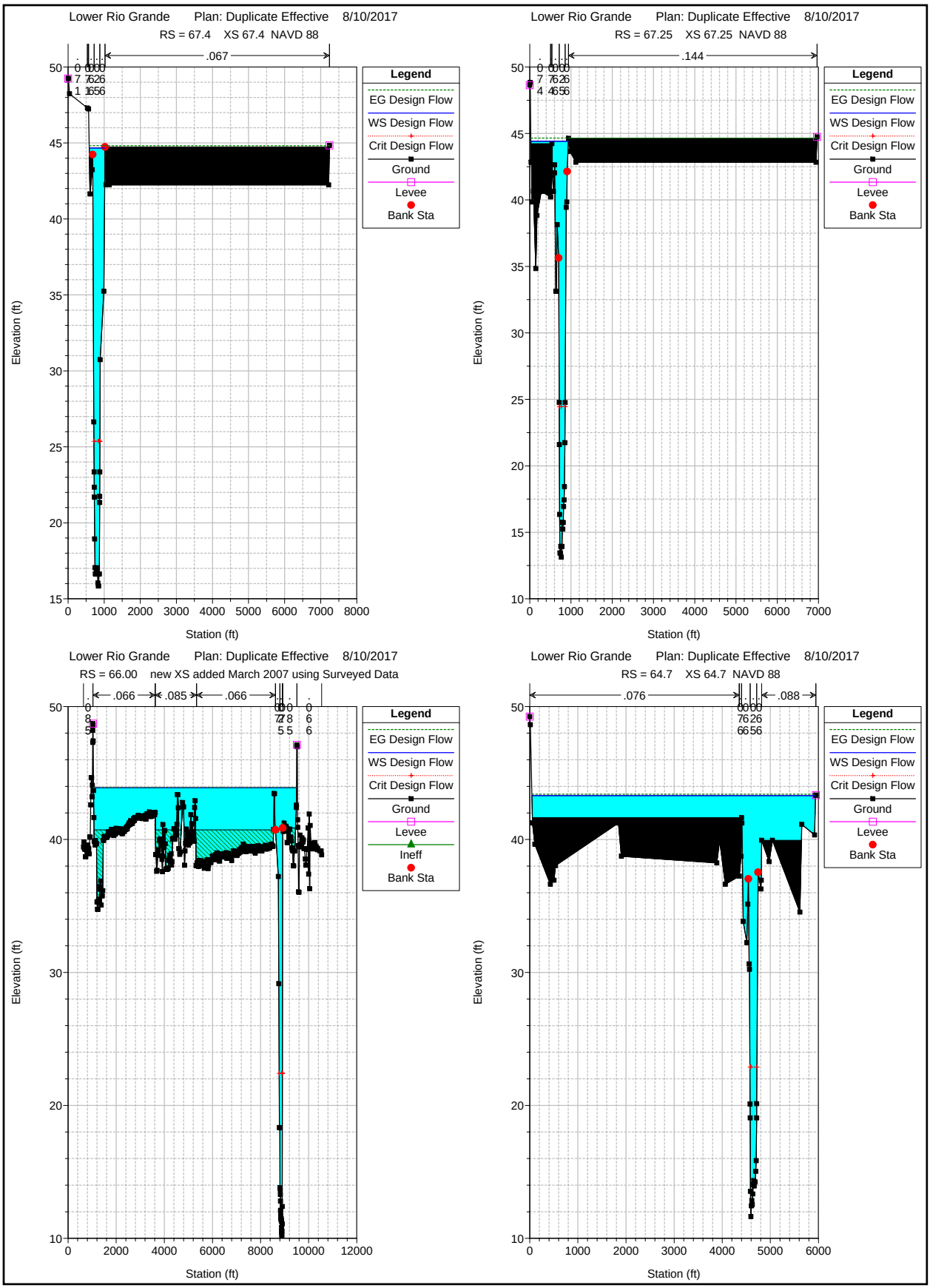

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 87.7 XS 87.7 NAVD 88
.183
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 87.40 new XS added March 2007 usign Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 86.6 XS 86.6 "M" NAVD 88
.169
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 85.3 new Xs added March 2007 usign Surveyed Data
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

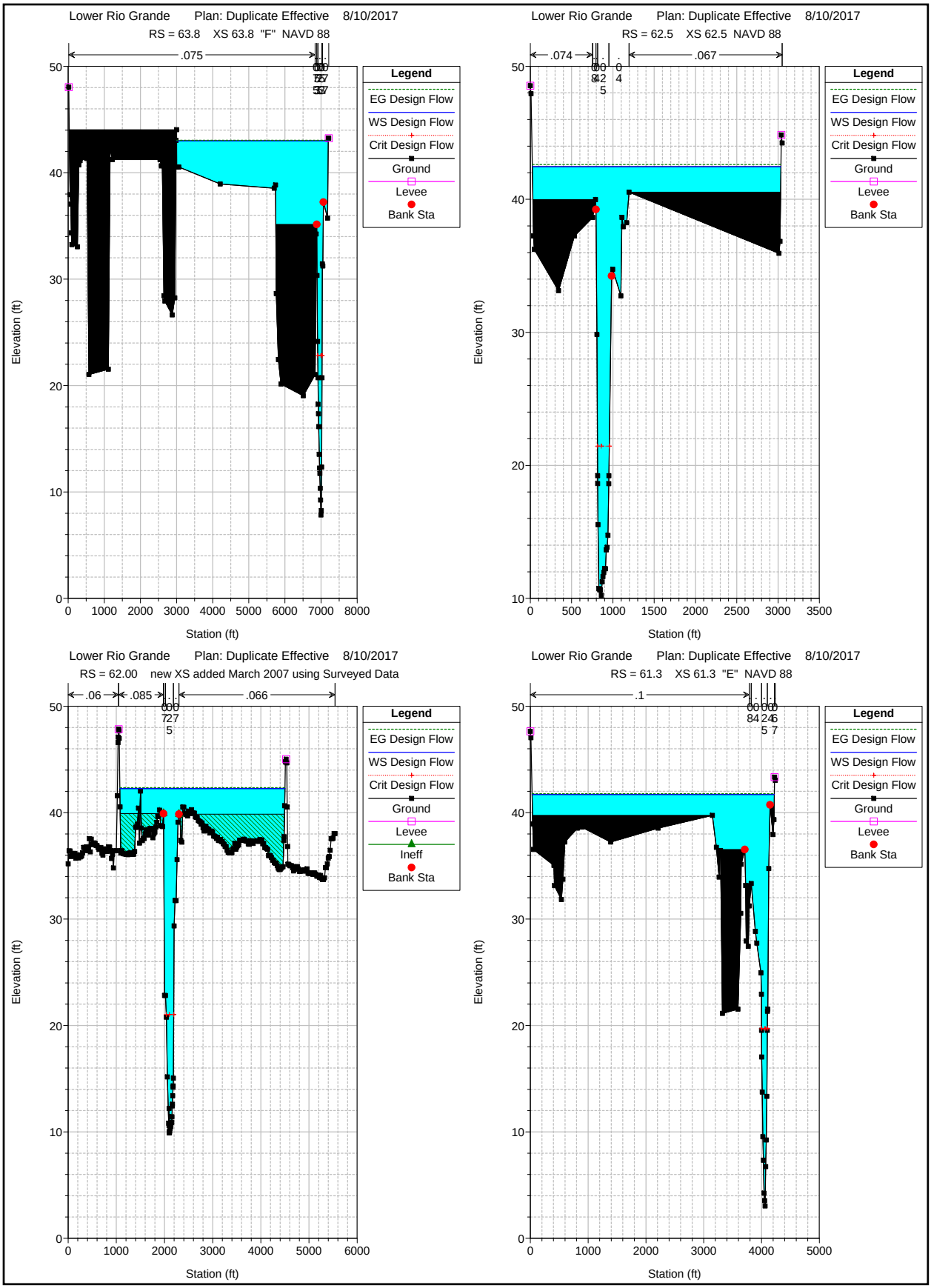

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 84 XS 84 NAVD 88
.14
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 83.2 New XS added march 2007 using Surveyed Data
.085
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 82 XS 82 "L" NAVD 88
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 81.5 XS 81.5 NAVD 88
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

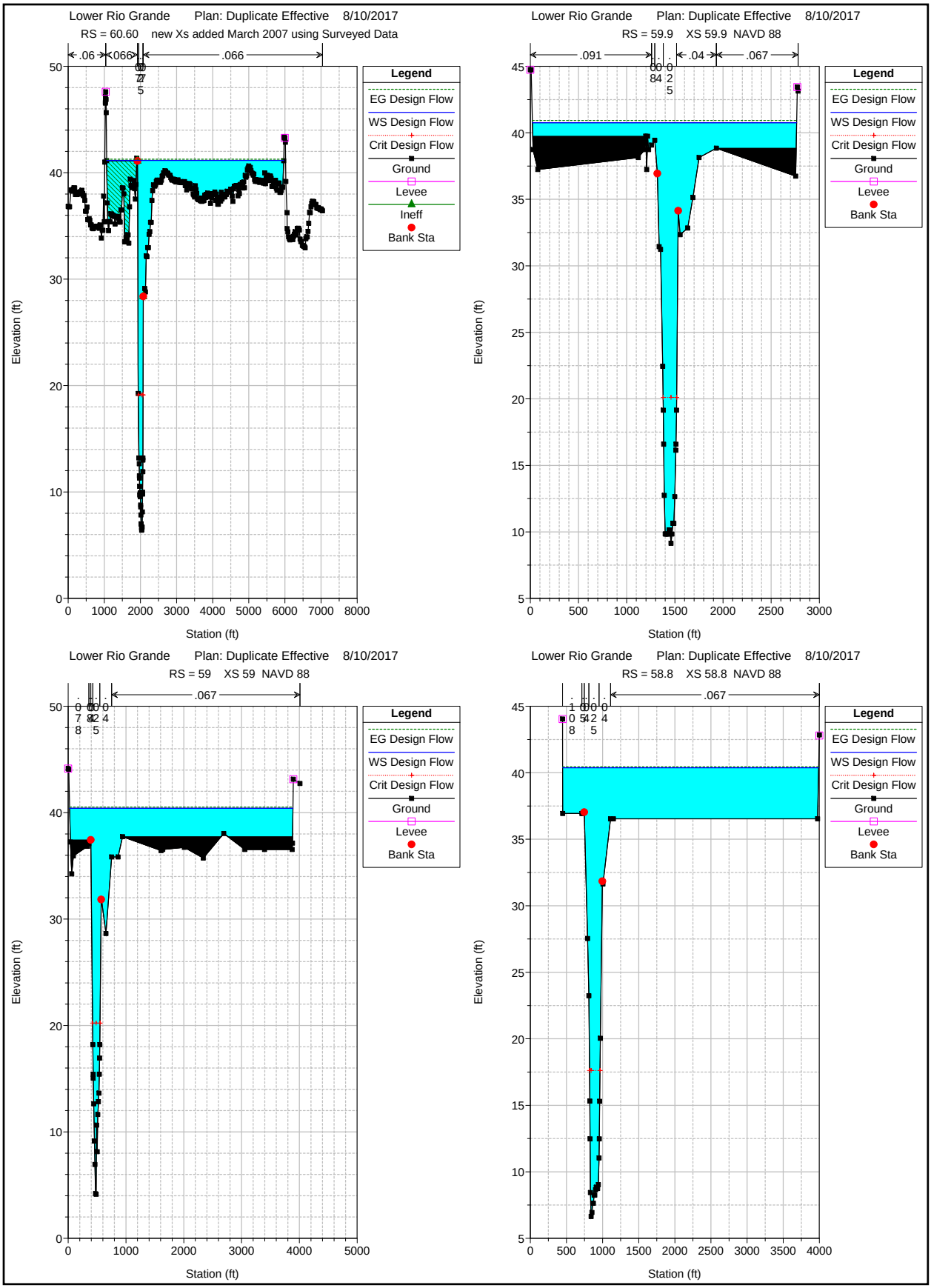

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 79.8 XS 79.8 "K" NAVD 88
.082
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 78.5 XS 78.5 NAVD 88
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 76.70 new XS added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 74.5 XS 74.5 NAVD 88
.074
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

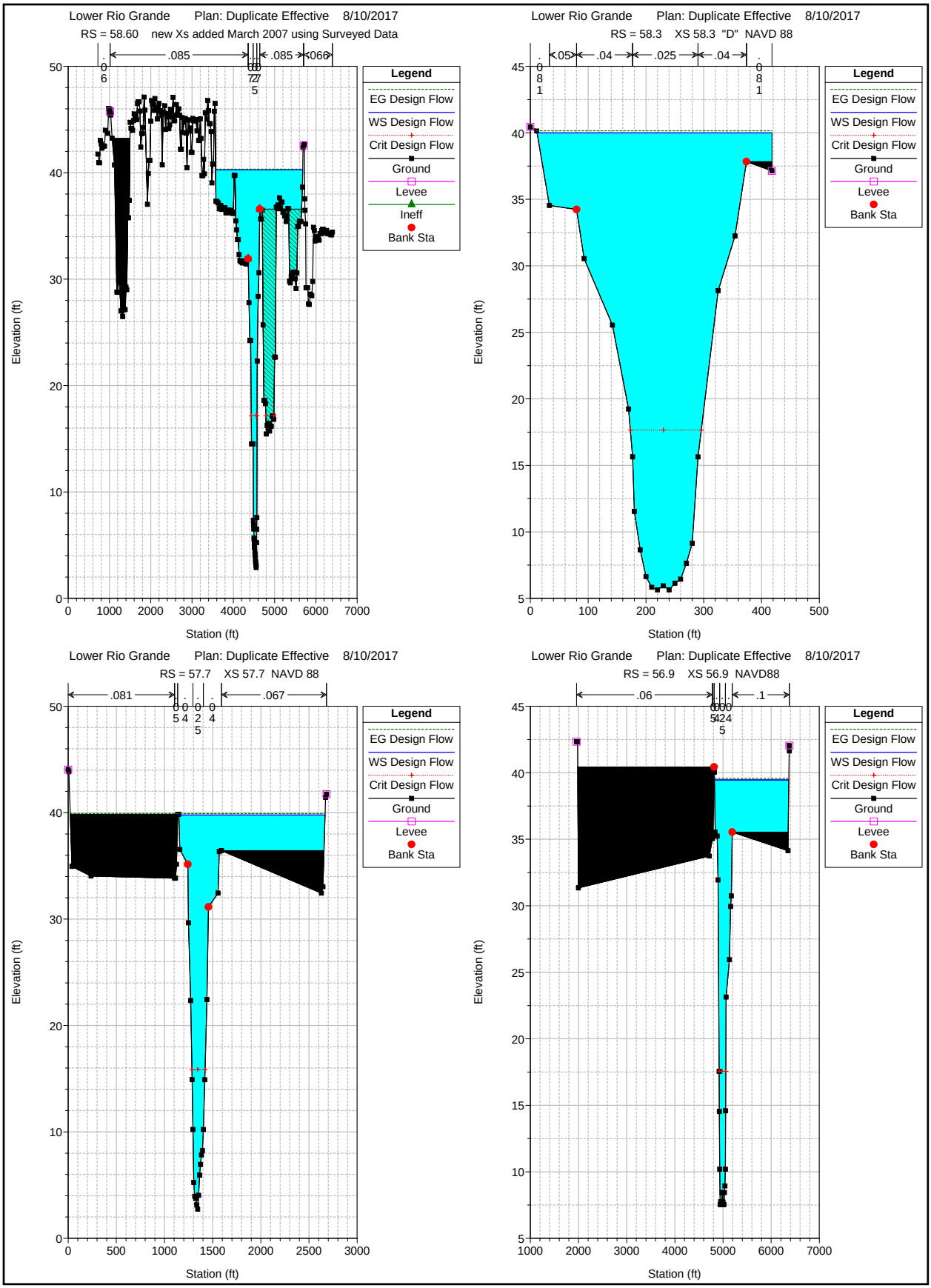

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 73.8 XS 73.8 NAVD 88
.088
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 72.9 XS 72.9 "J" NAVD 88
.082
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 72.2 XS 72.2 NAVD 88
.075
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 71.70 new XS added march 2007 using Surveyed Data
.066
.066
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

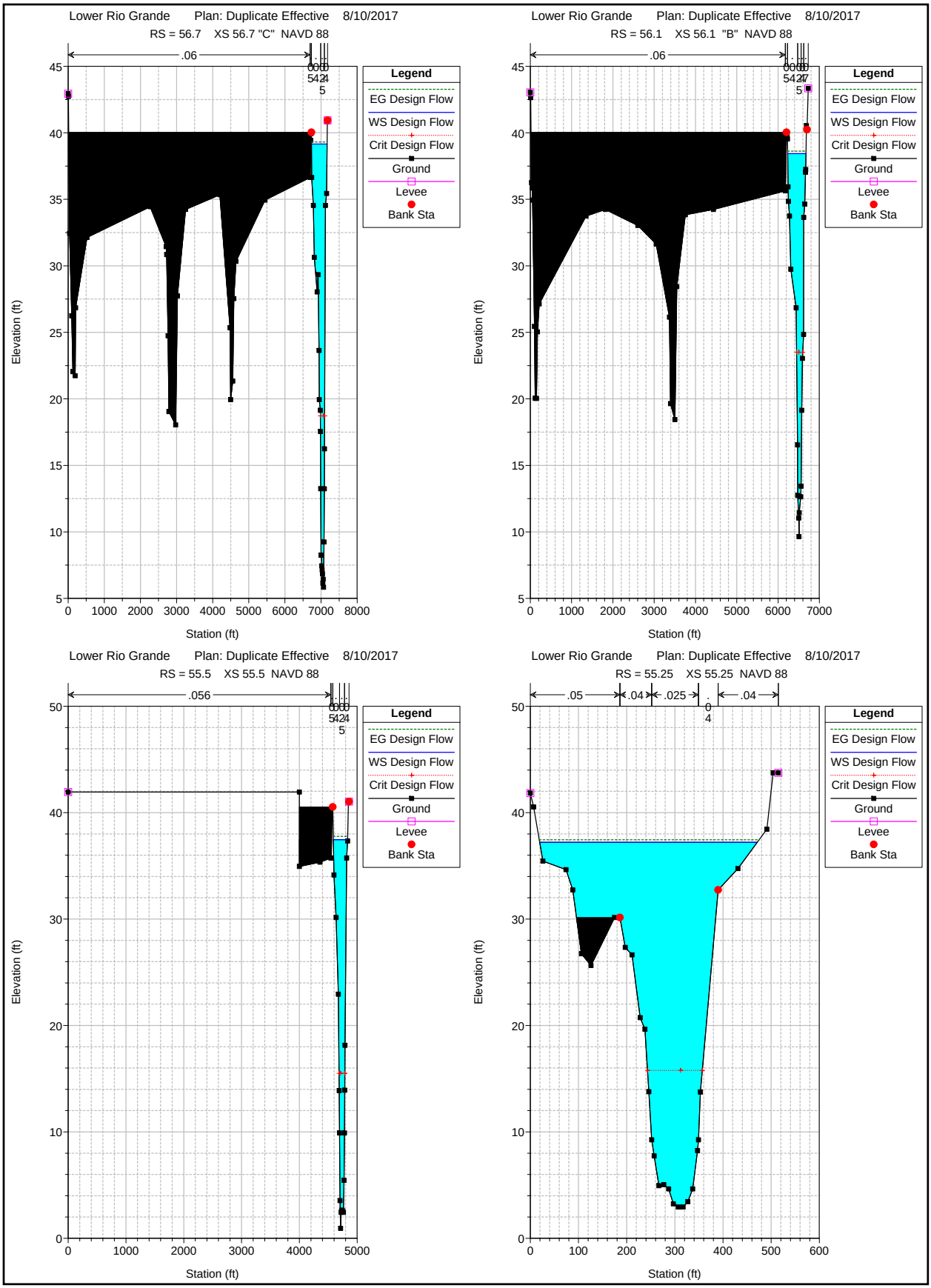

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 70.7 XS 70.7 "I" NAVD 88
.076
.062
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 70.5 XS 70.5 "H" NAVD 88
.078
.065
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 70.2 XS 70.2 NAVD 88
.079
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 69.50 new XS added March 2007 using Surveyed Data
.06
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

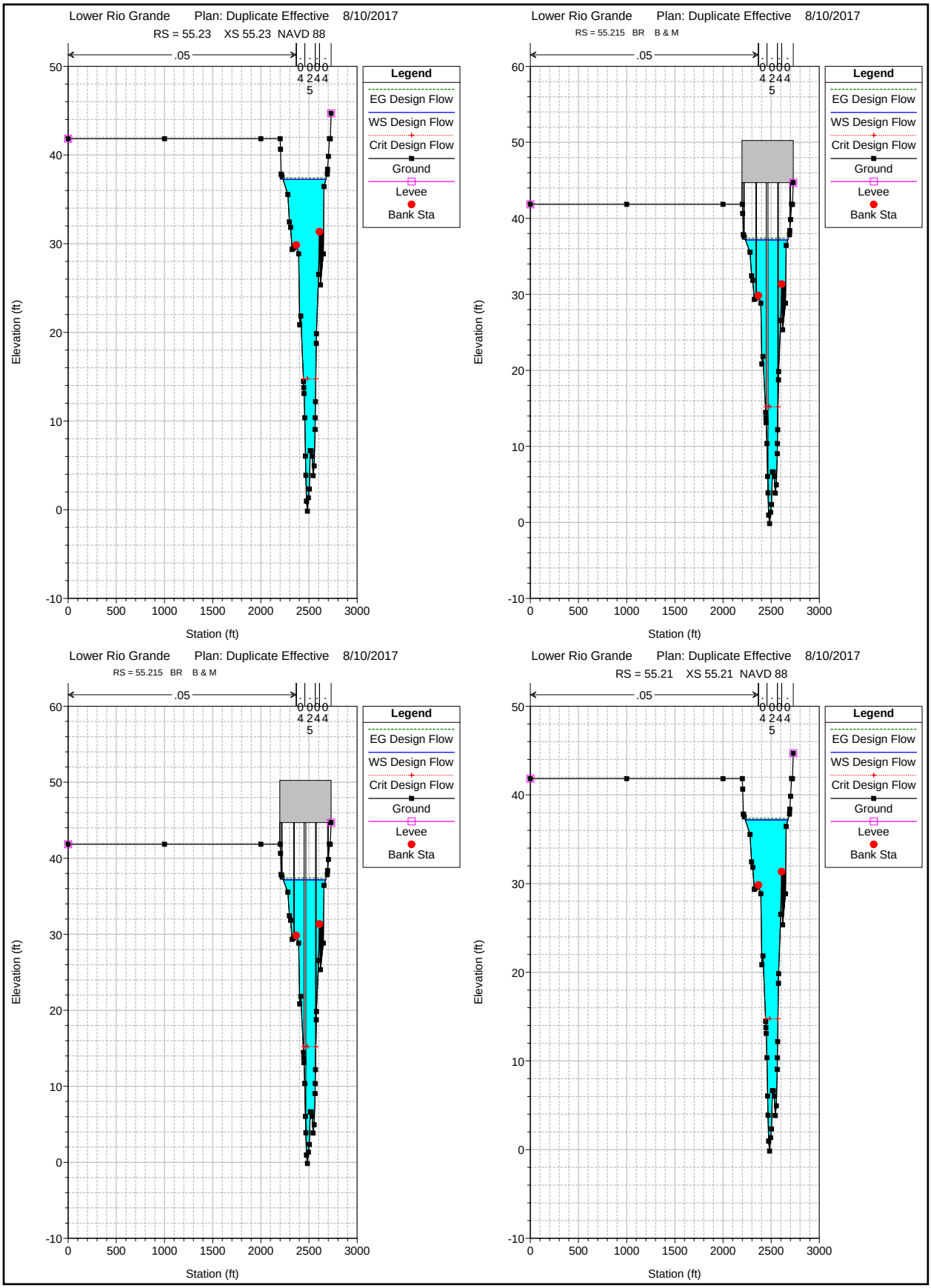

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 67.4 XS 67.4 NAVD 88
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 67.25 XS 67.25 NAVD 88
.144
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 66.00 new XS added March 2007 using Surveyed Data
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 64.7 XS 64.7 NAVD 88
.076
.088
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

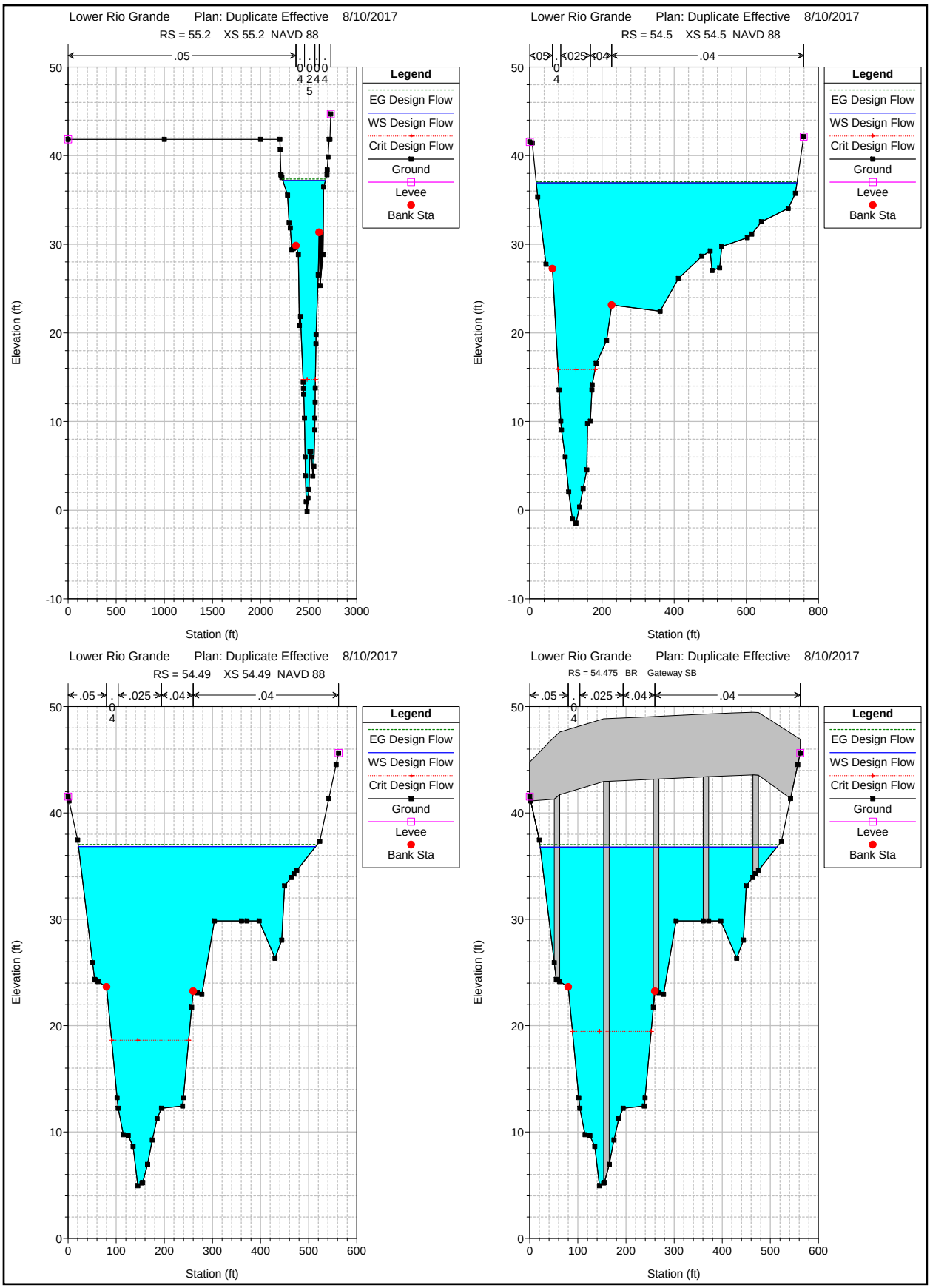

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 63.8 XS 63.8 "F" NAVD 88
.075
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 62.5 XS 62.5 NAVD 88
.074
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 62.00 new XS added March 2007 using Surveyed Data
.06
.085
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 61.3 XS 61.3 "E" NAVD 88
.1
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

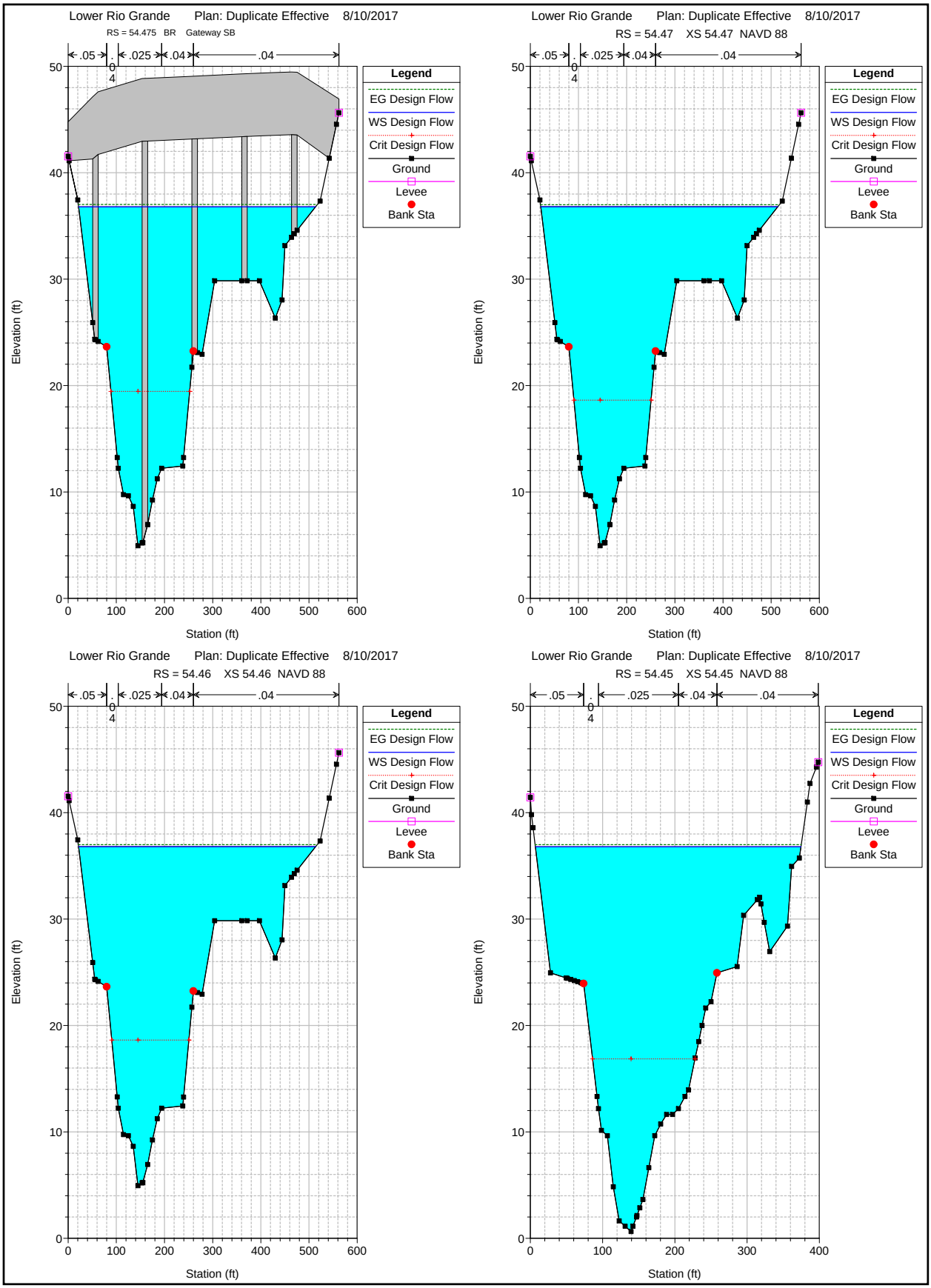

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 60.60 new Xs added March 2007 using Surveyed Data
.06
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 59.9 XS 59.9 NAVD 88
.091
.04
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 59 XS 59 NAVD 88
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 58.8 XS 58.8 NAVD 88
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

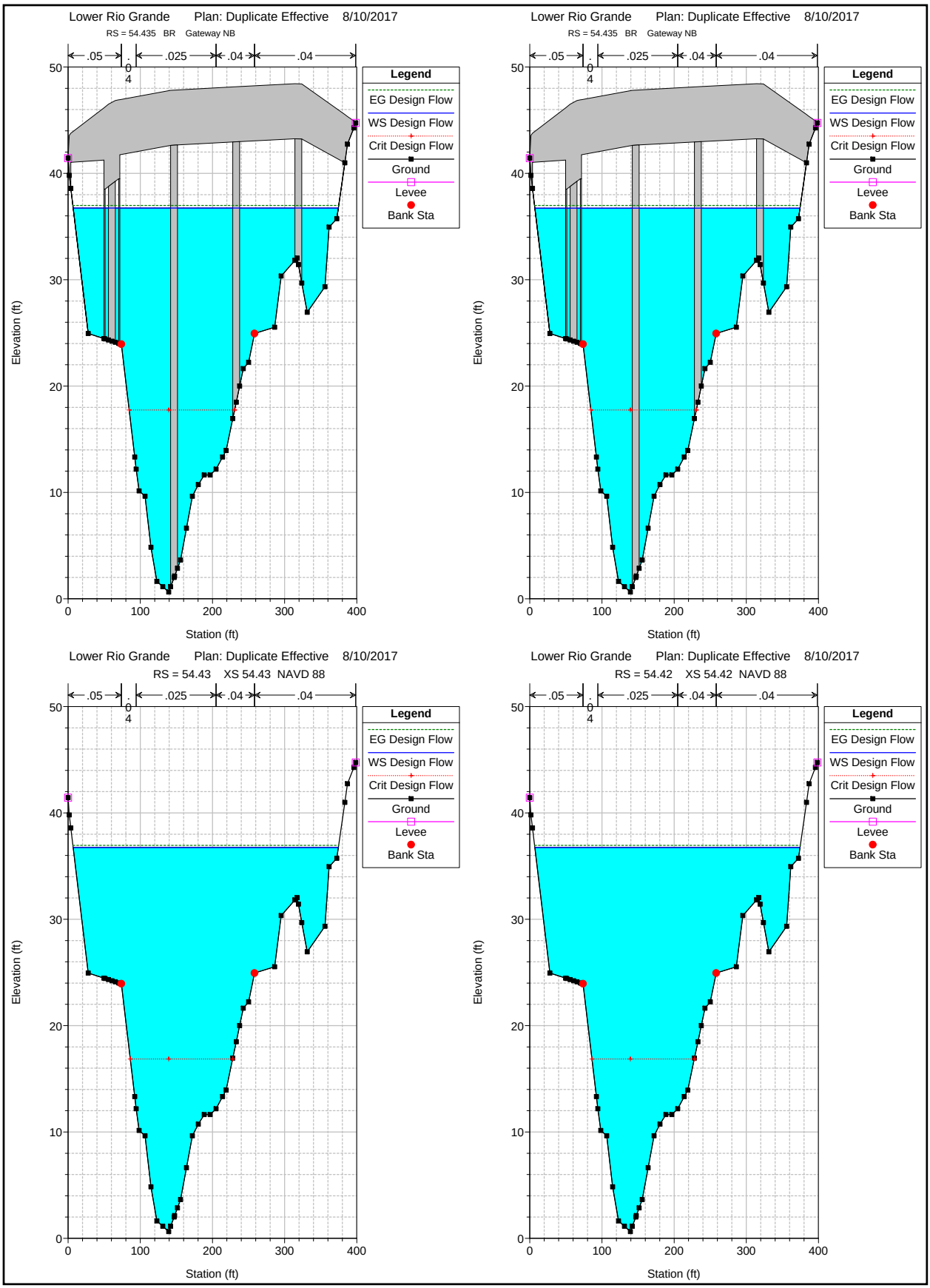

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 58.60 new Xs added March 2007 using Surveyed Data
.085
.085
.060
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 58.3 XS 58.3 "D" NAVD 88
.05
.04
.025
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 57.7 XS 57.7 NAVD 88
.081
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 56.9 XS 56.9 NAVD88
.06
.1
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

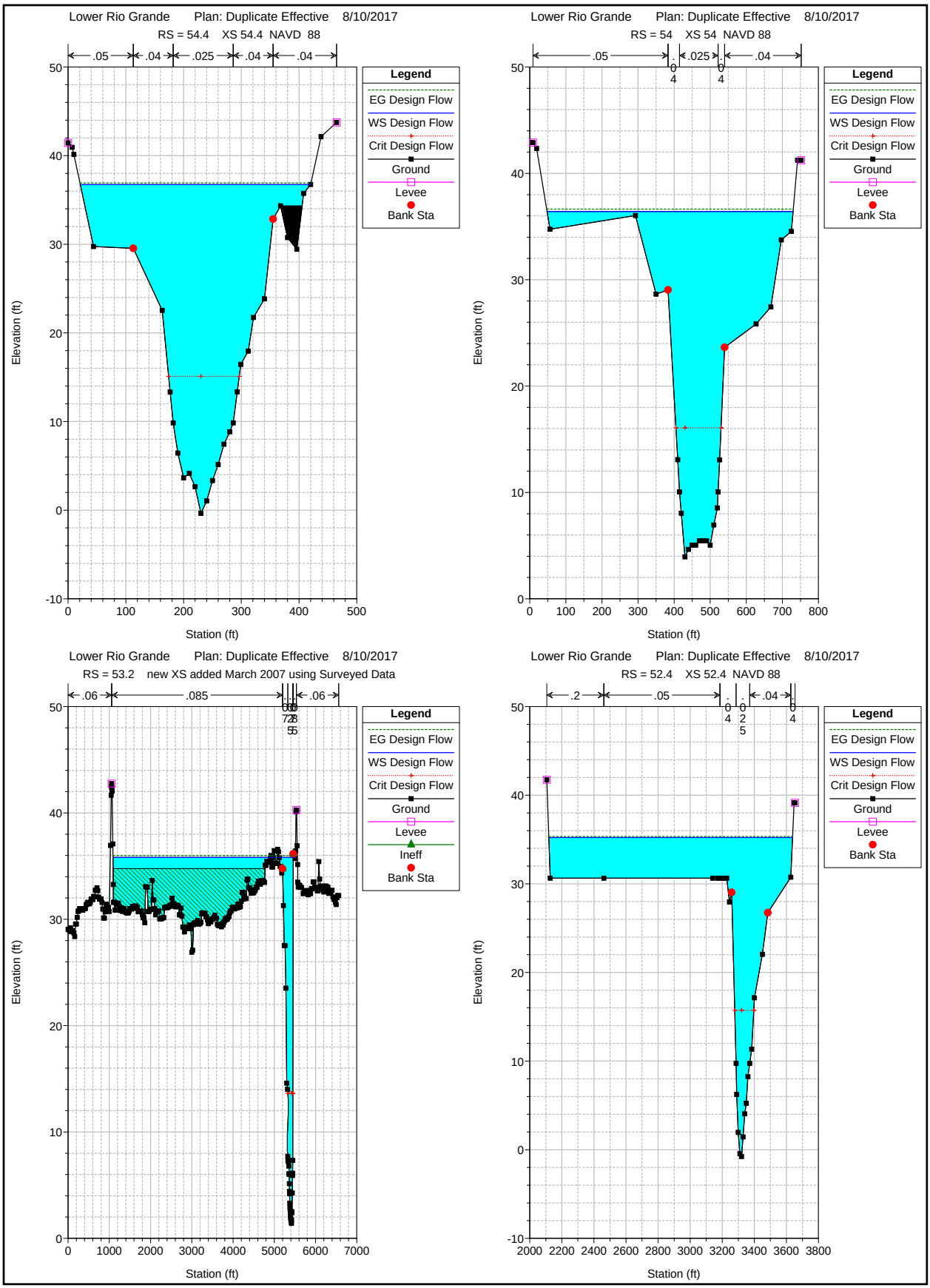

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 56.7 XS 56.7 "C" NAVD 88
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 56.1 XS 56.1 "B" NAVD 88
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 55.5 XS 55.5 NAVD 88
.056
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 55.25 XS 55.25 NAVD 88
.05
.04
.025
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

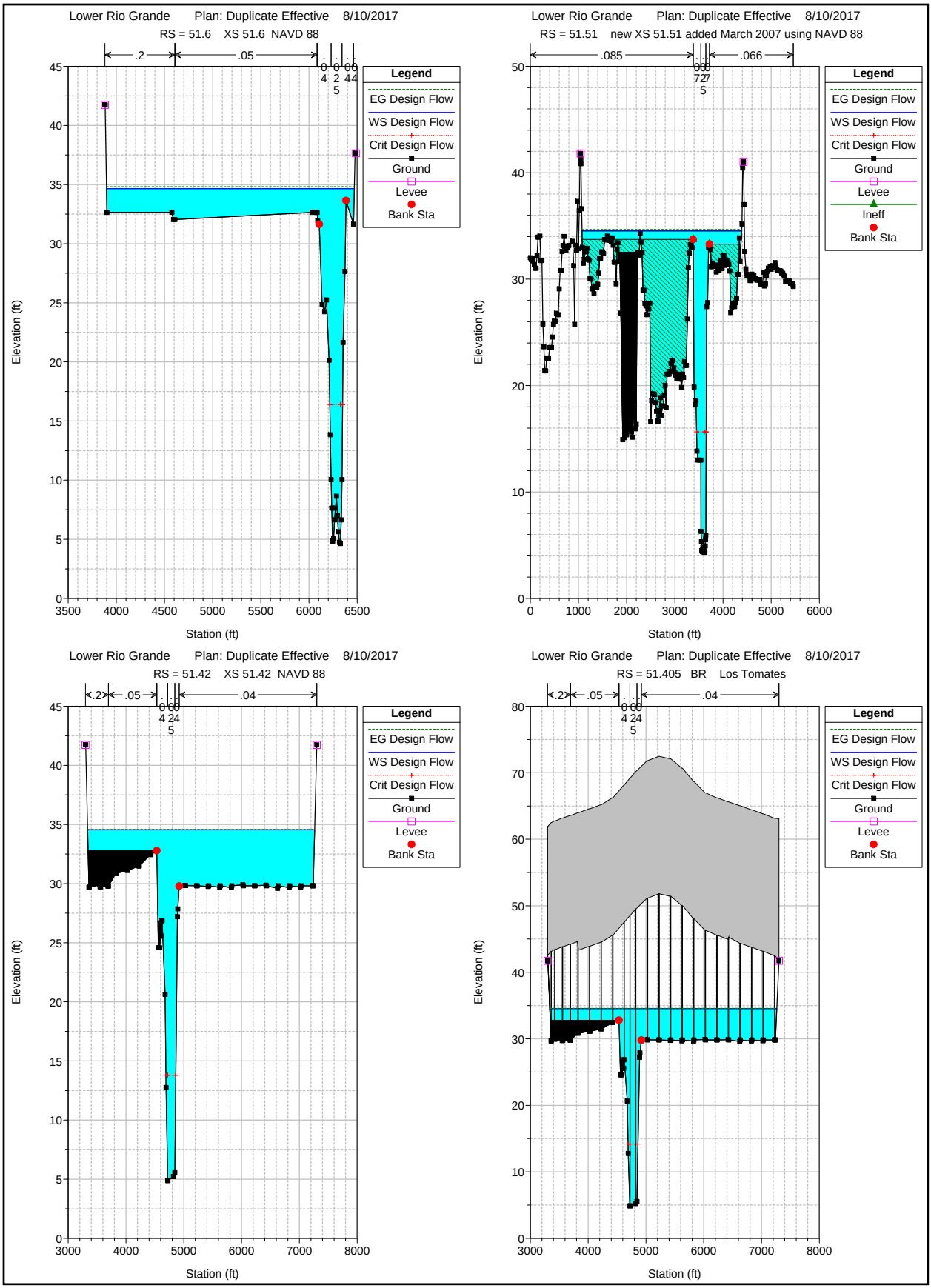

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 55.23 XS 55.23 NAVD 88
.05
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 55.215 BR B & M
.05
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 55.215 BR B & M
.05
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 55.21 XS 55.21 NAVD 88
.05
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

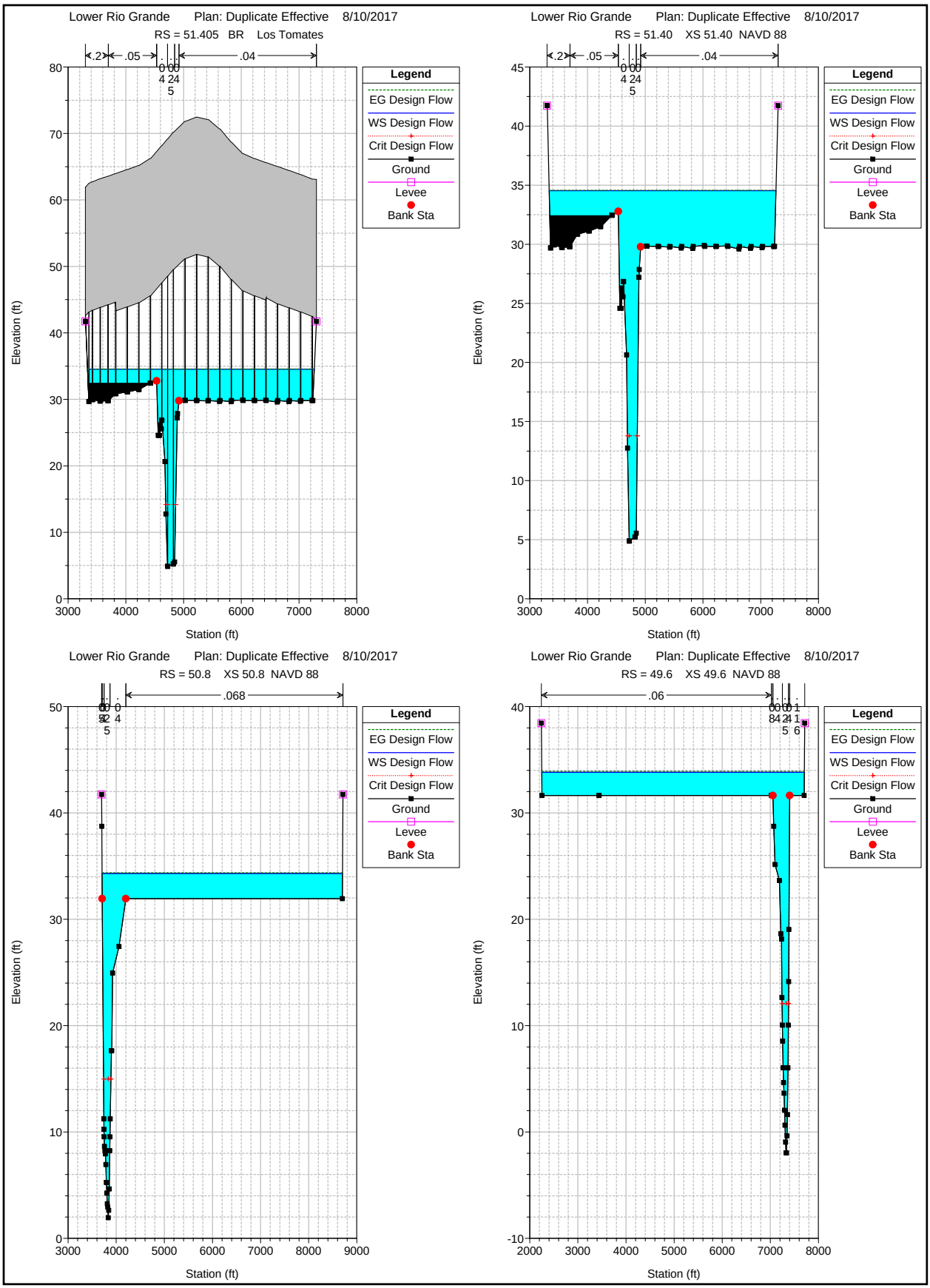

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 55.2 XS 55.2 NAVD 88
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.5 XS 54.5 NAVD 88
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.49 XS 54.49 NAVD 88
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.475 BR Gateway SB
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

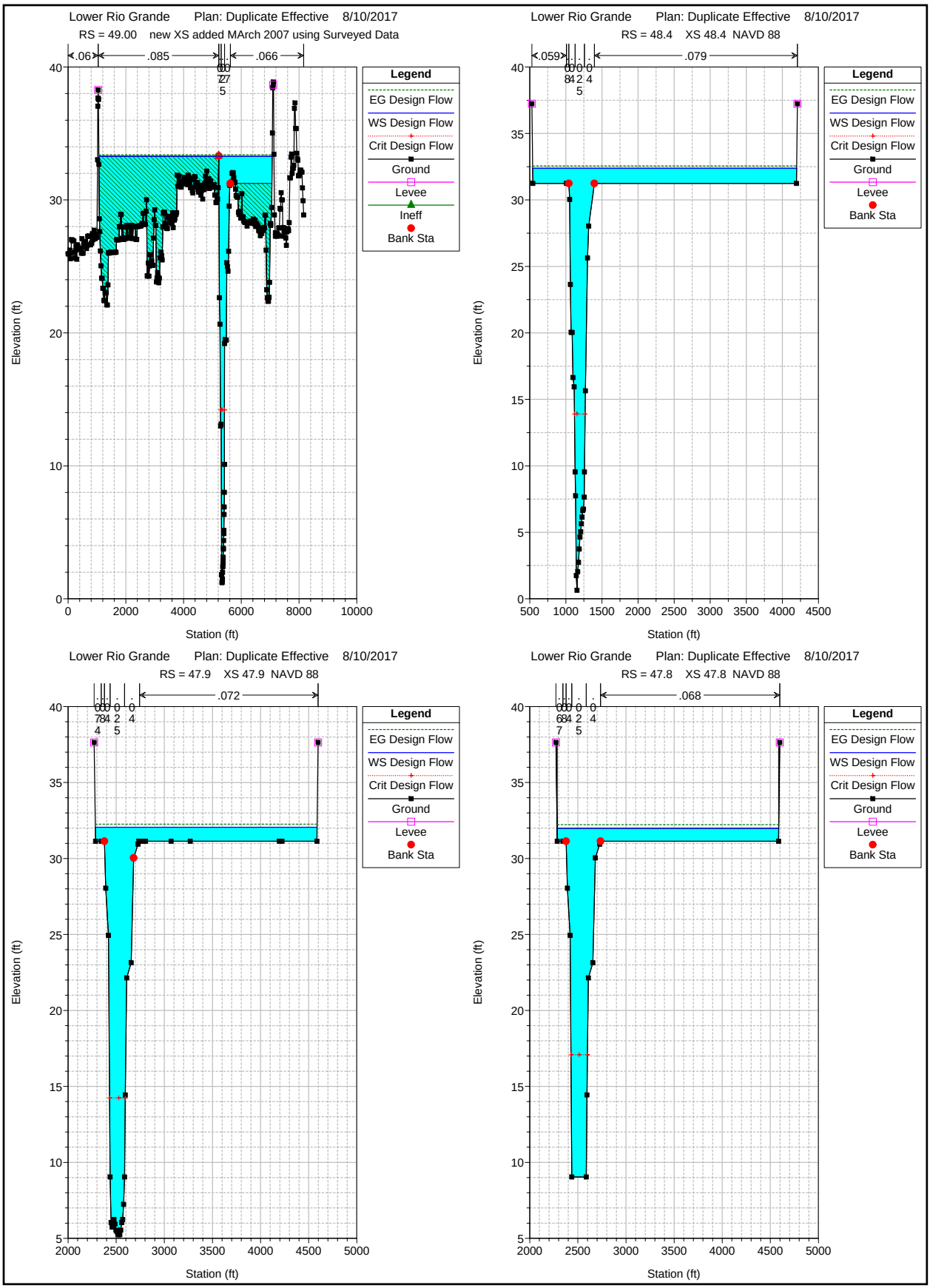

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.475 BR Gateway SB
.05
.025
.04
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.47 XS 54.47 NAVD 88
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.46 XS 54.46 NAVD 88
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.45 XS 54.45 NAVD 88

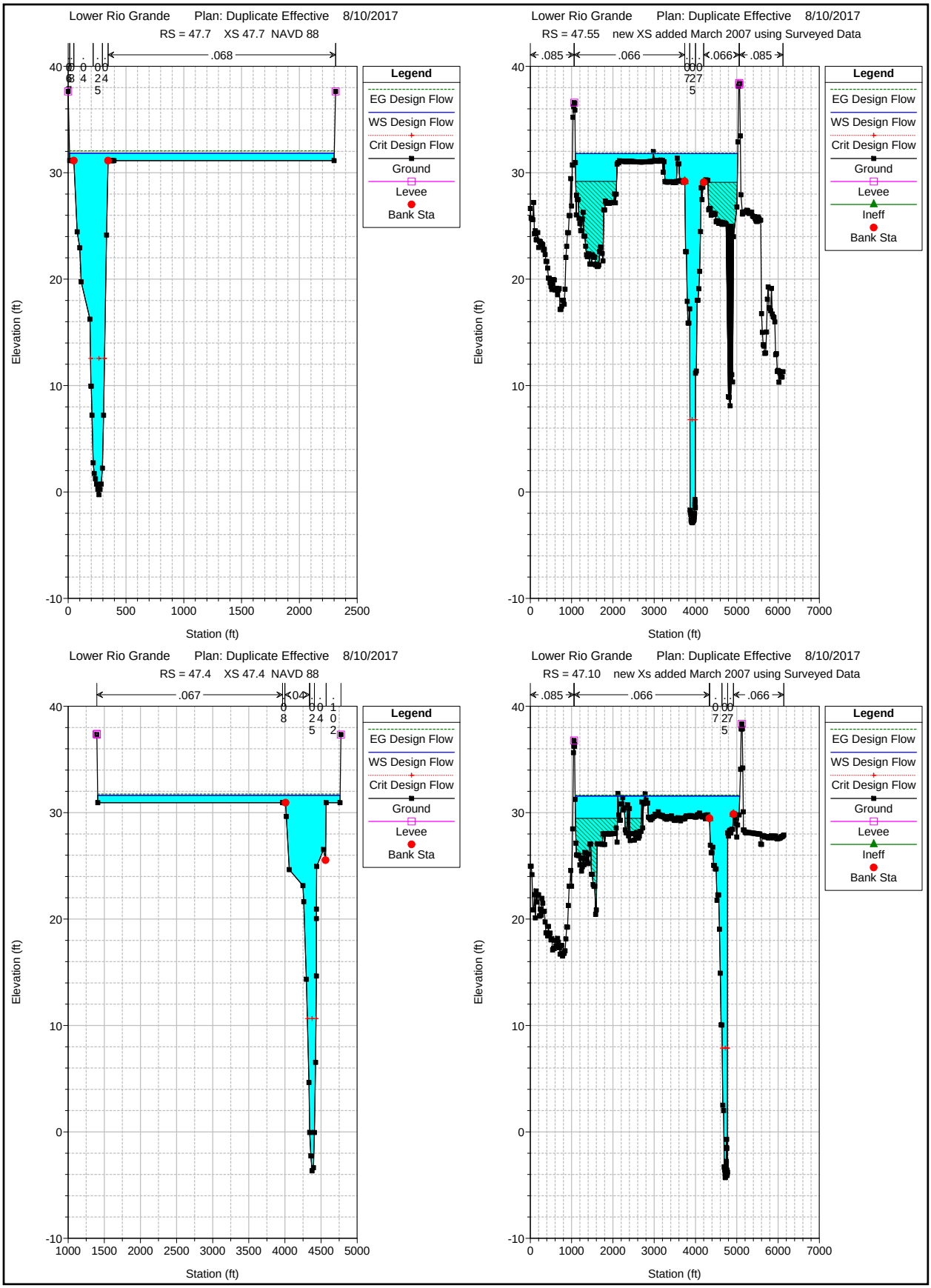

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.435 BR Gateway NB
.05
.04
.025
.04
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.435 BR Gateway NB
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.43 XS 54.43 NAVD 88
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.42 XS 54.42 NAVD 88

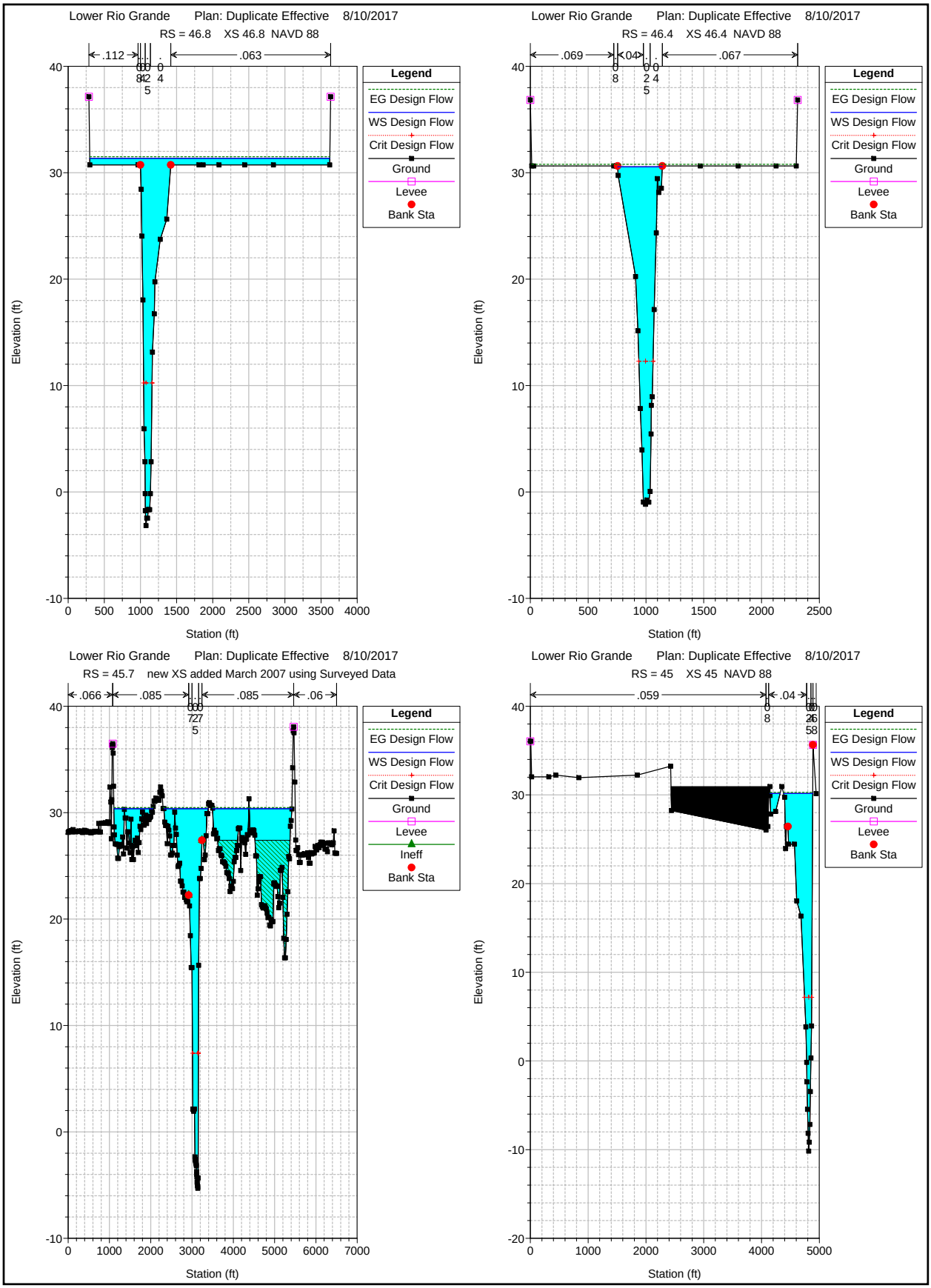

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54.4 XS 54.4 NAVD 88
.05 .04 .025 .04 .04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 54 XS 54 NAVD 88
.05 .025 .04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 53.2 new XS added March 2007 using Surveyed Data
.06 .085 .06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 52.4 XS 52.4 NAVD 88
.2 .05 .04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

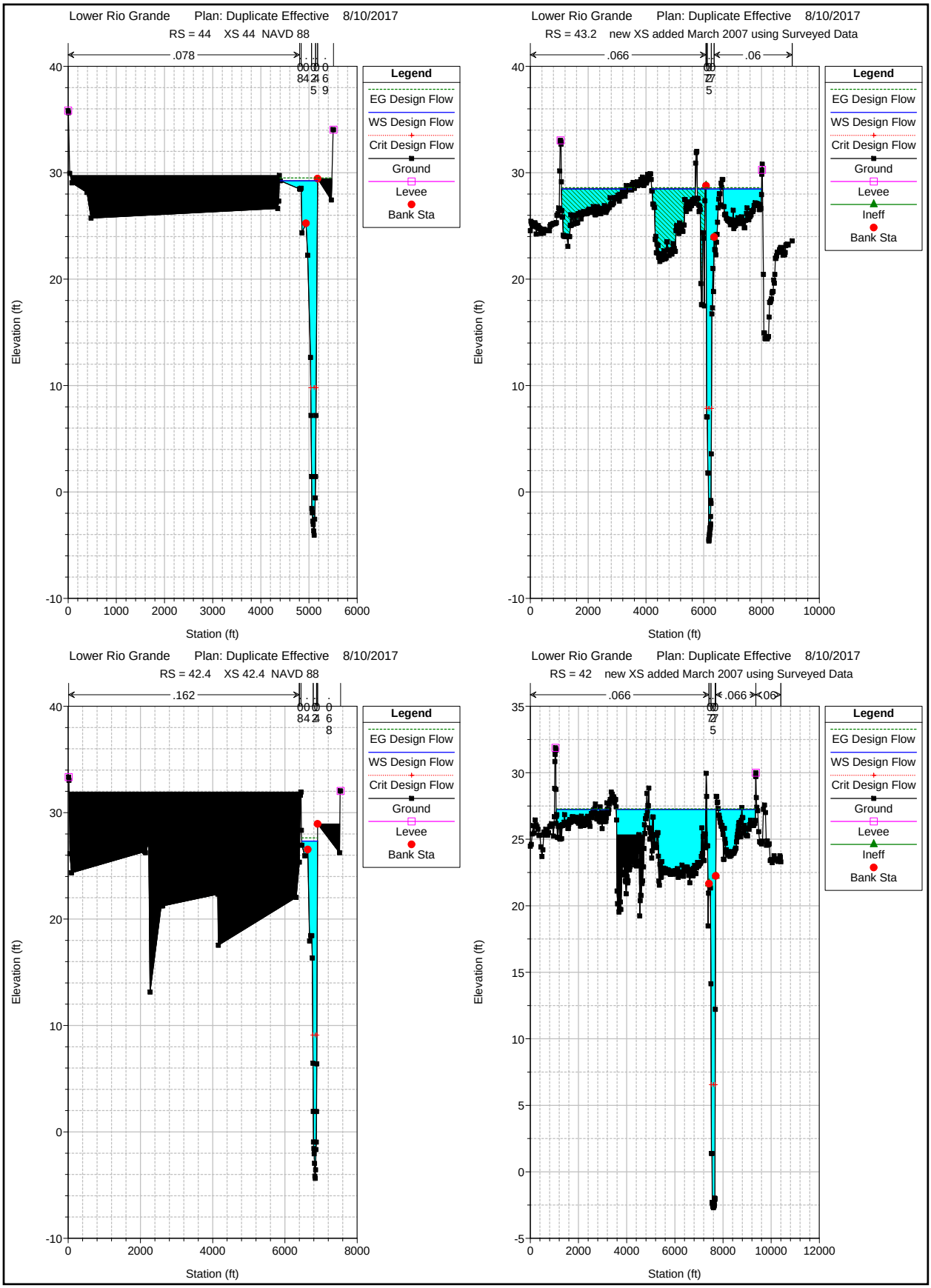

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 51.6 XS 51.6 NAVD 88
.2
.05
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 51.51 new XS 51.51 added March 2007 using NAVD 88
.085
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 51.42 XS 51.42 NAVD 88
.2
.05
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 51.405 BR Los Tomates
.2
.05
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

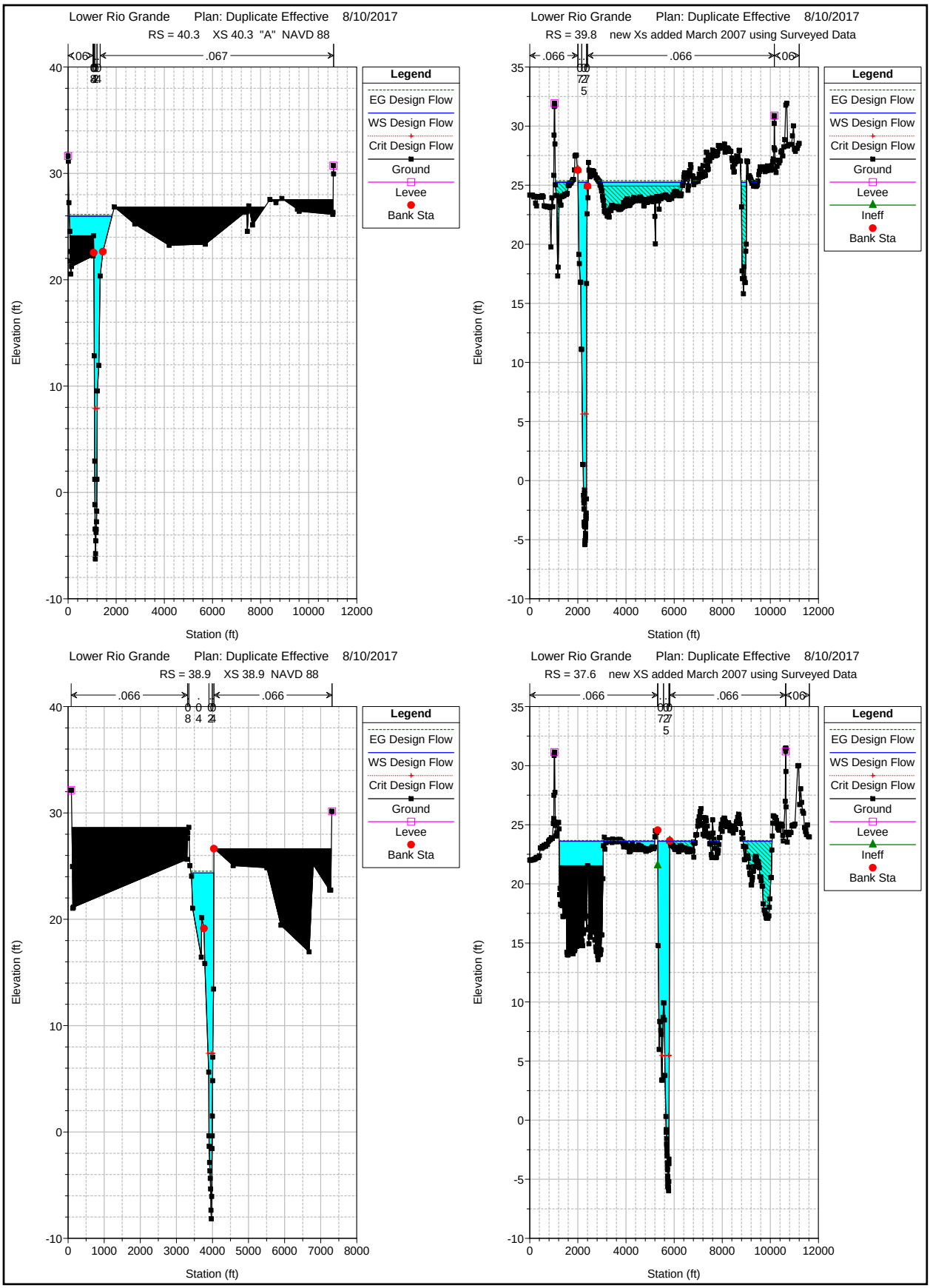

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 51.405 BR Los Tomates
.2
.05
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 51.40 XS 51.40 NAVD 88
.2
.05
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 50.8 XS 50.8 NAVD 88
.068
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 49.6 XS 49.6 NAVD 88
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

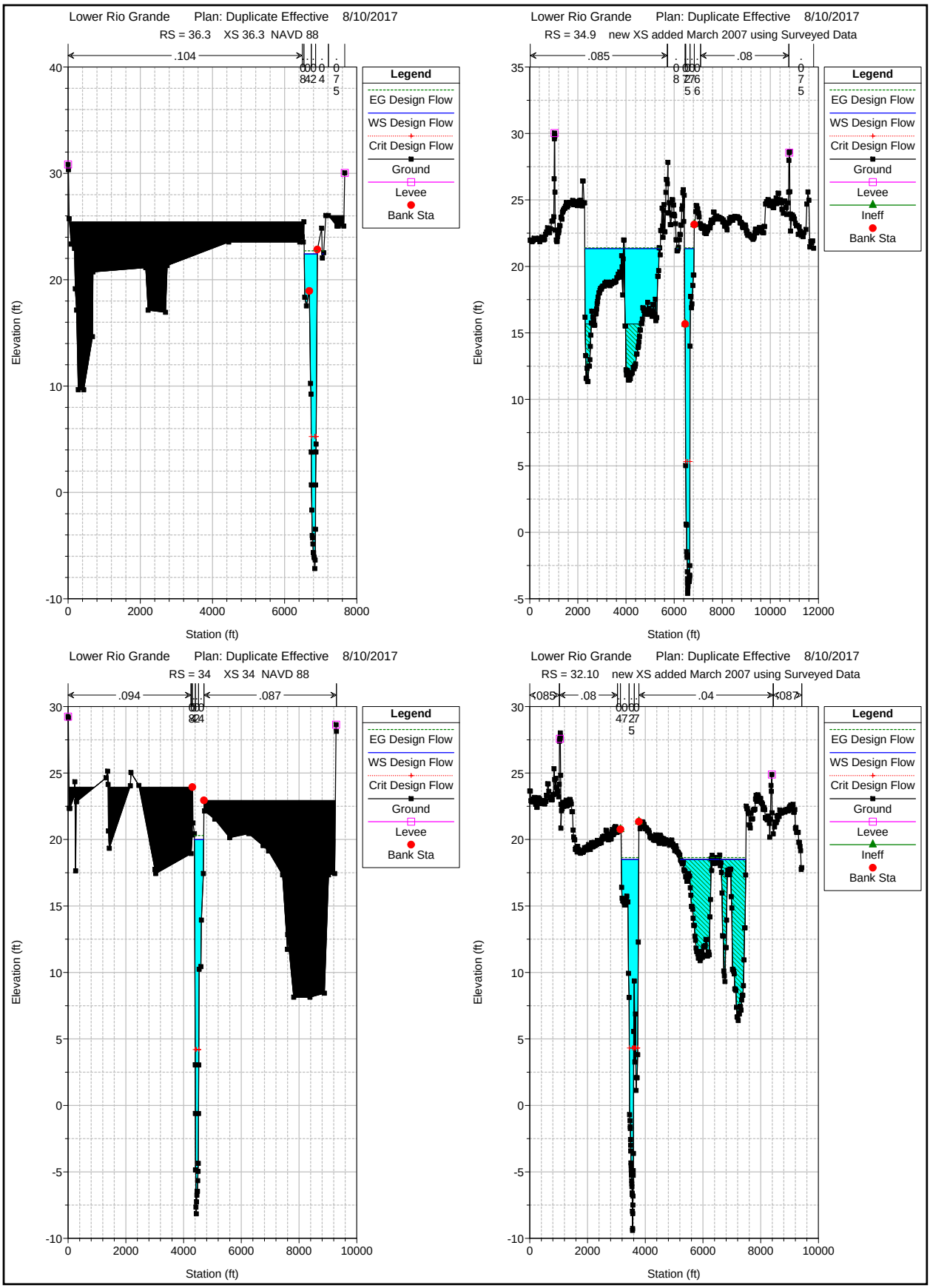

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 49.00 new XS added MArch 2007 using Surveyed Data
.06
.085
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 48.4 XS 48.4 NAVD 88
.059
.079
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 47.9 XS 47.9 NAVD 88
.072
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 47.8 XS 47.8 NAVD 88
.068
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

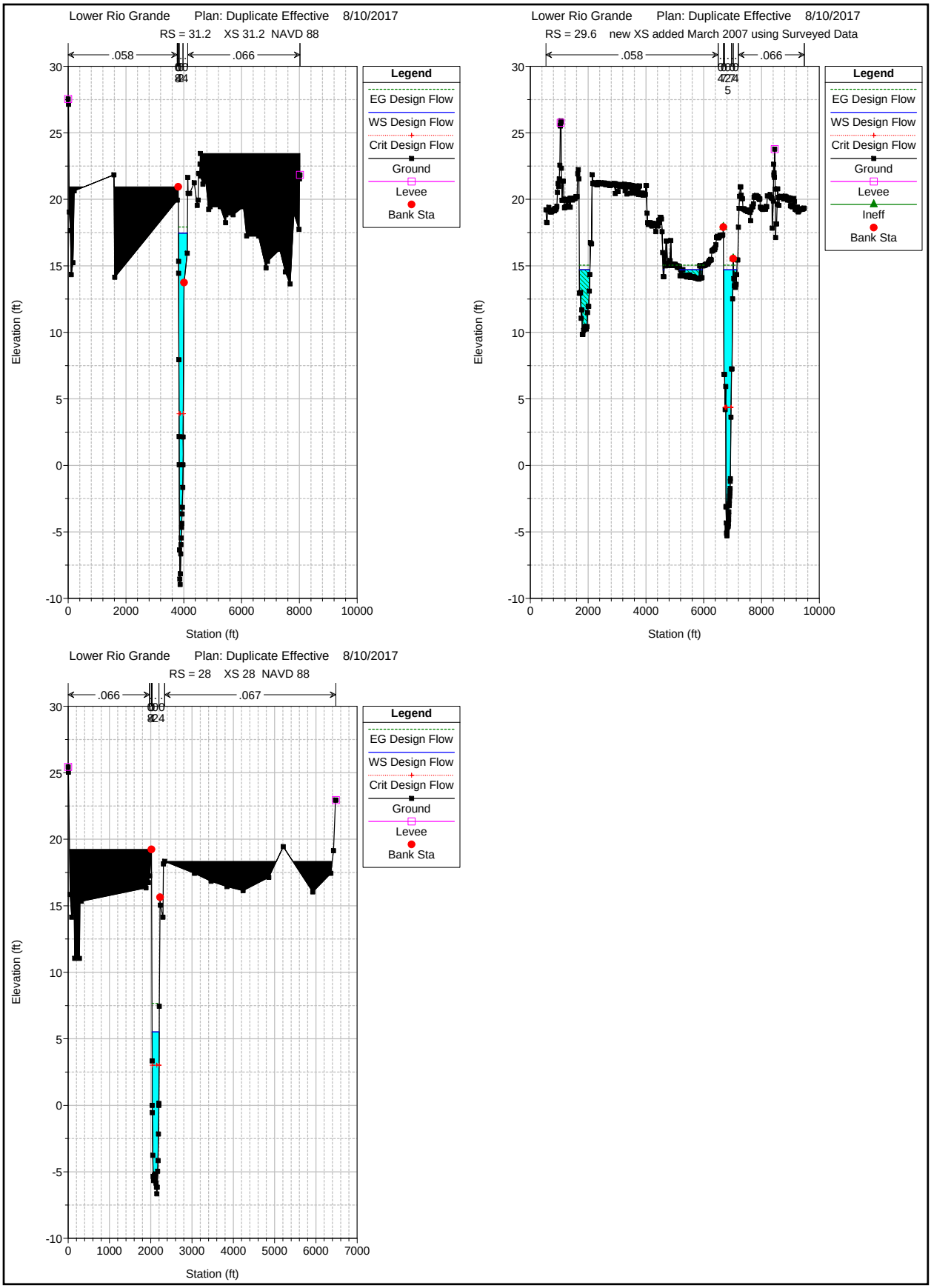

Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 47.7 XS 47.7 NAVD 88
.068
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 47.55 new XS added March 2007 using Surveyed Data
.085
.066
.066
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 47.4 XS 47.4 NAVD 88
.067
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 47.10 new Xs added March 2007 using Surveyed Data
.085
.066
.066
.085
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 46.8 XS 46.8 NAVD 88
.112
.063
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 46.4 XS 46.4 NAVD 88
.069
.04
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 45.7 new XS added March 2007 using Surveyed Data
.066
.085
.085
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 45 XS 45 NAVD 88
.059
.04
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 44 XS 44 NAVD 88
.078
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 43.2 new XS added March 2007 using Surveyed Data
.066
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 42.4 XS 42.4 NAVD 88
.162
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 42 new XS added March 2007 using Surveyed Data
.066
.066
.06
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 40.3 XS 40.3 "A" NAVD 88
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 39.8 new Xs added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 38.9 XS 38.9 NAVD 88
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 37.6 new XS added March 2007 using Surveyed Data
.066
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 36.3 XS 36.3 NAVD 88
.104
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 34.9 new XS added March 2007 using Surveyed Data
.085
.08
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 34 XS 34 NAVD 88
.094
.087
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 32.10 new XS added March 2007 using Surveyed Data
.085
.08
.04
.087
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 31.2 XS 31.2 NAVD 88
.058
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 29.6 new XS added March 2007 using Surveyed Data
.058
.066
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Duplicate Effective 8/10/2017
RS = 28 XS 28 NAVD 88
.066
.067
Legend
EG Design Flow
WS Design Flow
Crit Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

HEC-RAS Plan: Duplicate Effective River: Rio Grande Reach: Lower Reach Profile: Design Flow

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	186	Design Flow	235000.00	85.94	133.30	122.24	133.40	0.000069	4.66	169066.50	10519.00	0.14
Lower Reach	185.00	Design Flow	235000.00	73.20	133.12	122.00	133.17	0.000116	2.89	154196.10	10812.04	0.09
Lower Reach	184	Design Flow	235000.00	86.64	132.61	123.23	132.83	0.000140	6.26	132383.30	10724.00	0.18
Lower Reach	183.20	Design Flow	235000.00	89.30	132.16	121.41	132.22	0.000098	3.59	167716.80	12707.92	0.11
Lower Reach	182.4	Design Flow	235000.00	79.14	131.62	124.13	131.80	0.000077	6.31	190587.00	15357.50	0.17
Lower Reach	181.35	Design Flow	235000.00	92.00	131.39	118.59	131.45	0.000043	3.61	208111.60	12575.24	0.11
Lower Reach	180.3	Design Flow	235000.00	87.04	130.69	121.17	131.05	0.000123	7.62	136772.00	8444.98	0.22
Lower Reach	179.40	Design Flow	235000.00	84.40	130.43	117.30	130.46	0.000074	2.59	210133.30	13280.00	0.08
Lower Reach	178.5	Design Flow	235000.00	86.64	129.55	120.55	129.94	0.000141	7.88	149018.50	11045.00	0.23
Lower Reach	177.70	Design Flow	235000.00	87.00	129.26	117.39	129.32	0.000145	3.60	188344.50	11960.00	0.11
Lower Reach	176.8	Design Flow	235000.00	88.84	128.02	118.04	128.61	0.000217	8.64	129546.70	8702.00	0.27
Lower Reach	175.60	Design Flow	235000.00	89.20	127.73	116.16	127.80	0.000104	3.50	162797.70	10840.00	0.11
Lower Reach	174.6	Design Flow	235000.00	86.14	126.69	116.86	127.41	0.000113	9.03	152801.50	10078.00	0.27
Lower Reach	174.20	Design Flow	235000.00	86.00	127.00	114.20	127.05	0.000040	3.10	221388.90	13360.00	0.10
Lower Reach	171.8	Design Flow	235000.00	75.24	126.22	117.81	126.46	0.000153	6.26	115171.70	8410.00	0.19
Lower Reach	171.15	Design Flow	235000.00	73.00	125.98	113.56	126.17	0.000092	5.83	144128.30	8720.15	0.17
Lower Reach	170.5	Design Flow	235000.00	74.24	123.03	116.51	125.51	0.000431	15.17	71032.92	4871.15	0.46
Lower Reach	170.26	Design Flow	235000.00	76.10	123.61	113.12	124.16	0.000393	7.51	82472.31	5461.90	0.26
Lower Reach	170.02	Design Flow	235000.00	89.64	119.97	114.59	123.21	0.000338	16.76	68157.80	4848.19	0.54
Lower Reach	169.83	Design Flow	130000.00	89.64	120.79	111.87	122.40	0.000209	11.88	63137.61	4492.48	0.38
Lower Reach	169.49	Design Flow	130000.00	86.70	121.39	105.34	121.64	0.000249	5.12	49384.53	3402.26	0.17
Lower Reach	169.14	Design Flow	130000.00	84.64	120.70	97.06	121.43	0.000048	6.88	18885.95	523.80	0.20
Lower Reach	169.13		Inl Struct									
Lower Reach	169.12	Design Flow	130000.00	72.14	119.37	84.56	119.79	0.000021	5.26	24736.58	523.80	0.13
Lower Reach	169.1	Design Flow	130000.00	83.64	119.24	95.38	119.77	0.000034	5.86	22169.07	658.30	0.18
Lower Reach	168.85	Design Flow	130000.00	71.64	118.97	92.85	119.65	0.000477	6.69	22309.86	1070.00	0.20
Lower Reach	168.58	Design Flow	130000.00	70.65	118.85	92.93	118.98	0.000249	3.68	76669.60	6282.42	0.11
Lower Reach	168.3	Design Flow	130000.00	75.34	117.82	93.97	118.30	0.000889	5.95	34733.78	2237.23	0.18
Lower Reach	168.00	Design Flow	130000.00	71.95	117.70	94.09	117.85	0.000071	3.77	93470.21	7356.28	0.12
Lower Reach	167.4	Design Flow	130000.00	74.14	117.26	95.98	117.54	0.000198	5.37	74645.82	6732.55	0.16
Lower Reach	167.00	Design Flow	130000.00	70.45	117.11	95.32	117.18	0.000111	2.92	95507.98	9563.32	0.09
Lower Reach	166.6	Design Flow	130000.00	71.34	116.83	96.55	116.96	0.000099	4.50	143081.00	12200.92	0.13
Lower Reach	162.1	Design Flow	130000.00	69.75	115.57	93.04	115.59	0.000094	1.79	144853.90	13227.38	0.06
Lower Reach	161.4	Design Flow	130000.00	70.14	115.20	94.64	115.33	0.000132	4.28	123293.70	12191.50	0.13
Lower Reach	159.16	Design Flow	130000.00	67.95	114.08	93.17	114.11	0.000065	1.91	141317.70	13617.98	0.06
Lower Reach	157.15	Design Flow	130000.00	69.64	111.80	91.26	112.62	0.000276	8.04	32850.90	2402.00	0.24
Lower Reach	156.93	Design Flow	125000.00	57.14	111.22	80.82	112.12	0.000199	7.75	18582.58	541.00	0.20
Lower Reach	156.915		Bridge									
Lower Reach	156.9	Design Flow	125000.00	57.14	110.77	80.82	111.65	0.000198	7.67	18343.26	541.00	0.20
Lower Reach	156.87	Design Flow	125000.00	61.04	110.82	80.12	111.55	0.000093	7.25	23666.07	819.90	0.19
Lower Reach	156.855		Bridge									
Lower Reach	156.84	Design Flow	125000.00	61.04	110.70	80.12	111.49	0.000097	7.42	23570.20	819.90	0.19
Lower Reach	156.70	Design Flow	125000.00	70.75	110.87	90.55	111.19	0.000143	5.09	44870.88	4060.00	0.17
Lower Reach	156.6	Design Flow	125000.00	60.94	110.27	82.80	111.06	0.000235	7.66	24938.60	2183.00	0.21
Lower Reach	156.15	Design Flow	125000.00	69.65	110.32	89.84	110.44	0.000173	3.83	62092.23	5004.44	0.12
Lower Reach	155.7	Design Flow	125000.00	68.64	109.84	92.62	110.04	0.000195	5.02	63417.36	5301.76	0.15
Lower Reach	155.36	Design Flow	125000.00	69.55	109.67	92.42	109.72	0.000113	2.65	96459.14	9511.76	0.09
Lower Reach	155.01	Design Flow	125000.00	66.94	108.95	92.41	109.26	0.000637	5.51	44965.98	4507.35	0.19
Lower Reach	154.81	Design Flow	125000.00	66.95	108.12	92.08	108.68	0.000308	7.00	35951.53	4980.23	0.25
Lower Reach	154.6	Design Flow	125000.00	55.64	107.57	83.25	108.19	0.000445	6.50	25378.30	1332.12	0.19
Lower Reach	154.23	Design Flow	125000.00	53.80	107.25	85.14	107.63	0.000204	5.23	37326.60	6006.44	0.22
Lower Reach	153.85	Design Flow	125000.00	66.44	106.23	90.69	106.99	0.000821	7.84	30829.33	3714.66	0.26
Lower Reach	153.61	Design Flow	125000.00	54.20	106.28	85.42	106.59	0.000112	5.46	68217.13	9127.24	0.19
Lower Reach	153.36	Design Flow	125000.00	66.94	106.23	90.26	106.37	0.000210	4.34	91358.74	11834.99	0.15
Lower Reach	152.53	Design Flow	125000.00	66.64	105.33	90.22	105.41	0.000234	3.49	113106.80	14464.67	0.12
Lower Reach	151.7	Design Flow	125000.00	65.04	104.30	89.25	104.40	0.000212	3.96	104119.30	14120.85	0.13
Lower Reach	151.49	Design Flow	125000.00	55.70	104.17	82.40	104.27	0.000055	3.69	128084.50	15529.40	0.13
Lower Reach	151.27	Design Flow	125000.00	65.88	104.12	89.83	104.16	0.000095	2.81	117094.30	14880.44	0.10
Lower Reach	151.255		Bridge									
Lower Reach	151.25	Design Flow	125000.00	65.88	104.11	89.83	104.14	0.000089	2.72	116924.80	14880.34	0.10
Lower Reach	151.24	Design Flow	125000.00	65.88	104.10	89.83	104.14	0.000096	2.82	116854.00	14880.30	0.10
Lower Reach	150.78	Design Flow	125000.00	56.38	103.88	84.38	103.91	0.000102	2.13	127619.50	17196.29	0.07
Lower Reach	150.31	Design Flow	125000.00	64.64	103.44	91.62	103.54	0.000260	4.03	104044.90	17191.16	0.14
Lower Reach	149.00	Design Flow	125000.00	55.60	103.12	84.93	103.14	0.000072	2.23	153618.60	18295.32	0.07
Lower Reach	147.68	Design Flow	125000.00	60.04	102.72	88.46	102.77	0.000229	2.92	113927.40	15493.51	0.11
Lower Reach	146.00	Design Flow	125000.00	51.30	101.73	84.19	101.75	0.000069	1.49	149841.30	17083.78	0.06
Lower Reach	145	Design Flow	125000.00	60.84	101.18	87.08	101.25	0.000125	3.65	130561.40	14102.41	0.12
Lower Reach	144.55	Design Flow	125000.00	58.64	100.90	93.40	100.96	0.000133	3.51	127011.00	14234.92	0.11
Lower Reach	143.25	Design Flow	125000.00	54.30	100.24	78.61	100.28	0.000081	2.41	142898.80	14949.04	0.08
Lower Reach	142.5	Design Flow	125000.00	56.94	99.64	86.59	99.79	0.000253	4.95	125322.30	13895.44	0.16
Lower Reach	141.90	Design Flow	125000.00	53.73	99.19	78.81	99.22	0.000096	2.34	147411.90	15508.12	0.08
Lower Reach	140.74	Design Flow	125000.00	57.74	98.47	91.26	98.54	0.000098	3.69	126370.90	13771.99	0.12
Lower Reach	140.00	Design Flow	125000.00	55.00	98.07	78.80	98.16	0.000061	3.30	125103.00	12439.99	0.11
Lower Reach	139.85	Design Flow	125000.00	59.64	97.75	82.87	98.03	0.000216	6.09	81683.98	11862.63	0.19
Lower Reach	139.01	Design Flow	125000.00	59.44	96.99	84.97	97.09	0.000193	4.12	78196.84	10368.68	0.14
Lower Reach	138.36	Design Flow	125000.00	46.80	96.51	90.47	96.65	0.000095	4.93	96722.30	10692.48	0.17
Lower Reach	137.71	Design Flow	125000.00	56.64	96.11	83.05	96.19	0.000198	3.64	85186.28	10181.51	0.12
Lower Reach	137.14	Design Flow	125000.00	54.70	95.80	77.33	95.83	0.000068	2.57	132884.20	13382.54	0.08
Lower Reach	135	Design Flow	125000.00	57.94	94.50	82.46	94.62	0.000169	4.39	89689.34	10236.52	0.14

RGV-03

RGV-04

RGV-04

RGV-01

RGV-02

HEC-RAS Plan: Duplicate Effective River: Rio Grande Reach: Lower Reach Profile: Design Flow (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	134.65	Design Flow	125000.00	55.40	94.34	81.96	94.41	0.000067	3.33	113128.90	10908.08	0.12
Lower Reach	132.75	Design Flow	125000.00	53.54	92.79	87.52	93.17	0.000246	7.32	79075.87	8680.82	0.23
Lower Reach	131.6	Design Flow	125000.00	52.70	92.04	82.68	92.09	0.000113	3.10	93635.81	8507.13	0.10
Lower Reach	131.35	Design Flow	125000.00	55.24	91.65	80.88	91.83	0.000269	5.32	78560.07	8593.17	0.17
Lower Reach	130.93	Design Flow	125000.00	55.80	91.26	83.72	91.33	0.000170	3.74	77942.19	7483.49	0.12
Lower Reach	130.51	Design Flow	125000.00	55.14	90.45	82.04	90.82	0.000297	6.79	47270.26	4415.64	0.22
Lower Reach	129.3	Design Flow	20000.00	55.14	90.46	63.74	90.47	0.000010	1.11	41213.71	4166.06	0.04
Lower Reach	129.27	Design Flow	20000.00	55.00	90.43	63.85	90.45	0.000032	1.39	25528.61	2852.84	0.05
Lower Reach	129.23	Design Flow	20000.00	55.14	90.33	63.74	90.41	0.000044	2.26	8851.54	308.78	0.07
Lower Reach	129.22	Design Flow	20000.00	55.14	90.32	63.74	90.40	0.000044	2.26	8850.59	308.78	0.07
Lower Reach	129.216	Design Flow	20000.00	55.64	89.55	67.92	90.33	0.000105	7.11	2933.55	162.00	0.22
Lower Reach	129.215		Inl Struct									
Lower Reach	129.214	Design Flow	20000.00	55.64	82.57	67.92	83.84	0.000203	9.06	2208.09	82.00	0.31
Lower Reach	129.213	Design Flow	20000.00	55.64	81.09	70.42	83.59	0.001146	12.67	1577.99	62.00	0.44
Lower Reach	129.212	Design Flow	20000.00	55.64	81.05	70.42	83.56	0.001150	12.69	1575.66	62.00	0.44
Lower Reach	129.211	Design Flow	20000.00	55.64	82.22	62.88	82.39	0.000019	3.23	6187.71	293.53	0.12
Lower Reach	129.21	Design Flow	20000.00	55.64	82.24	62.24	82.37	0.000015	2.88	6936.83	321.59	0.11
Lower Reach	129.2	Design Flow	20000.00	55.04	82.22	62.98	82.35	0.000228	2.91	7301.25	775.69	0.12
Lower Reach	129.03	Design Flow	20000.00	53.84	81.97	63.02	82.09	0.000225	2.80	7153.33	459.65	0.12
Lower Reach	128.50	Design Flow	20000.00	52.30	81.81	62.46	81.86	0.000037	2.10	27422.48	10278.30	0.11
Lower Reach	127.7	Design Flow	20000.00	49.94	81.54	62.10	81.60	0.000129	2.10	17891.71	6874.73	0.09
Lower Reach	127.40	Design Flow	20000.00	55.20	81.46	62.66	81.49	0.000051	1.68	25943.61	7449.28	0.07
Lower Reach	126.7	Design Flow	20000.00	50.94	81.01	63.10	81.14	0.000276	3.10	14640.83	9447.81	0.13
Lower Reach	125.30	Design Flow	20000.00	52.10	80.03	60.50	80.09	0.000101	2.36	22120.09	9355.42	0.09
Lower Reach	125	Design Flow	20000.00	50.24	79.76	59.57	79.90	0.000127	3.13	11586.04	5297.49	0.11
Lower Reach	124.40	Design Flow	20000.00	50.30	79.58	61.01	79.61	0.000036	1.81	32469.46	9980.95	0.09
Lower Reach	123.8	Design Flow	20000.00	49.74	79.23	59.62	79.34	0.000143	2.73	10892.51	2438.89	0.11
Lower Reach	123.15	Design Flow	20000.00	47.30	78.94	59.83	78.96	0.000083	1.42	28247.80	8173.00	0.06
Lower Reach	122.5	Design Flow	20000.00	51.94	78.50	60.44	78.64	0.000103	3.09	7659.18	575.34	0.12
Lower Reach	121.46	Design Flow	20000.00	45.44	78.08	59.21	78.24	0.000122	3.44	9147.99	1060.81	0.12
Lower Reach	120.7	Design Flow	20000.00	50.84	77.63	59.56	77.74	0.000135	2.72	8487.52	842.40	0.11
Lower Reach	120.62	Design Flow	20000.00	46.54	77.54	58.15	77.68	0.000158	2.95	7286.39	612.96	0.12
Lower Reach	120.605		Bridge									
Lower Reach	120.59	Design Flow	20000.00	46.54	77.51	58.15	77.64	0.000159	2.96	7263.69	612.66	0.12
Lower Reach	120.5	Design Flow	20000.00	49.84	77.45	58.76	77.55	0.000101	2.66	10621.77	1284.49	0.10
Lower Reach	120.38	Design Flow	20000.00	51.64	77.10	59.98	77.17	0.000087	2.40	22400.31	3634.95	0.09
Lower Reach	118.81	Design Flow	20000.00	49.90	76.43	59.25	76.47	0.000114	1.76	22005.11	5724.18	0.08
Lower Reach	117.87	Design Flow	20000.00	49.34	75.82	58.15	75.94	0.000130	3.02	19396.82	5094.89	0.12
Lower Reach	117.2	Design Flow	20000.00	46.84	75.25	55.86	75.41	0.000160	3.23	10219.60	3839.43	0.13
Lower Reach	116.5	Design Flow	20000.00	47.54	74.85	56.78	75.04	0.000124	3.54	7925.35	1568.89	0.13
Lower Reach	116.1	Design Flow	20000.00	45.84	74.60	55.76	74.74	0.000134	3.06	7346.24	475.59	0.12
Lower Reach	115.7	Design Flow	20000.00	48.14	74.32	57.15	74.49	0.000124	3.36	7343.12	695.88	0.13
Lower Reach	115	Design Flow	20000.00	36.14	73.73	51.53	73.90	0.000183	3.43	7918.83	1472.11	0.13
Lower Reach	114.8	Design Flow	20000.00	46.94	73.43	56.96	73.61	0.000144	3.56	8567.86	1575.25	0.14
Lower Reach	114.65	Design Flow	20000.00	42.54	73.38	53.48	73.49	0.000128	2.72	10809.69	2082.70	0.11
Lower Reach	114.1	Design Flow	20000.00	42.04	72.51	52.92	72.63	0.000296	2.76	10549.92	9129.60	0.13
Lower Reach	113.00	Design Flow	20000.00	37.10	72.33	52.31	72.34	0.000020	1.52	44380.48	10201.35	0.06
Lower Reach	112.2	Design Flow	20000.00	40.84	72.10	52.36	72.20	0.000116	2.93	19140.96	6639.66	0.11
Lower Reach	111.5	Design Flow	20000.00	37.54	71.49	52.26	71.66	0.000162	3.47	7935.39	1733.85	0.13
Lower Reach	110.7	Design Flow	20000.00	42.74	70.85	51.58	71.02	0.000148	3.44	8251.51	3260.20	0.13
Lower Reach	110.10	Design Flow	20000.00	37.30	70.45	50.68	70.53	0.000172	2.68	14620.07	3506.48	0.10
Lower Reach	109.5	Design Flow	20000.00	40.74	70.05	49.18	70.16	0.000097	2.77	10291.86	3034.28	0.10
Lower Reach	109.2	Design Flow	20000.00	39.74	69.83	50.26	69.93	0.000194	2.63	10529.08	2870.54	0.11
Lower Reach	109.1	Design Flow	20000.00	36.64	69.79	48.81	69.85	0.000100	2.42	16852.36	3357.07	0.09
Lower Reach	108.5	Design Flow	20000.00	38.94	69.47	48.43	69.55	0.000116	2.61	18285.08	6295.47	0.10
Lower Reach	107.6	Design Flow	20000.00	37.64	68.68	49.32	68.74	0.000153	2.26	20950.72	7937.46	0.10
Lower Reach	106.4	Design Flow	20000.00	35.04	67.71	46.31	67.79	0.000194	2.53	17821.47	7953.07	0.11
Lower Reach	105.3	Design Flow	20000.00	24.54	66.58	42.92	66.75	0.000171	3.43	7900.38	997.52	0.12
Lower Reach	103.6	Design Flow	20000.00	38.60	65.67	50.41	65.78	0.000077	2.89	18426.89	10486.17	0.15
Lower Reach	103.1	Design Flow	20000.00	36.14	65.53	47.46	65.59	0.000088	2.37	29761.98	9322.64	0.09
Lower Reach	102.00	Design Flow	20000.00	34.50	64.93	47.54	65.00	0.000156	2.47	20368.72	10545.02	0.10
Lower Reach	100.1	Design Flow	20000.00	36.44	63.47	45.68	63.63	0.000142	3.50	13183.56	7627.01	0.13
Lower Reach	99.51	Design Flow	20000.00	35.64	62.94	45.51	63.08	0.000185	3.28	12399.08	4315.18	0.13
Lower Reach	99.4	Design Flow	20000.00	30.84	62.85	40.54	62.91	0.000114	2.14	14207.74	3931.50	0.08
Lower Reach	98.5	Design Flow	20000.00	28.40	62.49	38.92	62.51	0.000071	1.51	28115.35	7526.45	0.06
Lower Reach	97.5	Design Flow	20000.00	26.04	61.86	40.59	61.99	0.000231	3.14	8812.60	1099.68	0.12
Lower Reach	96.82	Design Flow	20000.00	30.71	61.16	41.11	61.22	0.000212	2.40	15974.16	5125.94	0.10
Lower Reach	96.805		Bridge									
Lower Reach	96.80	Design Flow	20000.00	30.71	61.12	41.11	61.18	0.000216	2.42	15775.70	5114.40	0.11
Lower Reach	94.05	Design Flow	20000.00	27.64	60.39	40.10	60.51	0.000199	3.14	13240.70	4352.93	0.12
Lower Reach	93.81	Design Flow	20000.00	27.94	60.03	40.15	60.18	0.000316	3.24	9831.70	4590.53	0.14
Lower Reach	93.8	Design Flow	20000.00	33.45	59.90	42.98	60.13	0.000406	3.98	7211.26	4077.49	0.16
Lower Reach	93.5	Design Flow	20000.00	26.74	59.39	39.79	59.58	0.000321	3.71	8661.31	4238.06	0.14
Lower Reach	92.00	Design Flow	20000.00	23.60	58.24	37.08	58.28	0.000110	2.00	25373.53	7490.78	0.08
Lower Reach	90.5	Design Flow	20000.00	27.04	57.12	36.87	57.27	0.000188	3.41	17990.65	4363.90	0.12
Lower Reach	88.40	Design Flow	20000.00	22.00	56.15	35.66	56.17	0.000074	1.87	33676.21	10604.14	0.07
Lower Reach	87.7	Design Flow	20000.00	20.54	55.90	33.44	55.94	0.000082	2.24	22136.44	4230.04	0.08
Lower Reach	87.40	Design Flow	20000.00	23.30	55.85	35.25	55.86	0.000041	1.54	36934.72	8913.31	0.06
Lower Reach	86.6	Design Flow	20000.00	22.54	55.47	34.07	55.52	0.000318	2.20	18229.21	7029.98	0.12

RGV-02

RGV-02

RGV-02

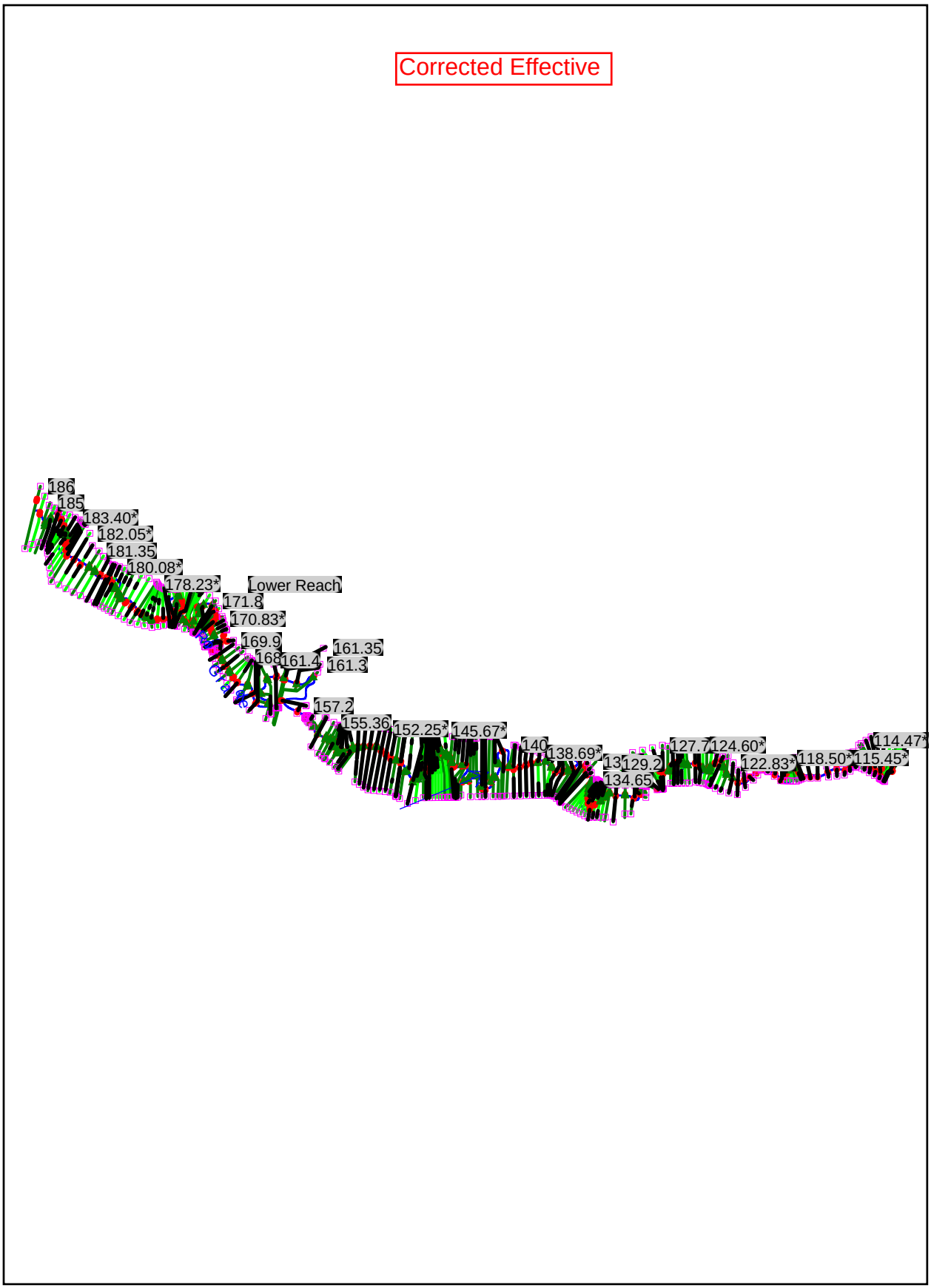
HEC-RAS Plan: Duplicate Effective River: Rio Grande Reach: Lower Reach Profile: Design Flow (Continued)

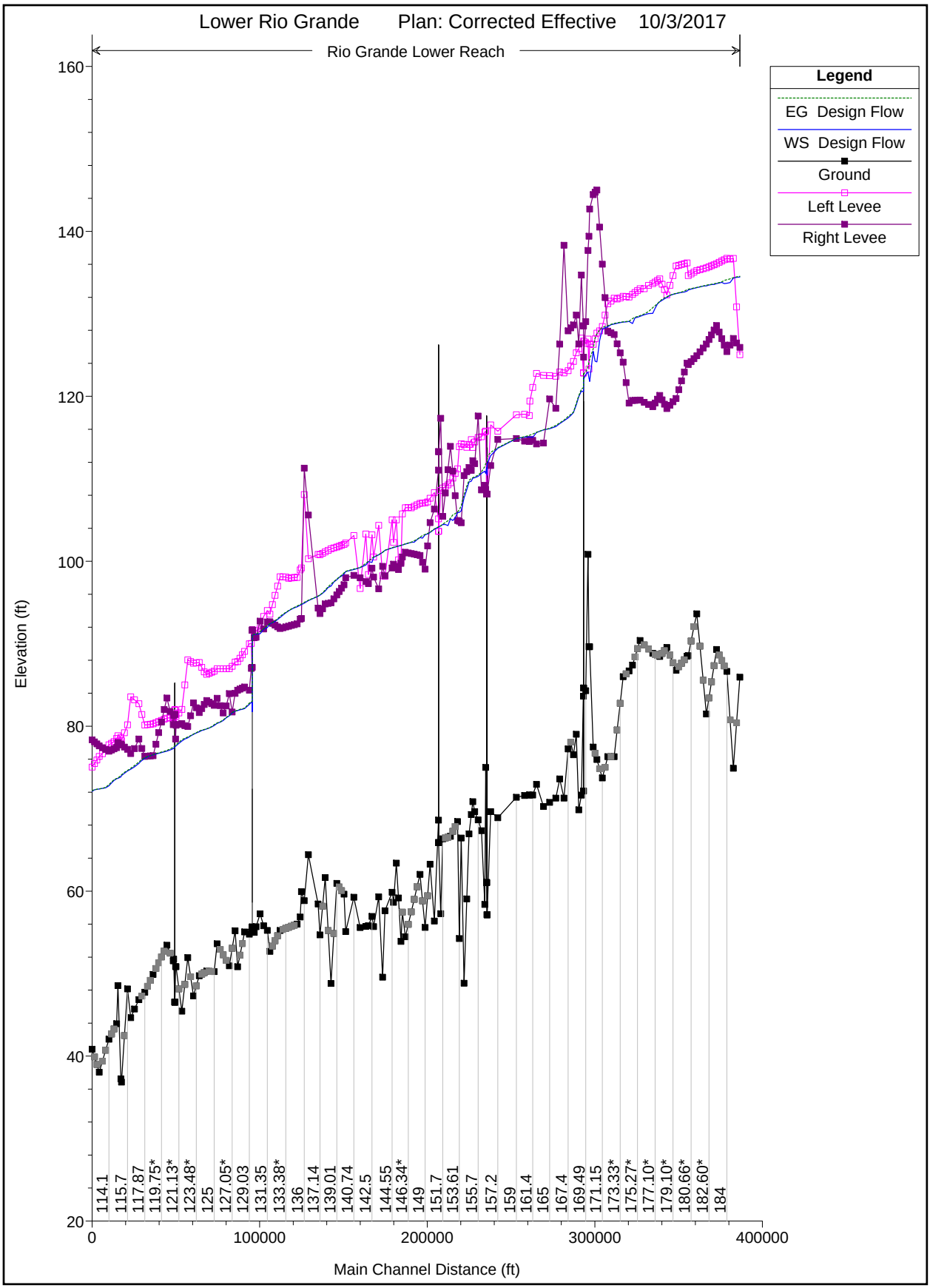
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	85.3	Design Flow	20000.00	25.50	55.06	34.17	55.07	0.000045	1.46	37197.36	9050.90	0.06
Lower Reach	84	Design Flow	20000.00	21.14	54.48	33.92	54.62	0.000258	3.33	13064.81	7016.25	0.13
Lower Reach	83.2	Design Flow	20000.00	25.20	54.22	34.64	54.24	0.000045	1.62	34967.73	8857.64	0.06
Lower Reach	82	Design Flow	20000.00	15.04	53.86	28.40	53.89	0.000096	1.84	25712.14	8722.08	0.08
Lower Reach	81.5	Design Flow	20000.00	22.44	53.65	32.87	53.71	0.000089	2.40	25160.77	8600.69	0.09
Lower Reach	79.8	Design Flow	20000.00	20.94	52.64	31.78	52.69	0.000147	2.31	19422.38	6271.73	0.10
Lower Reach	78.5	Design Flow	20000.00	15.54	51.41	31.51	51.49	0.000262	2.58	15052.86	6876.32	0.11
Lower Reach	76.70	Design Flow	20000.00	23.70	50.80	32.86	50.81	0.000046	1.44	37772.44	9598.11	0.06
Lower Reach	74.5	Design Flow	20000.00	16.74	50.32	28.88	50.36	0.000073	2.13	25314.83	6167.14	0.08
Lower Reach	73.8	Design Flow	20000.00	14.64	49.74	28.27	49.92	0.000239	3.58	8206.38	1922.80	0.14
Lower Reach	72.9	Design Flow	20000.00	14.14	49.05	28.52	49.10	0.000142	1.94	20130.67	5784.34	0.09
Lower Reach	72.2	Design Flow	20000.00	10.74	48.37	27.02	48.53	0.000170	3.52	11749.57	3724.92	0.12
Lower Reach	71.70	Design Flow	20000.00	22.50	47.78	31.29	47.85	0.000092	2.68	19431.87	5656.66	0.10
Lower Reach	70.7	Design Flow	20000.00	15.64	47.50	26.75	47.59	0.000101	2.82	13001.25	1959.37	0.10
Lower Reach	70.5	Design Flow	20000.00	12.34	47.32	26.21	47.46	0.000172	3.36	11392.55	2310.64	0.12
Lower Reach	70.2	Design Flow	20000.00	15.44	47.15	26.82	47.24	0.000114	3.00	16993.46	4388.43	0.11
Lower Reach	69.50	Design Flow	20000.00	22.90	46.26	31.88	46.29	0.000120	1.82	19662.07	4248.75	0.08
Lower Reach	67.4	Design Flow	20000.00	15.84	44.67	25.37	44.83	0.000242	3.18	6323.42	435.41	0.13
Lower Reach	67.25	Design Flow	20000.00	13.14	44.41	24.45	44.65	0.000198	4.02	5797.43	908.49	0.15
Lower Reach	66.00	Design Flow	20000.00	10.20	43.89	22.41	43.91	0.000110	1.74	29071.80	8436.64	0.07
Lower Reach	64.7	Design Flow	20000.00	11.64	43.30	22.88	43.41	0.000115	3.03	17341.66	5893.02	0.11
Lower Reach	63.8	Design Flow	20000.00	7.84	43.00	22.81	43.05	0.000070	2.32	24573.87	4196.19	0.08
Lower Reach	62.5	Design Flow	20000.00	10.24	42.46	21.45	42.62	0.000073	3.48	11649.92	3010.16	0.12
Lower Reach	62.00	Design Flow	20000.00	9.90	42.26	21.03	42.35	0.000152	2.61	13685.91	3428.14	0.10
Lower Reach	61.3	Design Flow	20000.00	3.04	41.71	19.70	41.78	0.000183	2.37	16045.09	4190.42	0.10
Lower Reach	60.60	Design Flow	20000.00	6.40	41.15	19.12	41.27	0.000128	3.26	15301.23	4884.58	0.11
Lower Reach	59.9	Design Flow	20000.00	9.14	40.76	20.11	40.93	0.000089	3.50	9829.23	2742.62	0.13
Lower Reach	59	Design Flow	20000.00	4.14	40.41	20.23	40.53	0.000070	3.26	15730.22	3864.21	0.12
Lower Reach	58.8	Design Flow	20000.00	6.64	40.37	17.62	40.45	0.000048	2.56	18611.11	3543.69	0.09
Lower Reach	58.60	Design Flow	20000.00	2.90	40.26	17.16	40.34	0.000156	2.46	14106.37	2209.45	0.09
Lower Reach	58.3	Design Flow	20000.00	5.64	39.99	17.65	40.16	0.000109	3.27	6433.68	406.42	0.13
Lower Reach	57.7	Design Flow	20000.00	2.74	39.78	15.85	39.91	0.000063	3.05	10548.34	1517.50	0.10
Lower Reach	56.9	Design Flow	20000.00	7.54	39.46	17.55	39.57	0.000102	2.79	11132.20	1543.46	0.12
Lower Reach	56.7	Design Flow	20000.00	5.84	39.16	18.72	39.31	0.000168	3.11	6434.80	431.63	0.14
Lower Reach	56.1	Design Flow	20000.00	9.64	38.44	23.51	38.62	0.000322	3.47	5756.99	442.85	0.17
Lower Reach	55.5	Design Flow	20000.00	0.94	37.46	15.50	37.77	0.000256	4.46	4488.89	246.43	0.18
Lower Reach	55.25	Design Flow	20000.00	2.94	37.21	15.78	37.45	0.000136	4.02	5761.89	451.74	0.15
Lower Reach	55.23	Design Flow	20000.00	-0.16	37.23	14.75	37.41	0.000100	3.44	6461.19	444.75	0.13
Lower Reach	55.215		Bridge									
Lower Reach	55.21	Design Flow	20000.00	-0.16	37.18	14.75	37.36	0.000101	3.45	6438.46	441.93	0.13
Lower Reach	55.2	Design Flow	20000.00	-0.16	37.18	14.74	37.36	0.000101	3.45	6437.76	441.84	0.13
Lower Reach	54.5	Design Flow	20000.00	-1.46	36.94	15.87	37.05	0.000069	3.13	9262.18	722.23	0.11
Lower Reach	54.49	Design Flow	20000.00	4.94	36.84	18.63	37.03	0.000102	3.78	6768.89	492.73	0.13
Lower Reach	54.475		Bridge									
Lower Reach	54.47	Design Flow	20000.00	4.94	36.80	18.63	37.00	0.000103	3.79	6749.78	491.95	0.13
Lower Reach	54.46	Design Flow	20000.00	4.94	36.80	18.63	37.00	0.000103	3.79	6749.46	491.94	0.13
Lower Reach	54.45	Design Flow	20000.00	0.64	36.79	16.86	36.99	0.000092	3.80	6287.67	367.54	0.13
Lower Reach	54.435		Bridge									
Lower Reach	54.43	Design Flow	20000.00	0.64	36.74	16.86	36.95	0.000093	3.81	6270.75	367.36	0.13
Lower Reach	54.42	Design Flow	20000.00	0.64	36.74	16.86	36.95	0.000093	3.81	6270.40	367.36	0.13
Lower Reach	54.4	Design Flow	20000.00	-0.36	36.73	15.09	36.92	0.000116	3.59	6089.75	398.74	0.13
Lower Reach	54	Design Flow	20000.00	3.94	36.41	16.07	36.64	0.000099	4.09	6556.82	681.90	0.14
Lower Reach	53.2	Design Flow	20000.00	1.40	35.81	13.63	35.98	0.000291	3.42	9508.00	4281.67	0.13
Lower Reach	52.4	Design Flow	20000.00	-0.76	35.22	15.73	35.34	0.000095	3.14	11117.05	1519.27	0.12
Lower Reach	51.6	Design Flow	20000.00	4.64	34.66	16.40	34.82	0.000147	3.49	10088.77	2572.03	0.14
Lower Reach	51.51	Design Flow	20000.00	4.30	34.53	15.65	34.66	0.000291	2.97	9095.23	3312.63	0.12
Lower Reach	51.42	Design Flow	20000.00	4.88	34.55	13.79	34.58	0.000040	1.77	20062.11	3927.24	0.07
Lower Reach	51.405		Bridge									
Lower Reach	51.40	Design Flow	20000.00	4.88	34.54	13.79	34.57	0.000040	1.76	20469.57	3927.18	0.07
Lower Reach	50.8	Design Flow	20000.00	1.94	34.31	14.98	34.38	0.000103	2.34	17417.76	4997.27	0.11
Lower Reach	49.6	Design Flow	20000.00	-1.96	33.82	12.07	33.90	0.000079	2.53	17464.73	5456.35	0.10
Lower Reach	49.00	Design Flow	20000.00	1.22	33.29	14.21	33.40	0.000346	2.87	9182.04	6004.69	0.13
Lower Reach	48.4	Design Flow	20000.00	0.64	32.39	13.90	32.56	0.000171	3.42	9320.14	3657.97	0.15
Lower Reach	47.9	Design Flow	20000.00	5.24	32.05	14.24	32.26	0.000159	3.68	7150.60	2303.93	0.16
Lower Reach	47.8	Design Flow	20000.00	9.04	31.99	17.08	32.22	0.000269	3.97	6544.06	2300.00	0.19
Lower Reach	47.7	Design Flow	20000.00	-0.26	31.84	12.55	32.05	0.000184	3.69	6732.05	2289.81	0.15
Lower Reach	47.55	Design Flow	20000.00	-2.90	31.79	6.79	31.86	0.000039	2.27	14903.71	3926.10	0.10
Lower Reach	47.4	Design Flow	20000.00	-3.66	31.63	10.65	31.75	0.000081	2.80	8992.92	3354.80	0.14
Lower Reach	47.10	Design Flow	20000.00	-4.30	31.56	7.88	31.65	0.000050	2.41	14031.07	3970.28	0.12
Lower Reach	46.8	Design Flow	20000.00	-3.16	31.35	10.24	31.51	0.000196	3.22	7870.64	3322.48	0.15
Lower Reach	46.4	Design Flow	20000.00	-1.16	30.55	12.28	30.79	0.000340	3.94	5077.31	385.67	0.19
Lower Reach	45.7	Design Flow	20000.00	-5.30	30.37	7.39	30.48	0.000041	2.77	16927.25	3924.78	0.11
Lower Reach	45	Design Flow	20000.00	-10.16	30.17	7.18	30.28	0.000114	2.71	7769.70	678.00	0.12
Lower Reach	44	Design Flow	20000.00	-4.06	29.24	9.79	29.51	0.000215	4.23	5182.53	774.76	0.17
Lower Reach	43.2	Design Flow	20000.00	-4.60	28.48	7.85	28.60	0.000194	2.97	9882.20	5945.05	0.11
Lower Reach	42.4	Design Flow	20000.00	-4.36	27.33	9.10	27.63	0.000260	4.40	4682.48	439.34	0.19
Lower Reach	42	Design Flow	20000.00	-2.70	27.24	6.55	27.29	0.000085	2.25	22639.56	7661.62	0.09
Lower Reach	40.3	Design Flow	20000.00	-6.26	25.98	7.89	26.13	0.000279	3.29	8113.19	1775.26	0.15
Lower Reach	39.8	Design Flow	20000.00	-5.42	25.24	5.63	25.39	0.000257	3.05	7718.30	5107.72	0.13

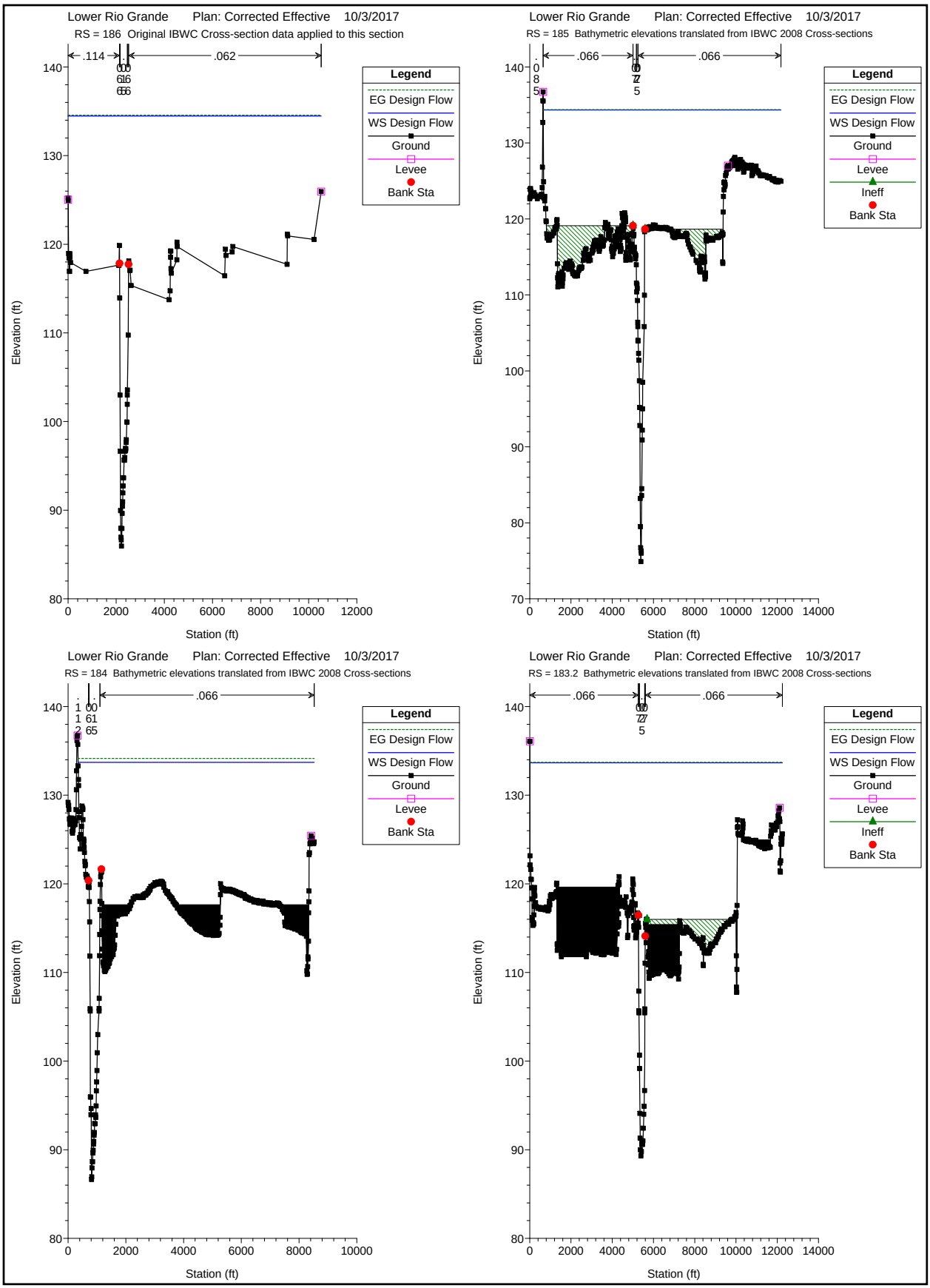
HEC-RAS Plan: Duplicate Effective River: Rio Grande Reach: Lower Reach Profile: Design Flow (Continued)

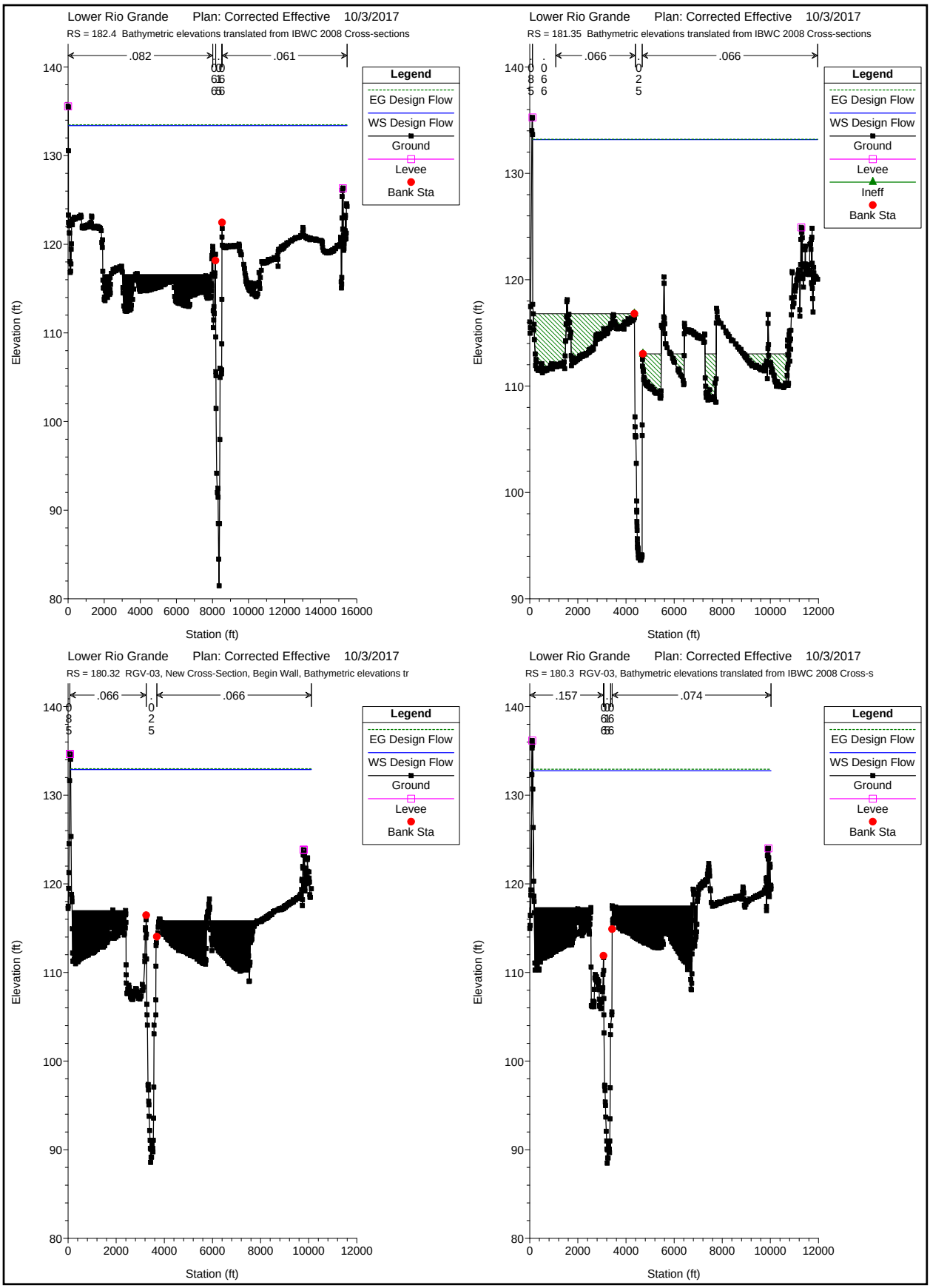
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	38.9	Design Flow	20000.00	-8.16	24.35	7.39	24.53	0.000143	3.52	6808.01	631.49	0.14
Lower Reach	37.6	Design Flow	20000.00	-5.98	23.61	5.47	23.66	0.000102	1.98	13910.28	6571.07	0.08
Lower Reach	36.3	Design Flow	20000.00	-7.16	22.43	5.25	22.72	0.000169	4.43	4935.70	395.80	0.18
Lower Reach	34.9	Design Flow	20000.00	-4.60	21.35	5.33	21.40	0.000202	2.31	17921.53	3533.59	0.11
Lower Reach	34	Design Flow	20000.00	-8.16	20.00	4.20	20.29	0.000303	4.38	4563.57	320.12	0.20
Lower Reach	32.10	Design Flow	20000.00	-9.40	18.50	4.32	18.64	0.000107	2.95	6790.41	2795.96	0.15
Lower Reach	31.2	Design Flow	20000.00	-8.96	17.46	3.88	17.92	0.000229	5.50	3877.72	309.79	0.23
Lower Reach	29.6	Design Flow	20000.00	-5.30	14.70	4.36	15.05	0.000553	4.74	4216.06	1595.27	0.23
Lower Reach	28	Design Flow	20000.00	-6.66	5.52	3.02	7.66	0.001502	11.74	1703.80	173.23	0.66

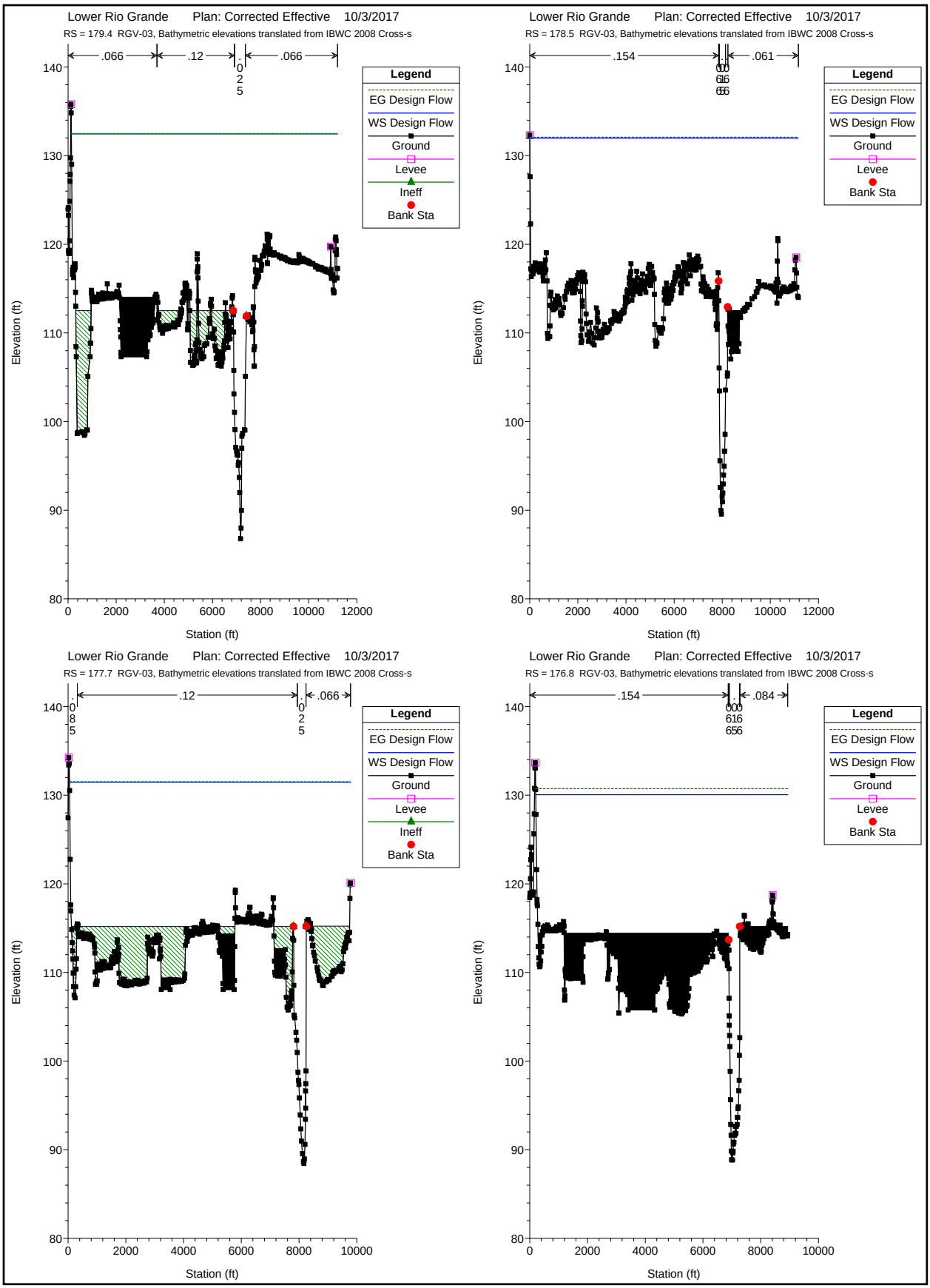
- **Penitas to Hidalgo-Cameron County Line Corrected Effective HEC-RAS Model**

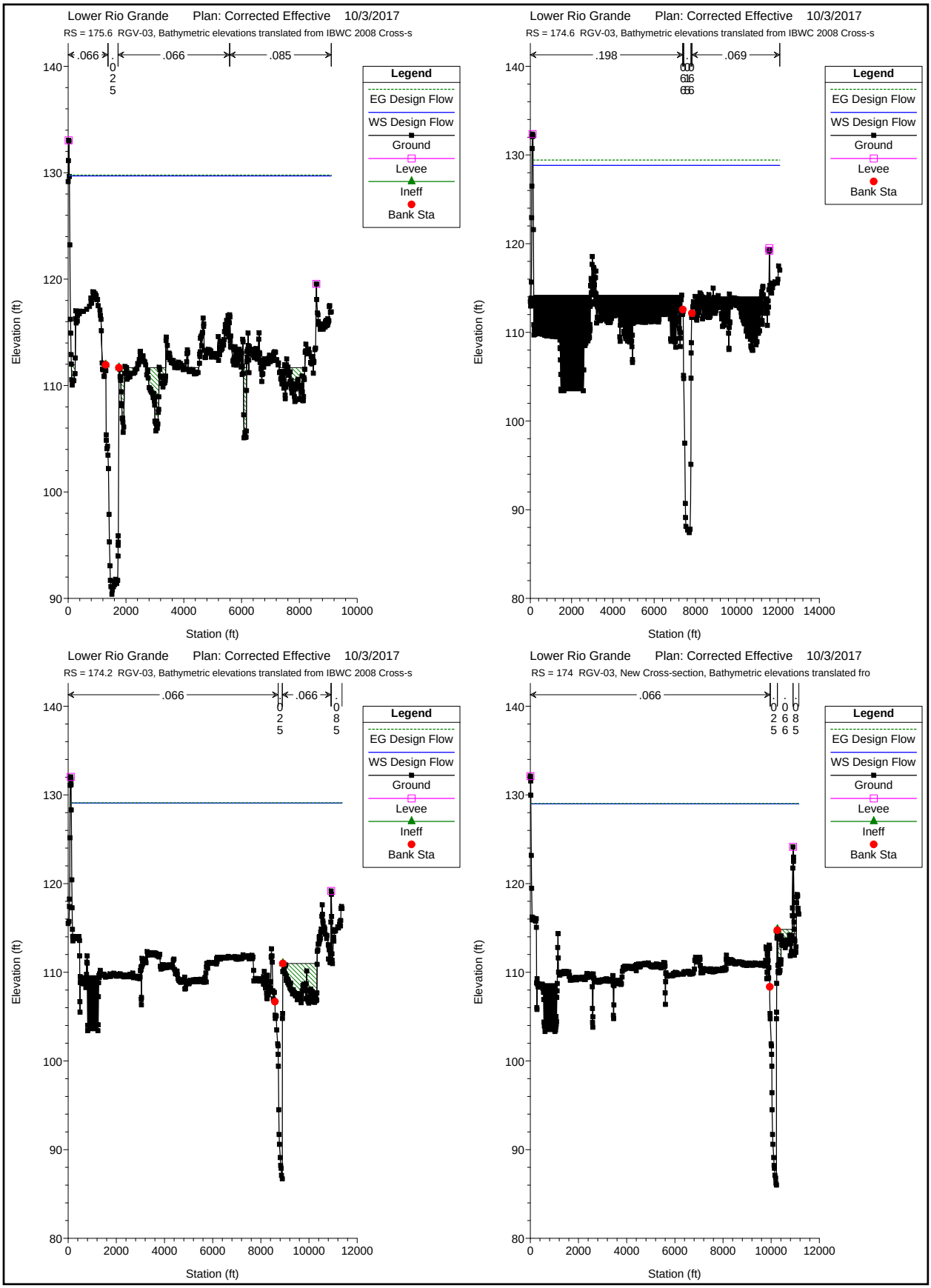

Corrected Effective
186
185
183.40*
182.05*
181.35
180.08*
178.23*
Lower Reach
171.8
170.83*
169.9
168
161.4
161.35
161.3
157.2
155.36
152.25*
145.67*
140
138.69*
134.65
129.2
127.7
124.60*
122.83*
118.50*
115.45*
114.47*

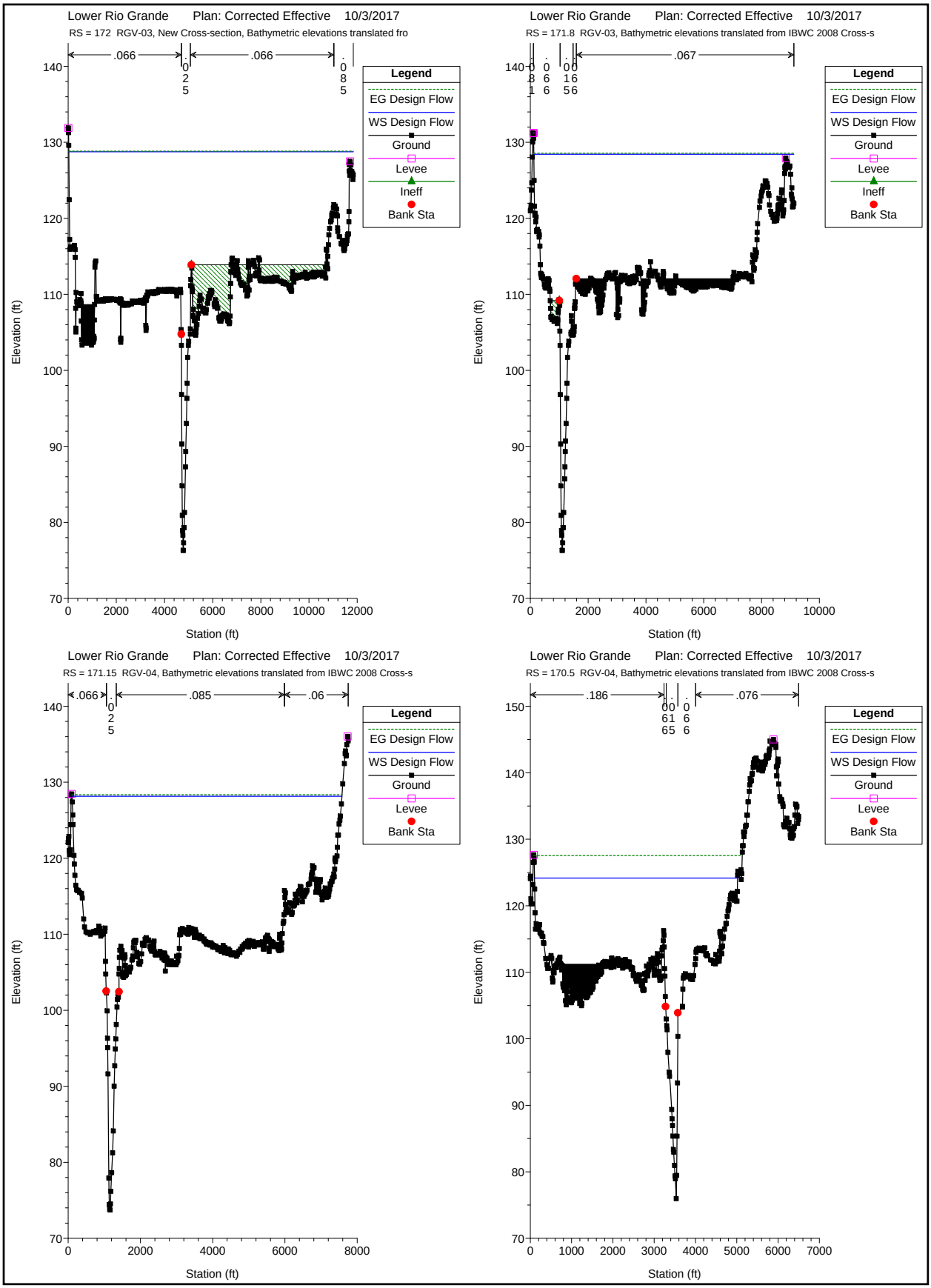

Lower Rio Grande Plan: Corrected Effective 10/3/2017
Rio Grande Lower Reach
Legend
EG Design Flow
WS Design Flow
Ground
Left Levee
Right Levee
Elevation (ft)
Main Channel Distance (ft)
160
140
120
100
80
60
40
20
0
100000
200000
300000
400000
114.1
115.7
117.87
119.75*
121.13*
123.48*
125
127.05*
129.03
131.35
133.38*
136
137.14
139.01
140.74
142.5
144.55
146.34*
149
151.7
153.61
155.7
157.2
159
161.4
165
167.4
169.49
171.15
173.33*
175.27*
177.10*
179.10*
180.66*
182.60*
184

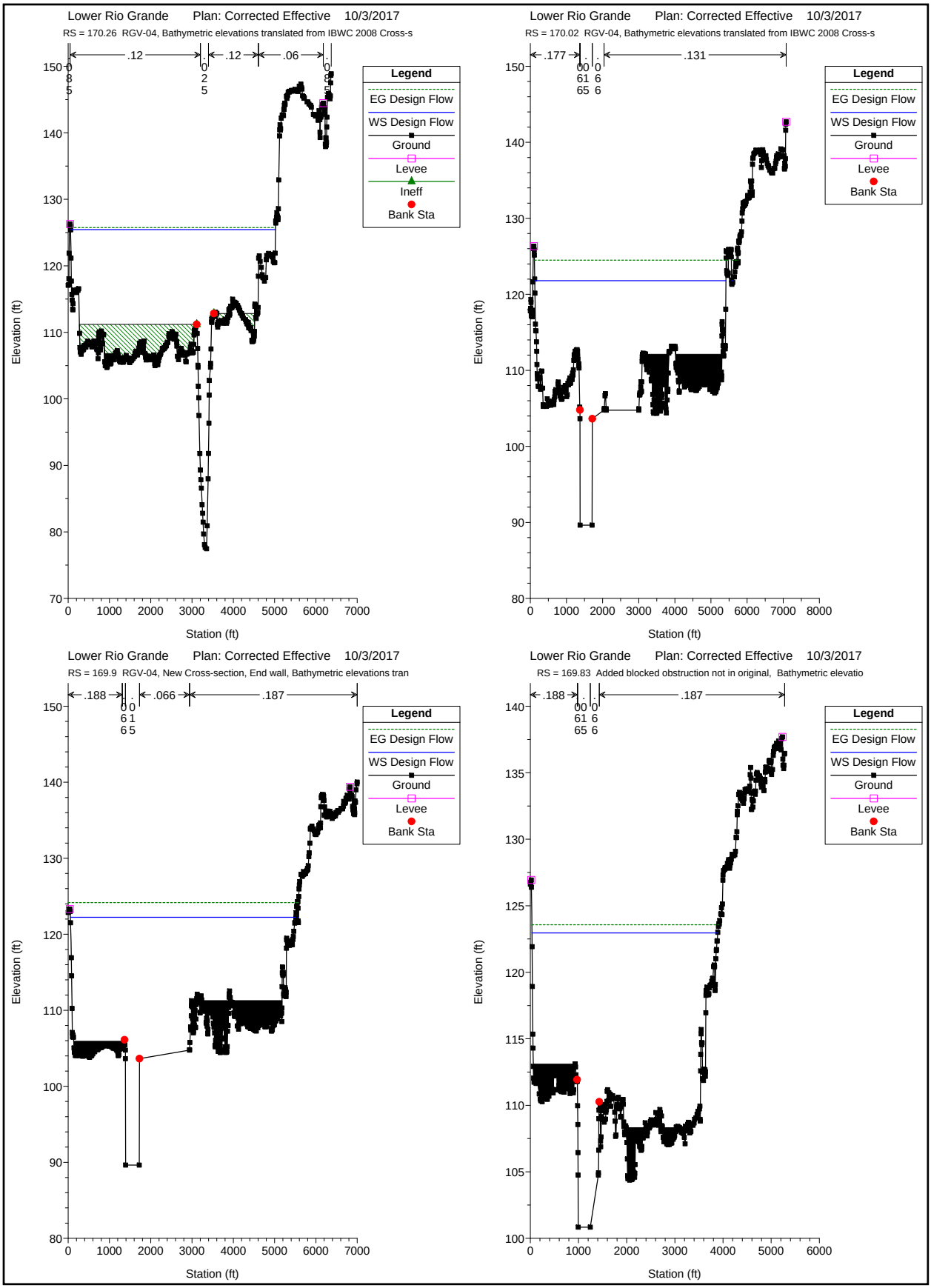

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 186 Original IBWC Cross-section data applied to this section
.114
.062
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 185 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 184 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 183.2 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

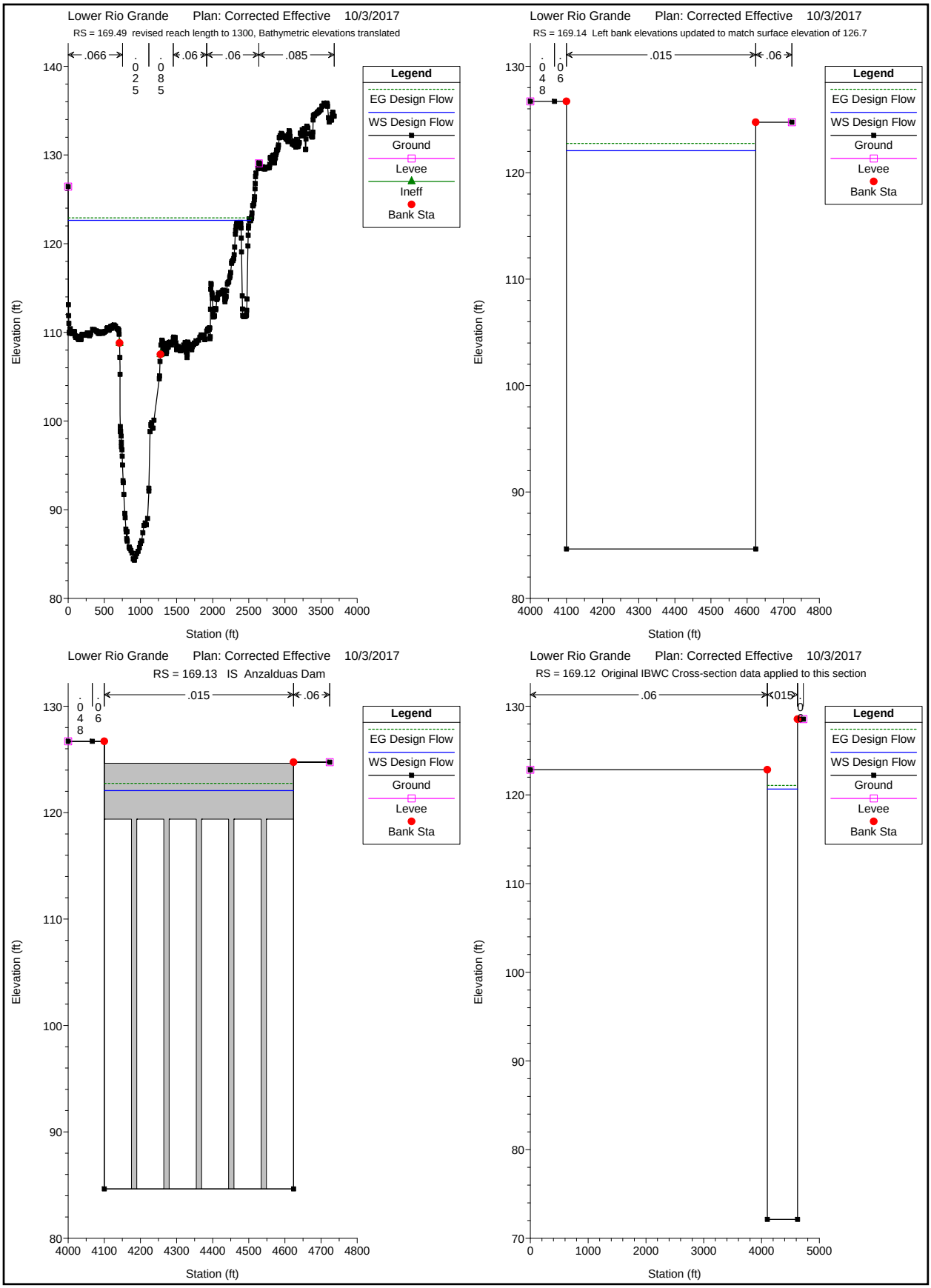

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 182.4 Bathymetric elevations translated from IBWC 2008 Cross-sections
.082
.061
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 181.35 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 180.32 RGV-03, New Cross-Section, Begin Wall, Bathymetric elevations tr
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 180.3 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.157
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

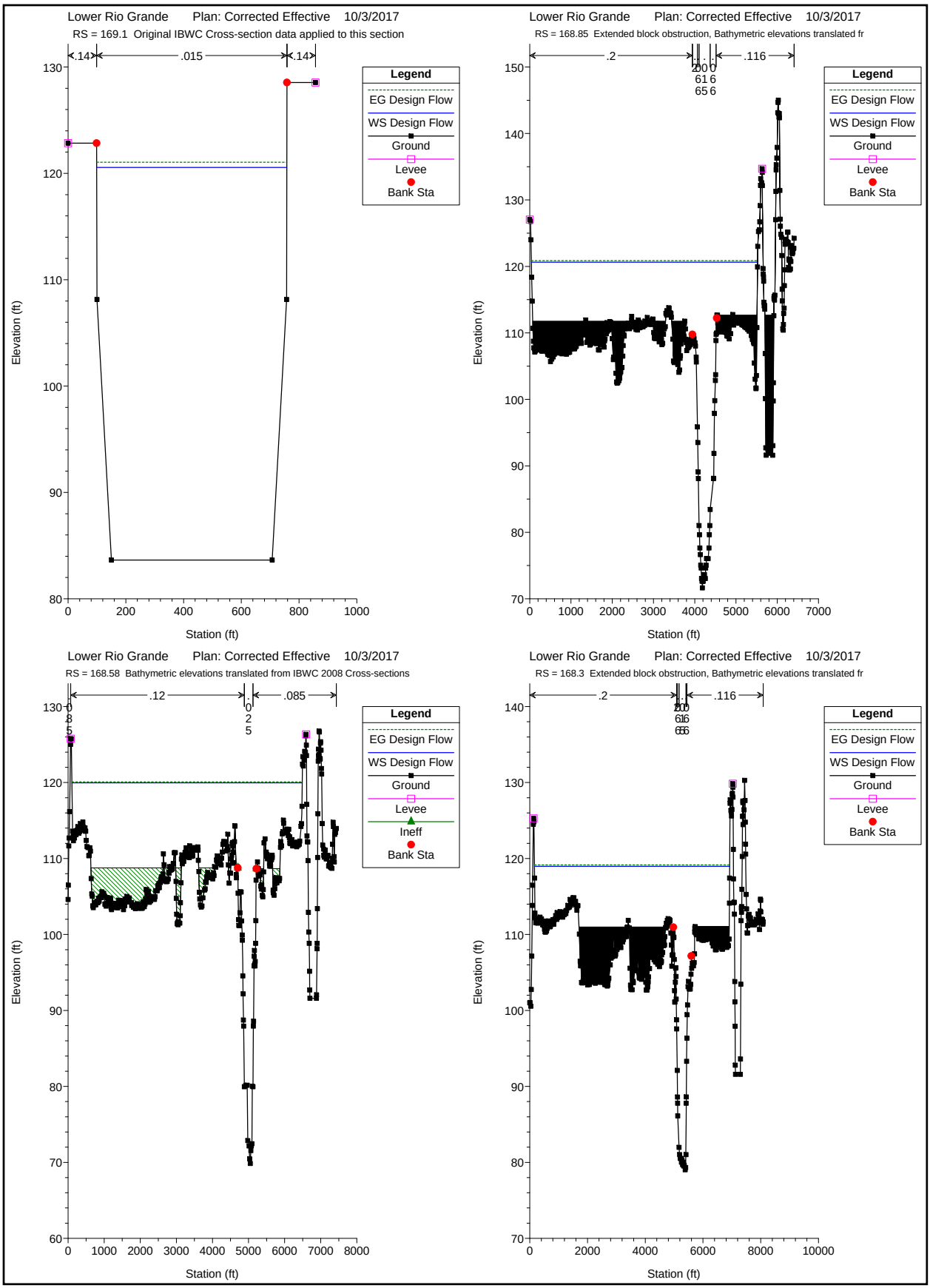

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 179.4 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.12
.025
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 178.5 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.154
.061
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 177.7 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.085
.12
.025
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 176.8 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.154
.084
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

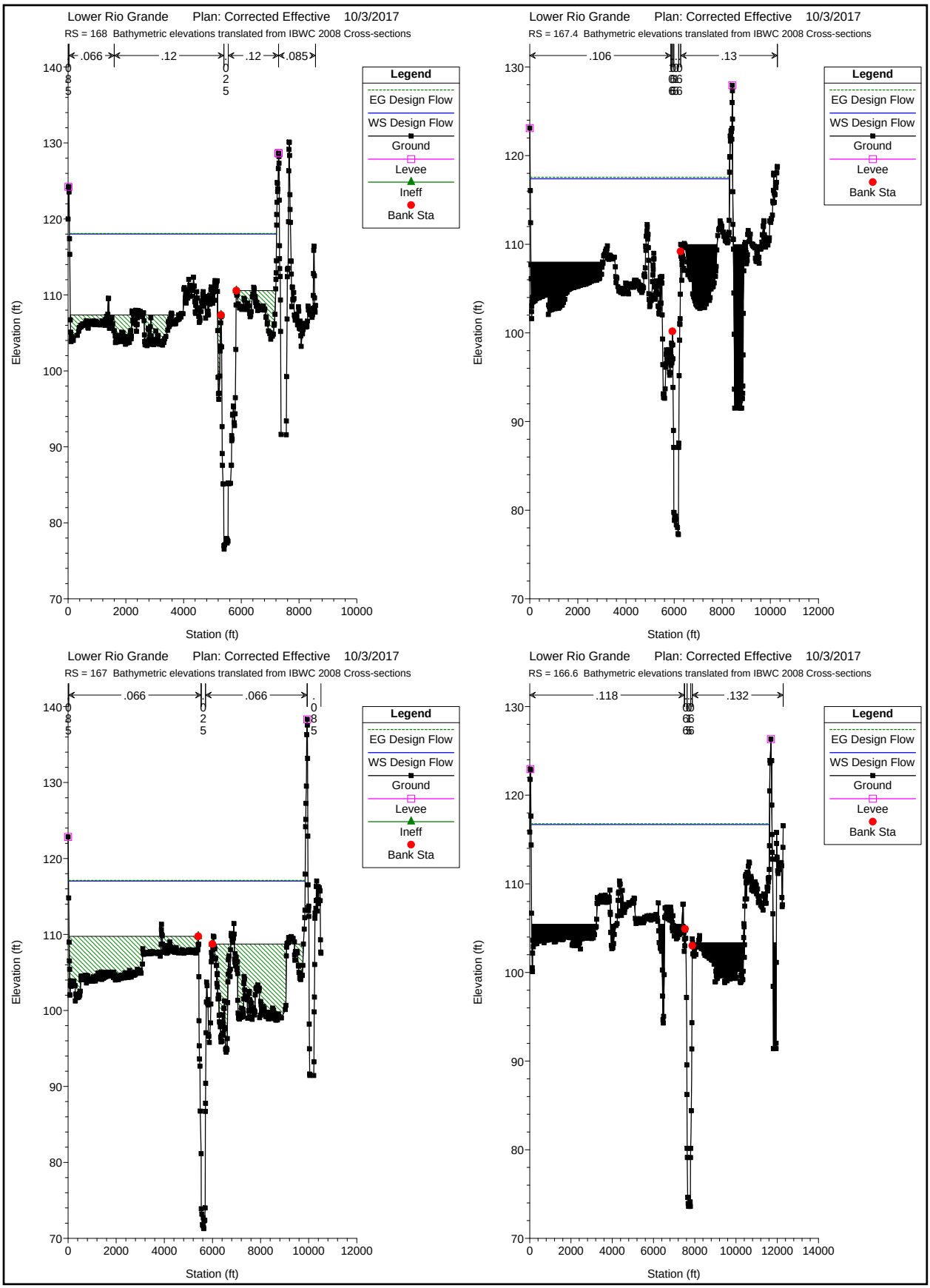

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 175.6 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.066
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 174.6 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.198
.069
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 174.2 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 174 RGV-03, New Cross-section, Bathymetric elevations translated fro
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

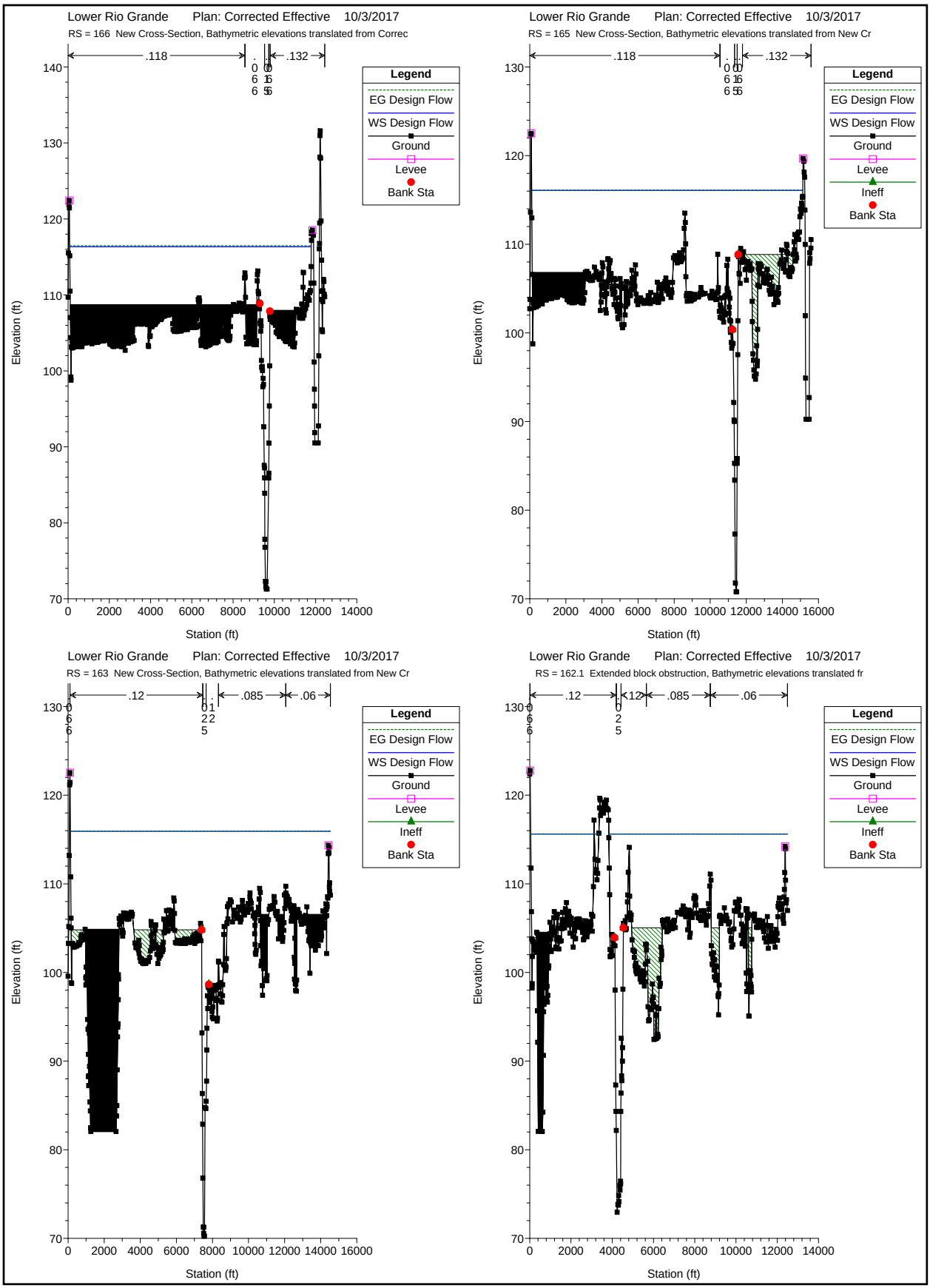

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 172 RGV-03, New Cross-section, Bathymetric elevations translated fro
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 171.8 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 171.15 RGV-04, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.085
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 170.5 RGV-04, Bathymetric elevations translated from IBWC 2008 Cross-s
.186
.076
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

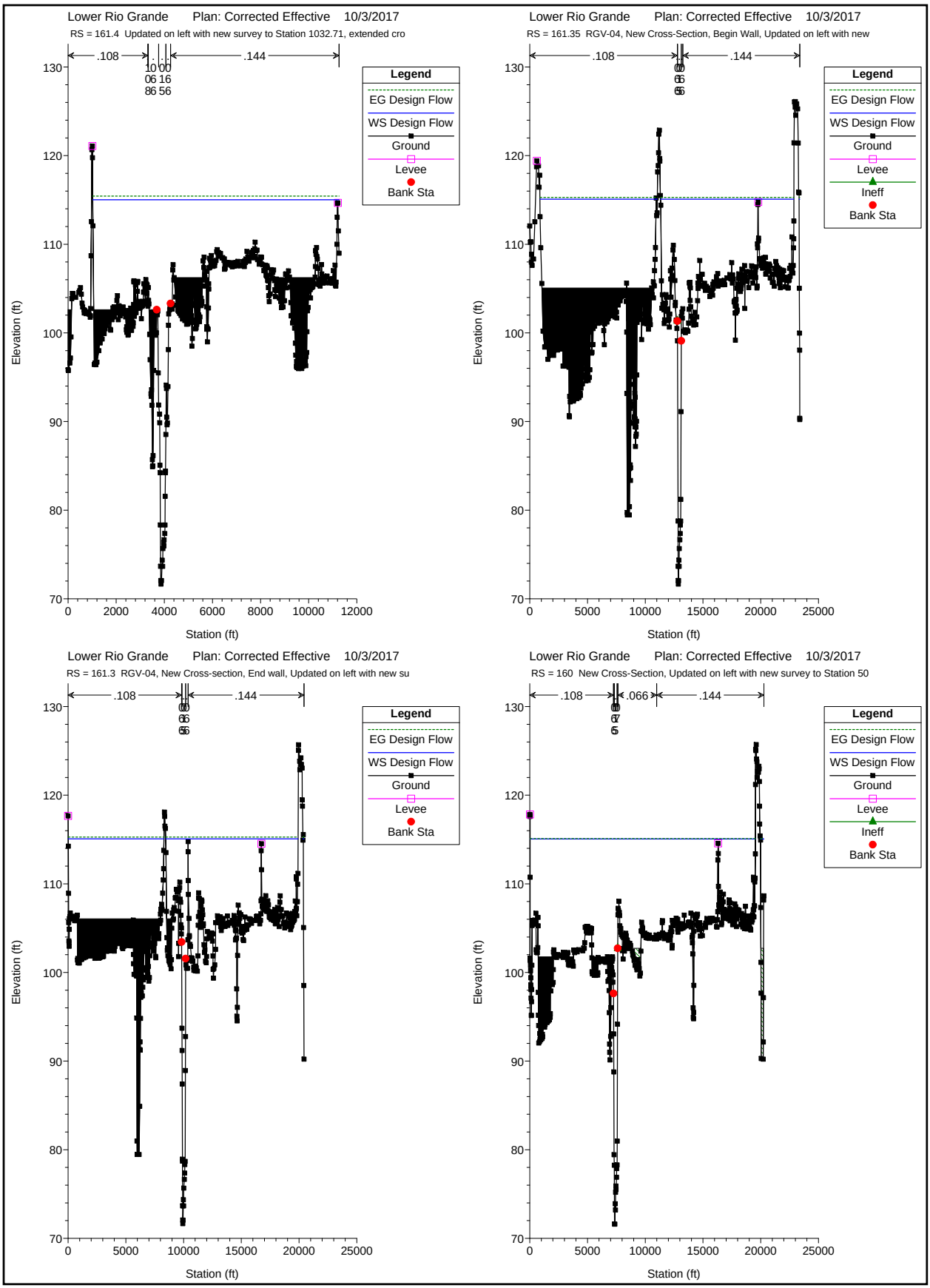

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 170.26 RGV-04, Bathymetric elevations translated from IBWC 2008 Cross-s
.12
.12
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 170.02 RGV-04, Bathymetric elevations translated from IBWC 2008 Cross-s
.177
.131
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 169.9 RGV-04, New Cross-section, End wall, Bathymetric elevations tran
.188
.066
.187
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 169.83 Added blocked obstruction not in original, Bathymetric elevatio
.188
.187
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

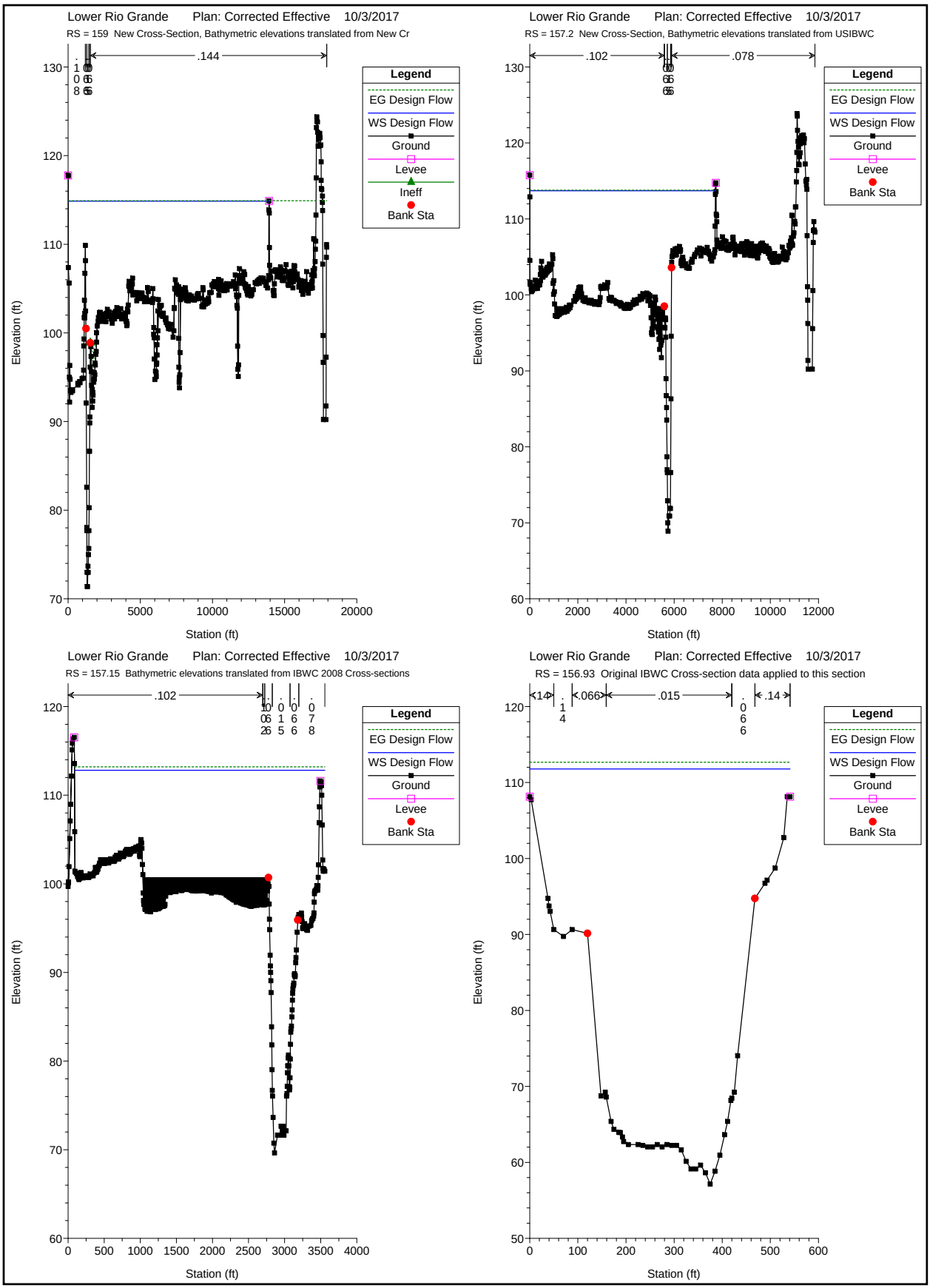

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 169.49 revised reach length to 1300, Bathymetric elevations translated
.066
.025
.085
.06
.06
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 169.14 Left bank elevations updated to match surface elevation of 126.7
.048
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 169.13 IS Anzalduas Dam
.048
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 169.12 Original IBWC Cross-section data applied to this section
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

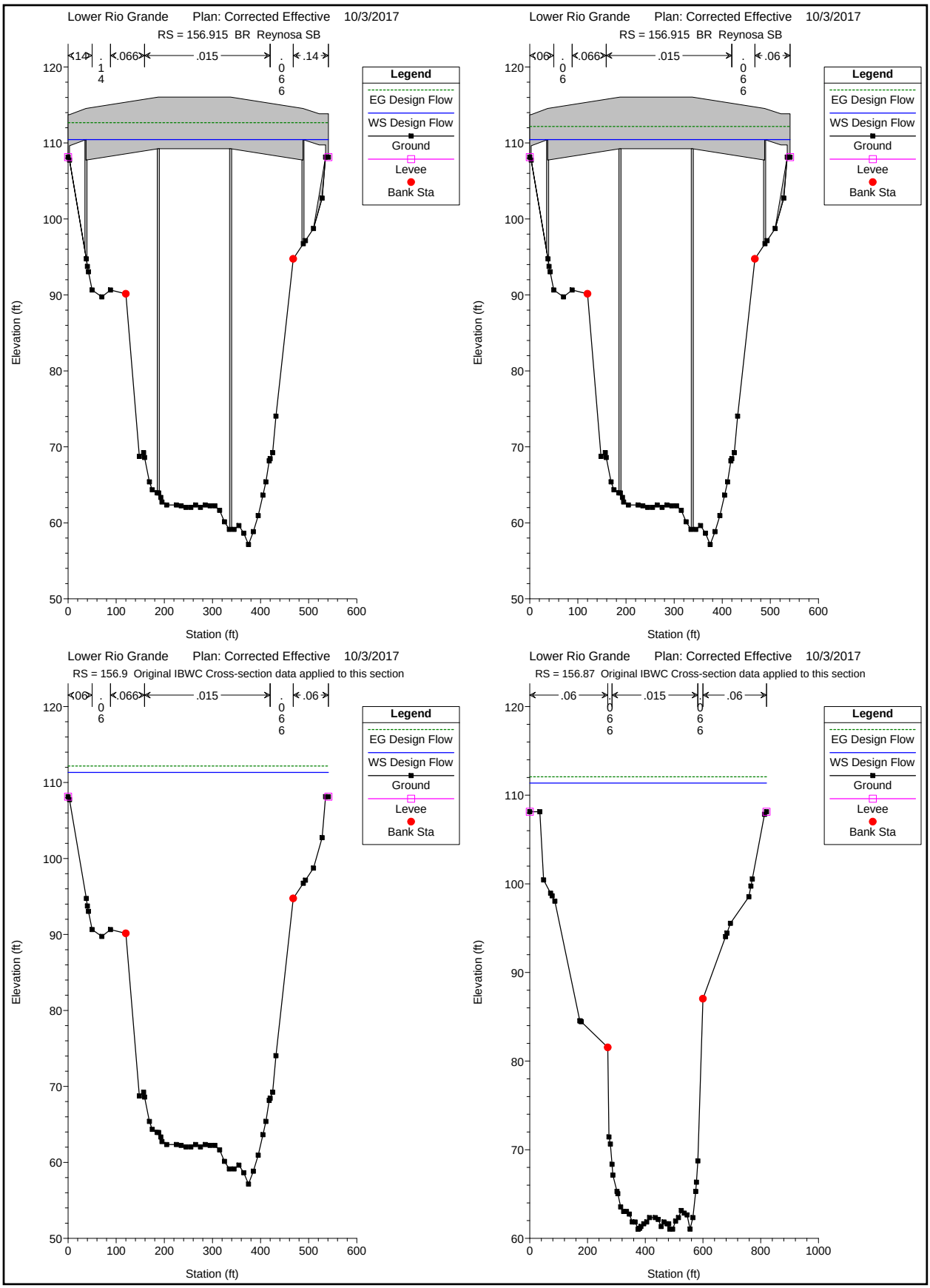

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 169.1 Original IBWC Cross-section data applied to this section
.14
.015
.14
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 168.85 Extended block obstruction, Bathymetric elevations translated fr
.2
.116
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 168.58 Bathymetric elevations translated from IBWC 2008 Cross-sections
.12
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 168.3 Extended block obstruction, Bathymetric elevations translated fr
.2
.116
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

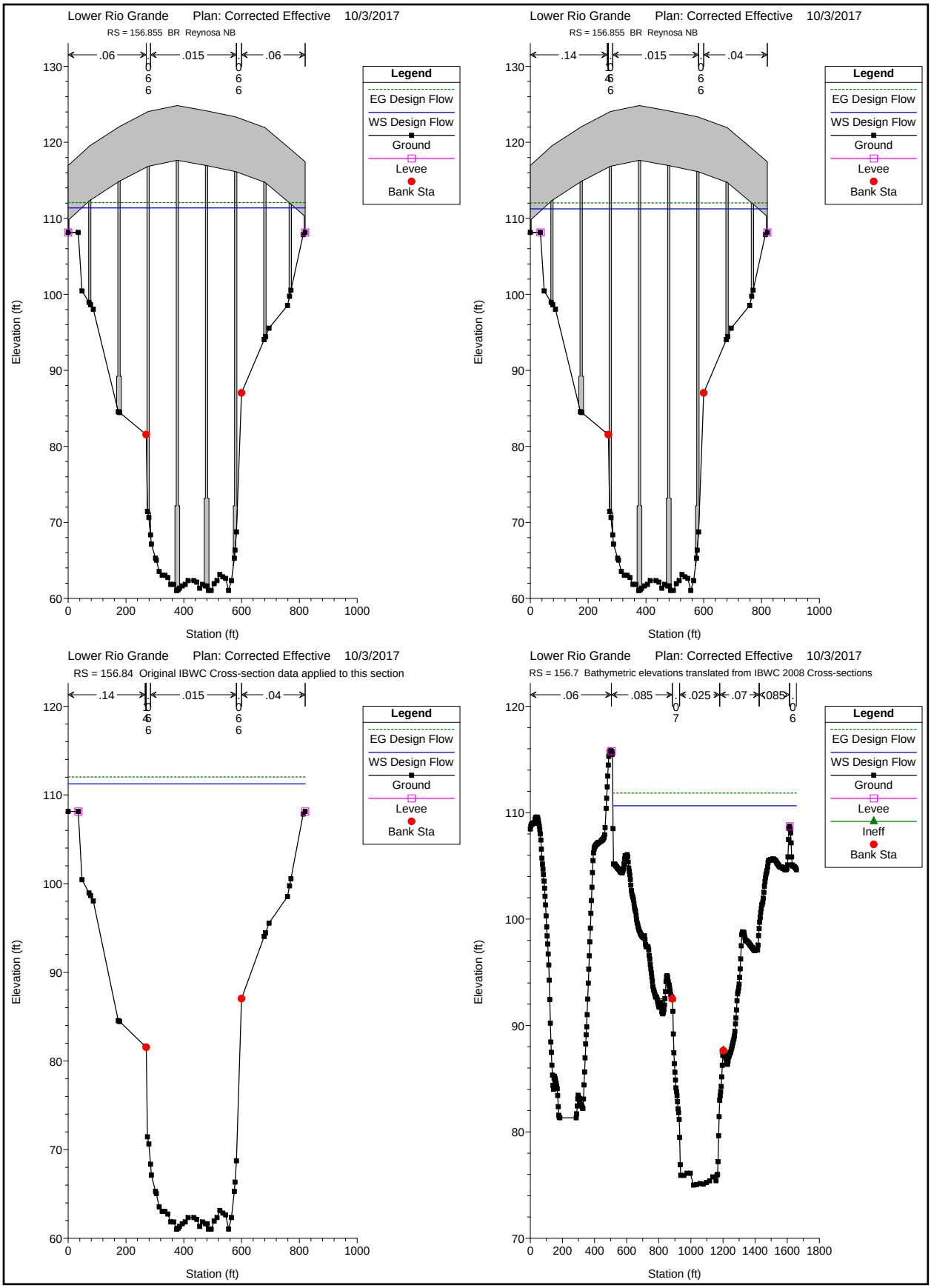

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 168 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.12
.12
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 167.4 Bathymetric elevations translated from IBWC 2008 Cross-sections
.106
.13
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 167 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 166.6 Bathymetric elevations translated from IBWC 2008 Cross-sections
.118
.132
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

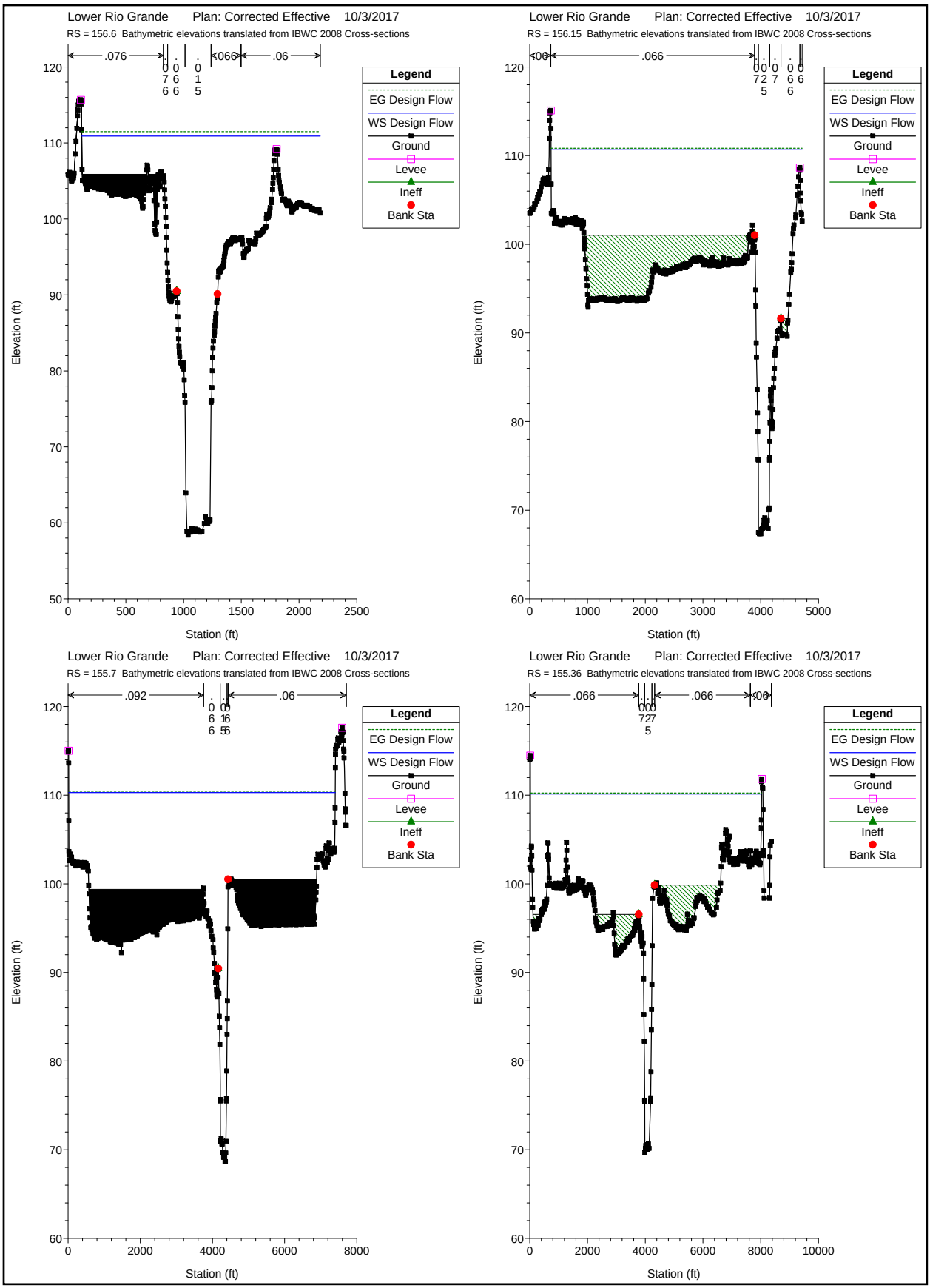

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 166 New Cross-Section, Bathymetric elevations translated from Correc
.118
.132
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 165 New Cross-Section, Bathymetric elevations translated from New Cr
.118
.132
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 163 New Cross-Section, Bathymetric elevations translated from New Cr
.12
.085
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 162.1 Extended block obstruction, Bathymetric elevations translated fr
.12
.12
.085
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

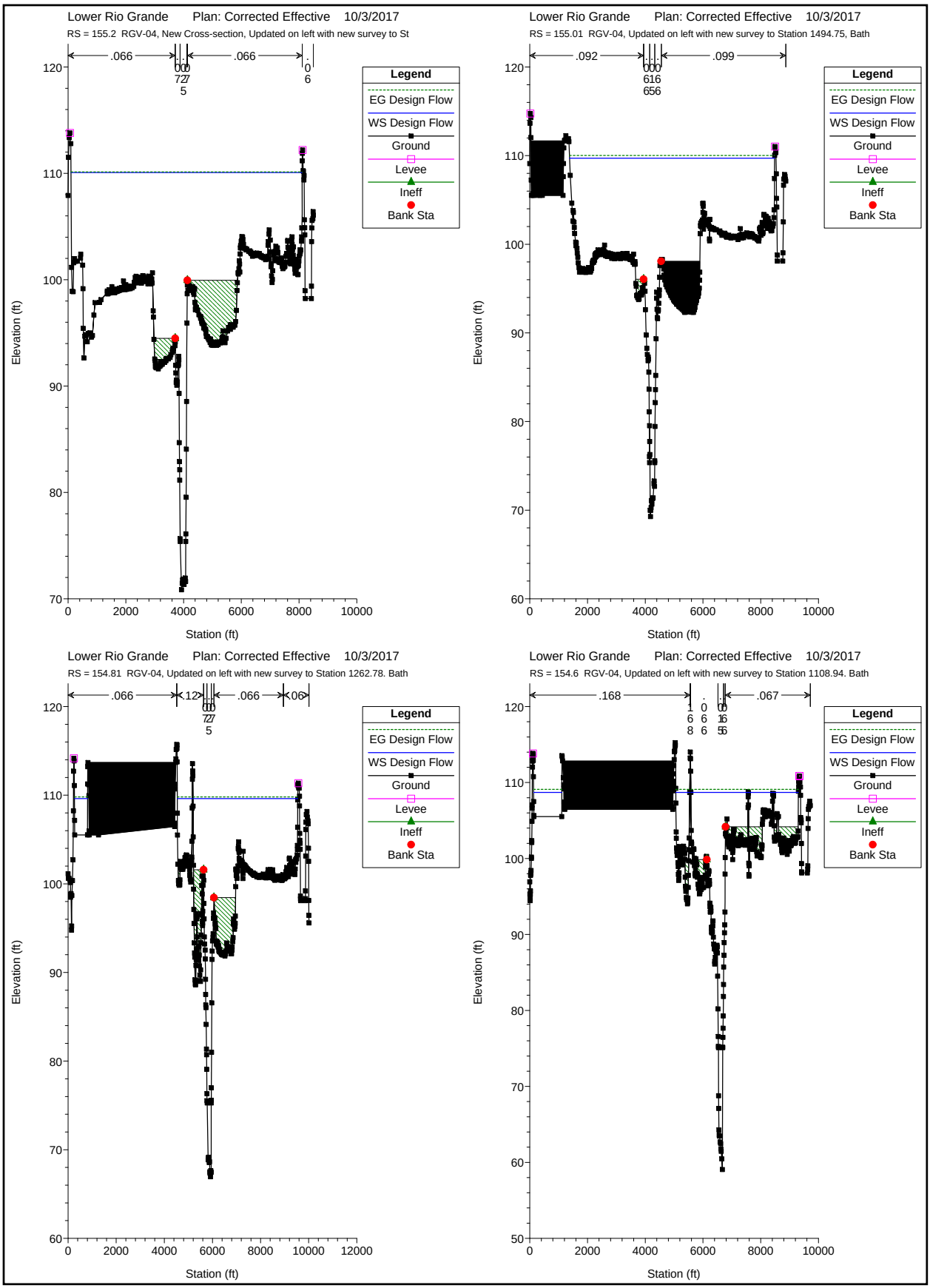

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 161.4 Updated on left with new survey to Station 1032.71, extended cro
.108
.144
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 161.35 RGV-04, New Cross-Section, Begin Wall, Updated on left with new
.108
.144
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 161.3 RGV-04, New Cross-section, End wall, Updated on left with new su
.108
.144
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 160 New Cross-Section, Updated on left with new survey to Station 50
.108
.066
.144
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

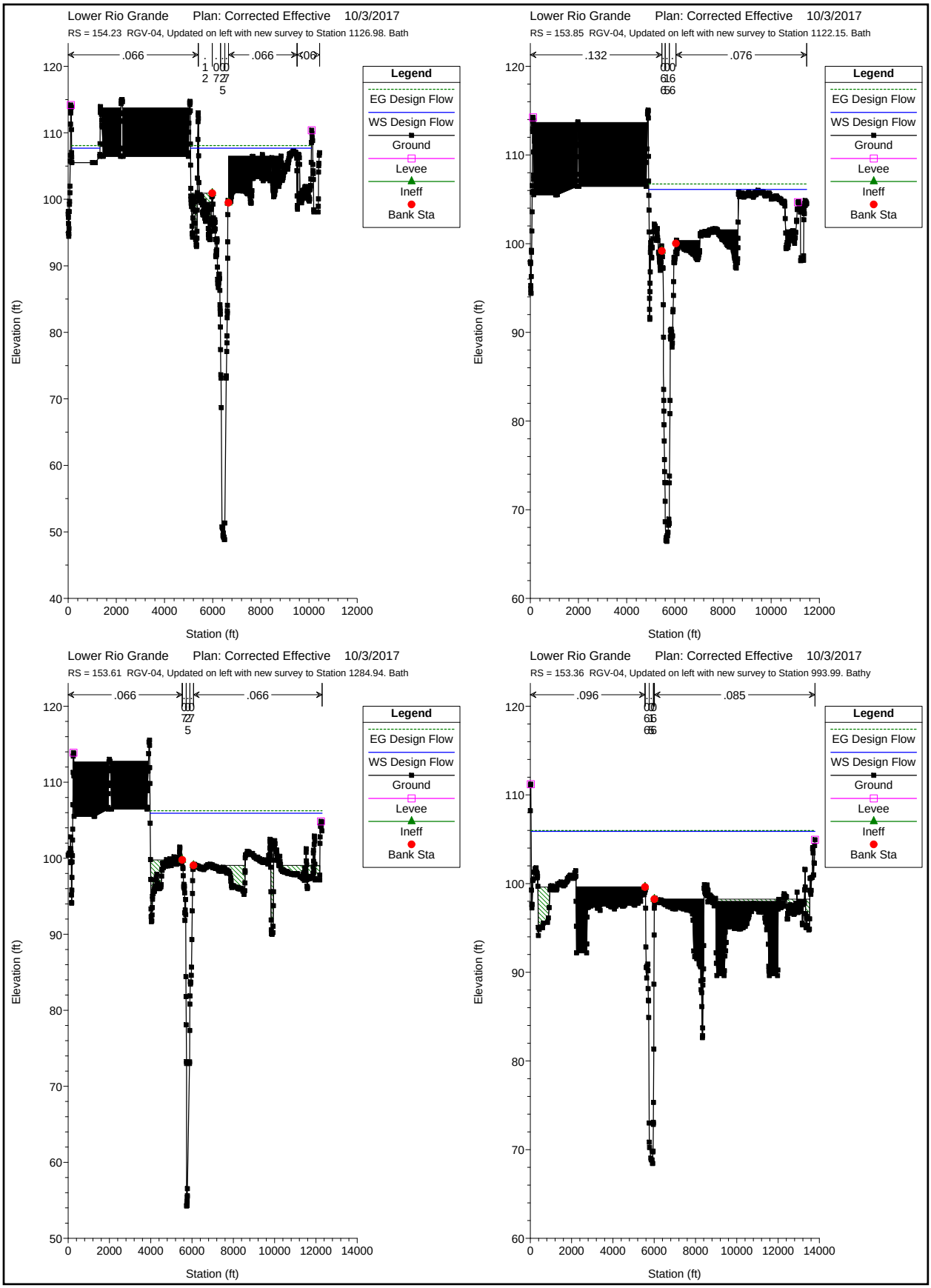

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 159 New Cross-Section, Bathymetric elevations translated from New Cr
.144
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 157.2 New Cross-Section, Bathymetric elevations translated from USIBWC
.102
.078
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 157.15 Bathymetric elevations translated from IBWC 2008 Cross-sections
.102
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.93 Original IBWC Cross-section data applied to this section
.14
.066
.015
.14
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

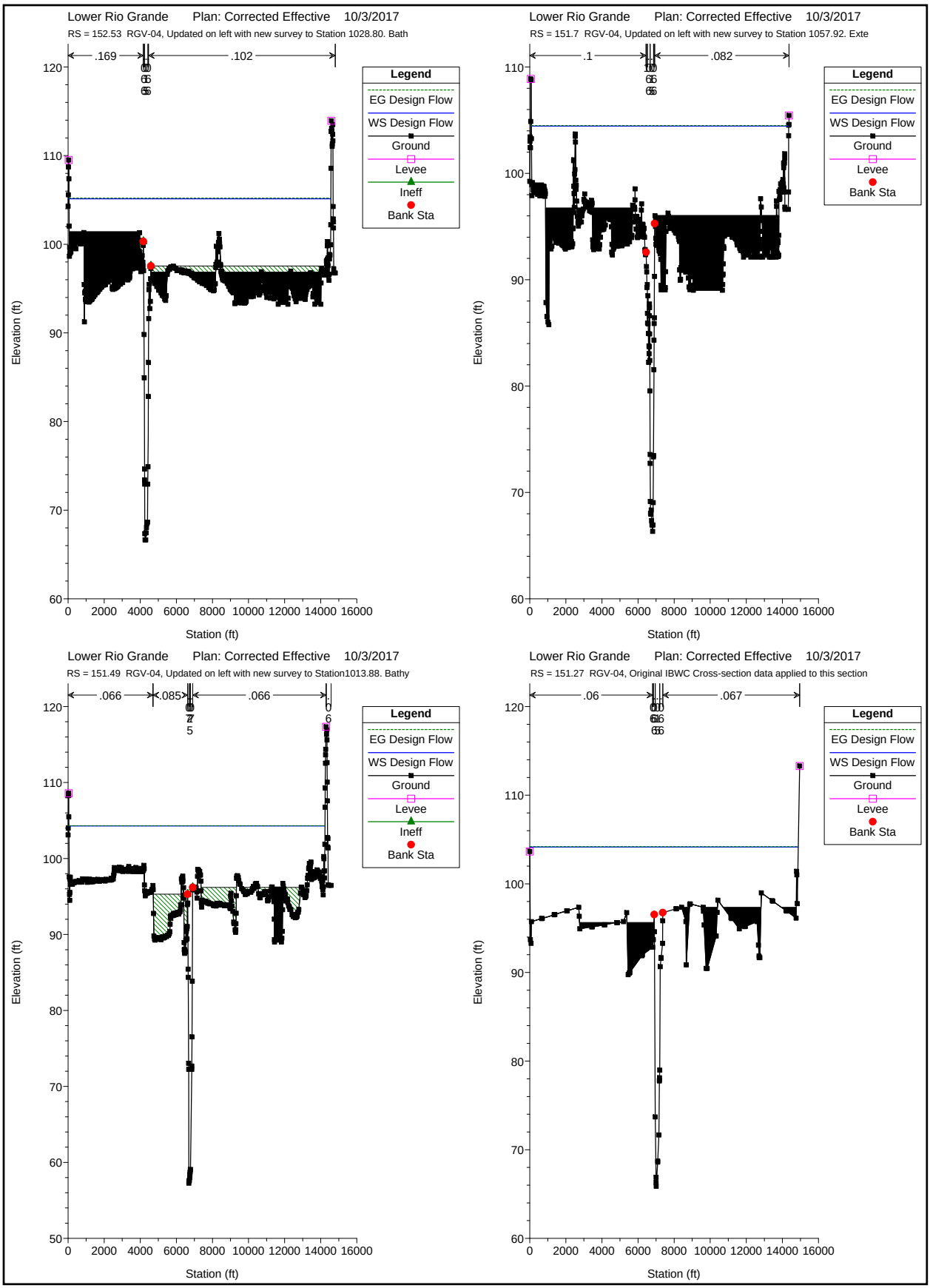

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.915 BR Reynosa SB
.14
.066
.015
.14
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.915 BR Reynosa SB
.06
.066
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.9 Original IBWC Cross-section data applied to this section
.06
.066
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.87 Original IBWC Cross-section data applied to this section
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

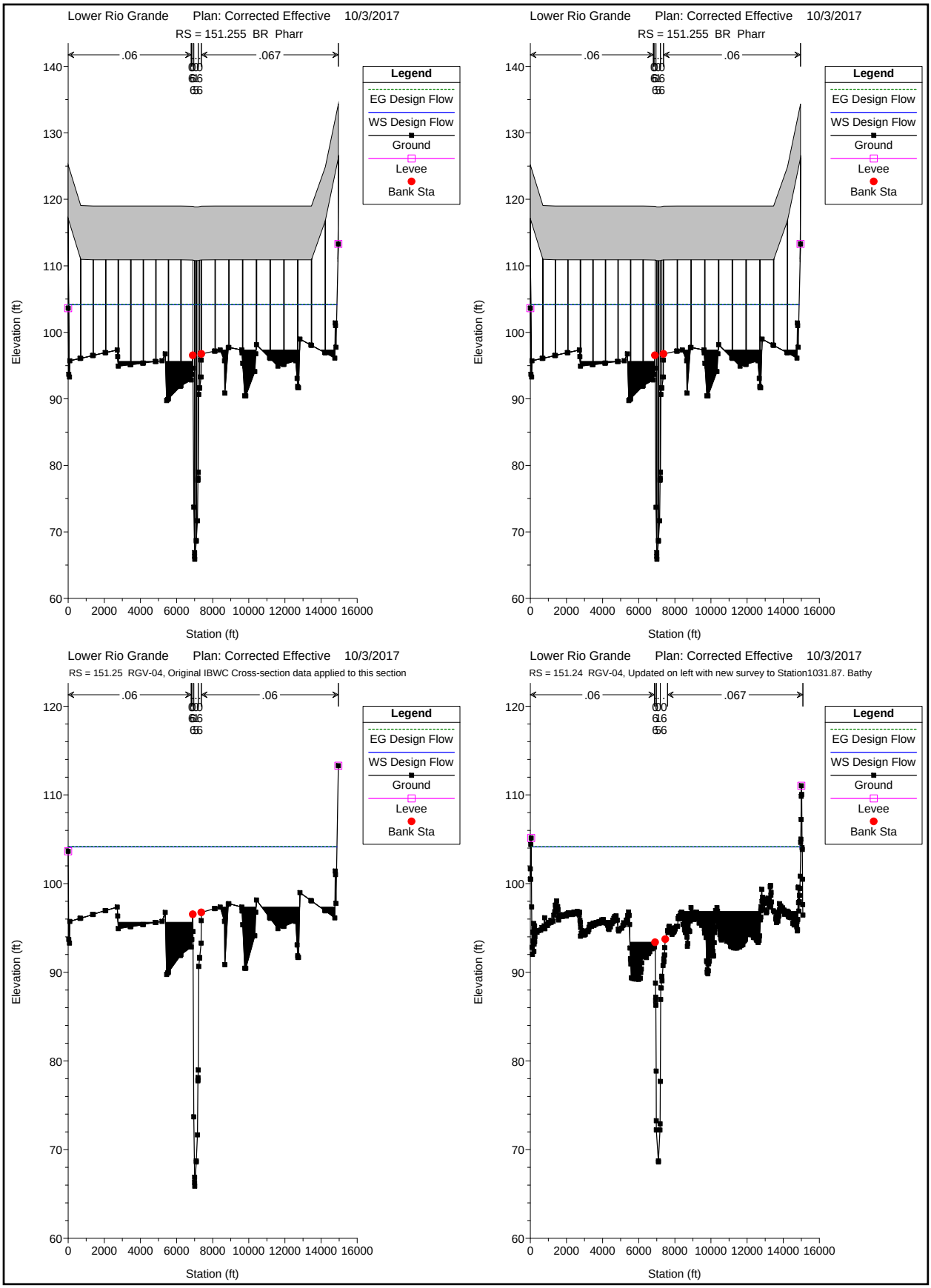

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.855 BR Reynosa NB
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.855 BR Reynosa NB
.14
.015
.04
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.84 Original IBWC Cross-section data applied to this section
.14
.015
.04
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.7 Bathymetric elevations translated from IBWC 2008 Cross-sections
.06
.085
.025
.07
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

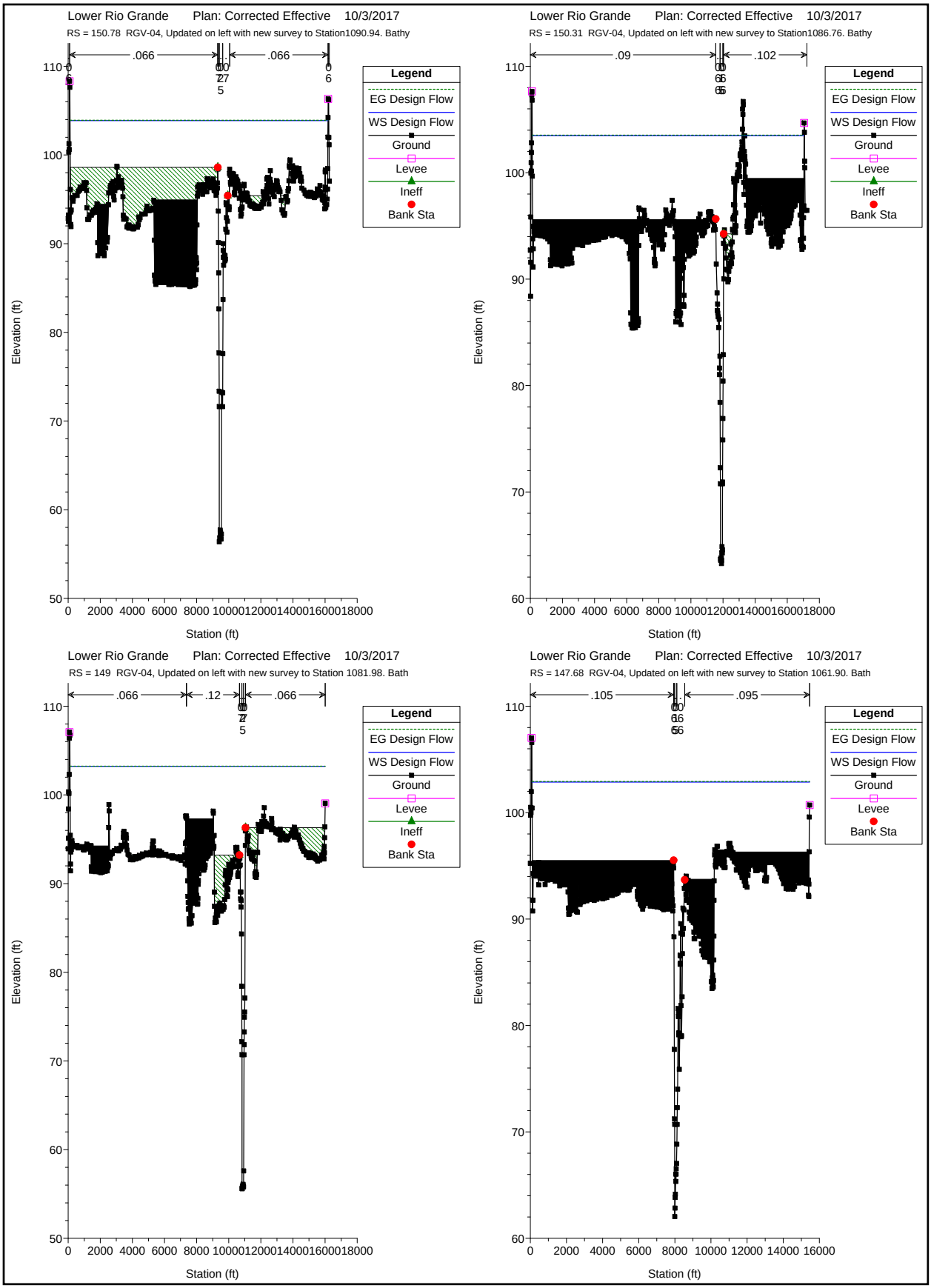

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.6 Bathymetric elevations translated from IBWC 2008 Cross-sections
.076
.066
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 156.15 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 155.7 Bathymetric elevations translated from IBWC 2008 Cross-sections
.092
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 155.36 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

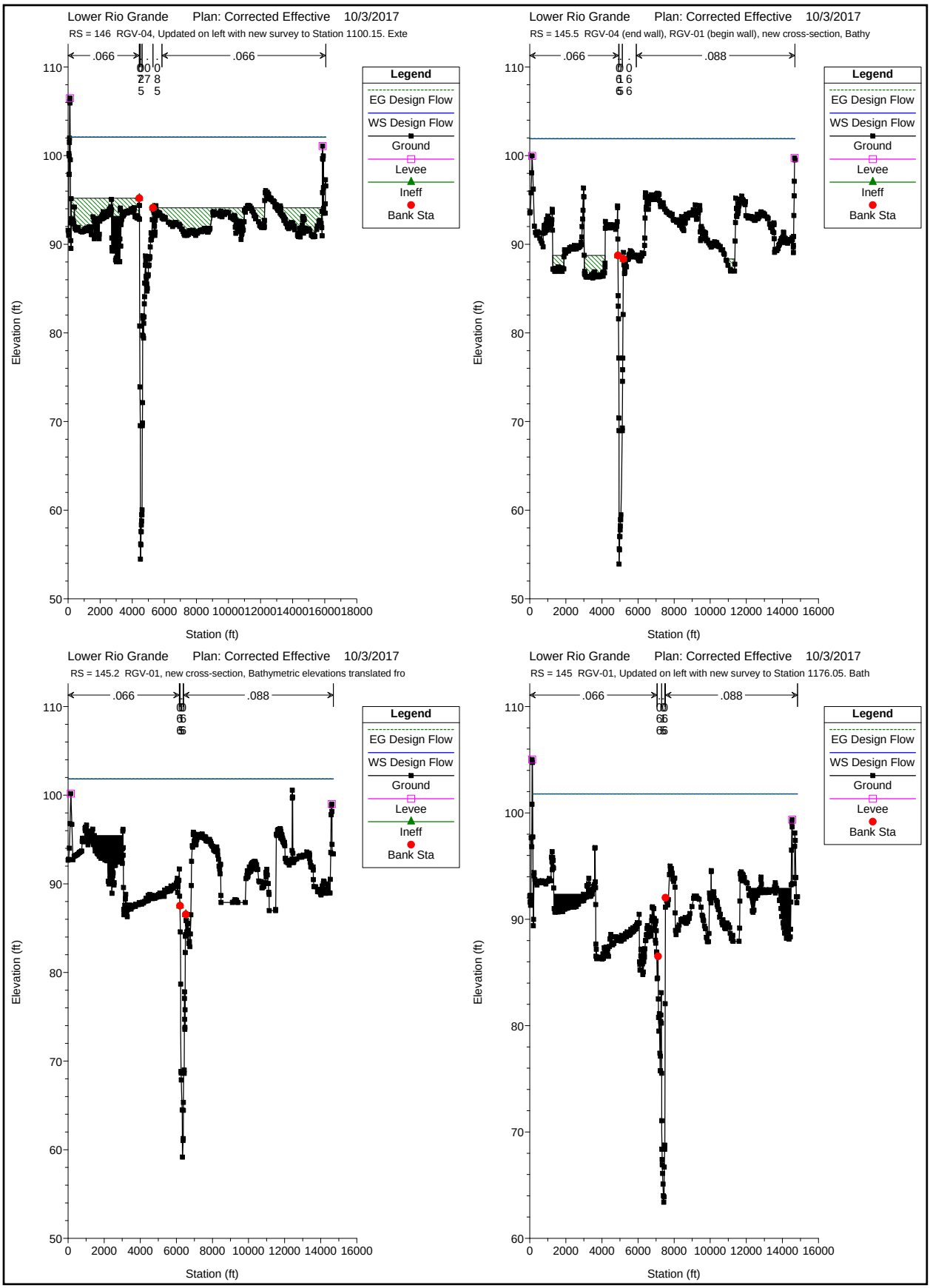

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 155.2 RGV-04, New Cross-section, Updated on left with new survey to St
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 155.01 RGV-04, Updated on left with new survey to Station 1494.75, Bath
.092
.099
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 154.81 RGV-04, Updated on left with new survey to Station 1262.78. Bath
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 154.6 RGV-04, Updated on left with new survey to Station 1108.94. Bath
.168
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

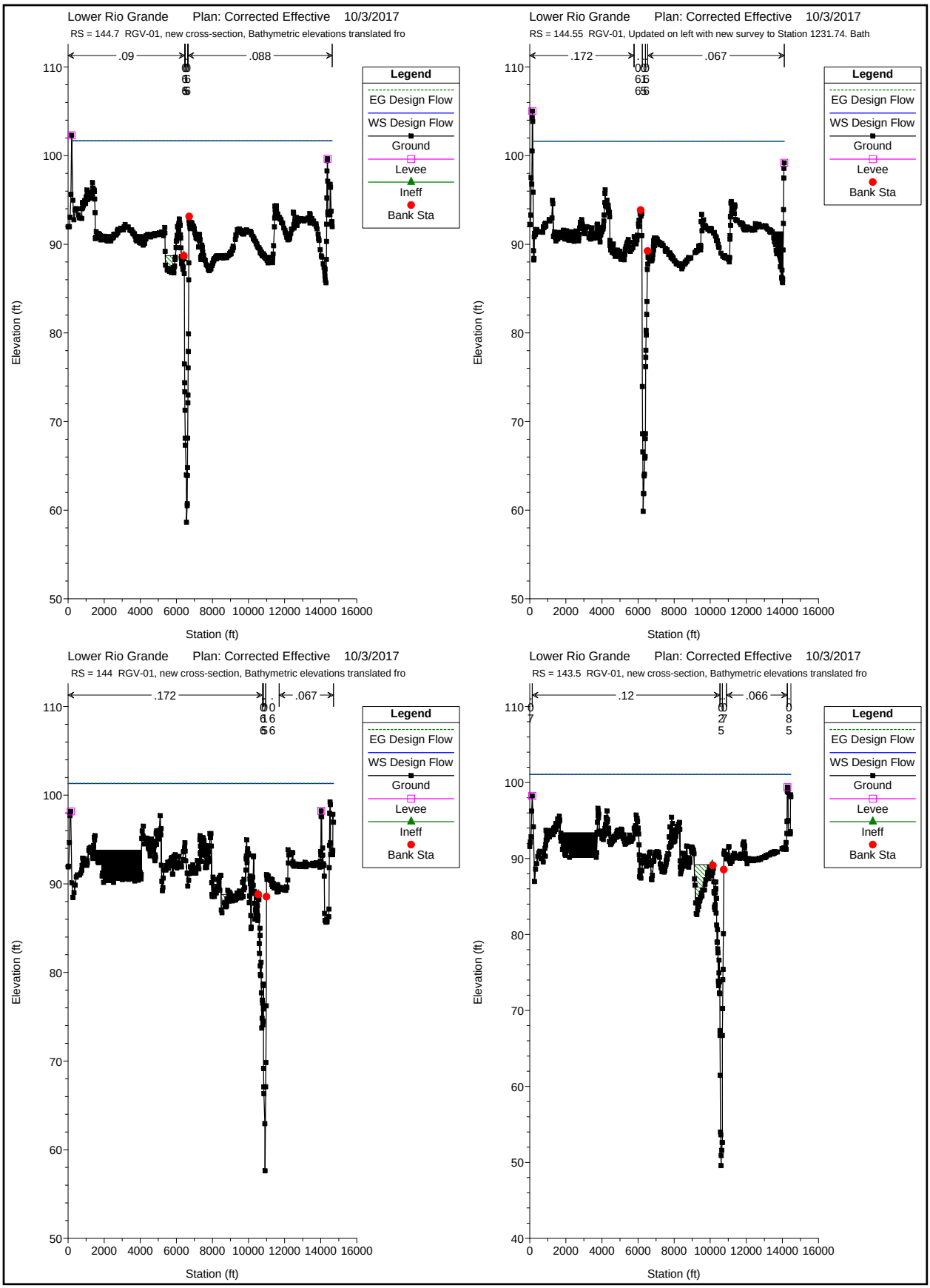

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 154.23 RGV-04, Updated on left with new survey to Station 1126.98. Bath
.066
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 153.85 RGV-04, Updated on left with new survey to Station 1122.15. Bath
.132
.076
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 153.61 RGV-04, Updated on left with new survey to Station 1284.94. Bath
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 153.36 RGV-04, Updated on left with new survey to Station 993.99. Bathy
.096
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

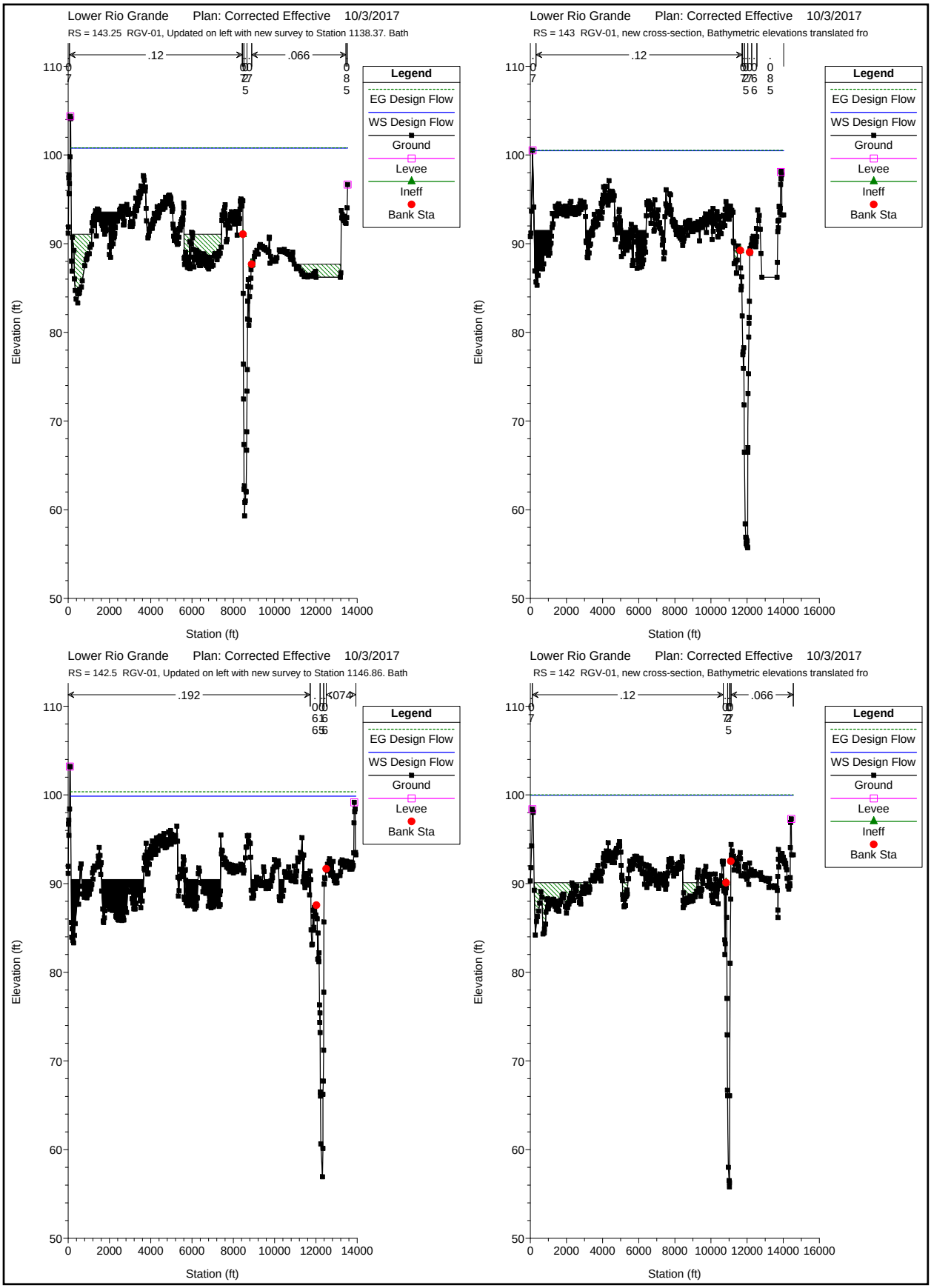

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 152.53 RGV-04, Updated on left with new survey to Station 1028.80. Bath
.169
.102
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 151.7 RGV-04, Updated on left with new survey to Station 1057.92. Exte
.1
.082
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 151.49 RGV-04, Updated on left with new survey to Station1013.88. Bathy
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 151.27 RGV-04, Original IBWC Cross-section data applied to this section
.06
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

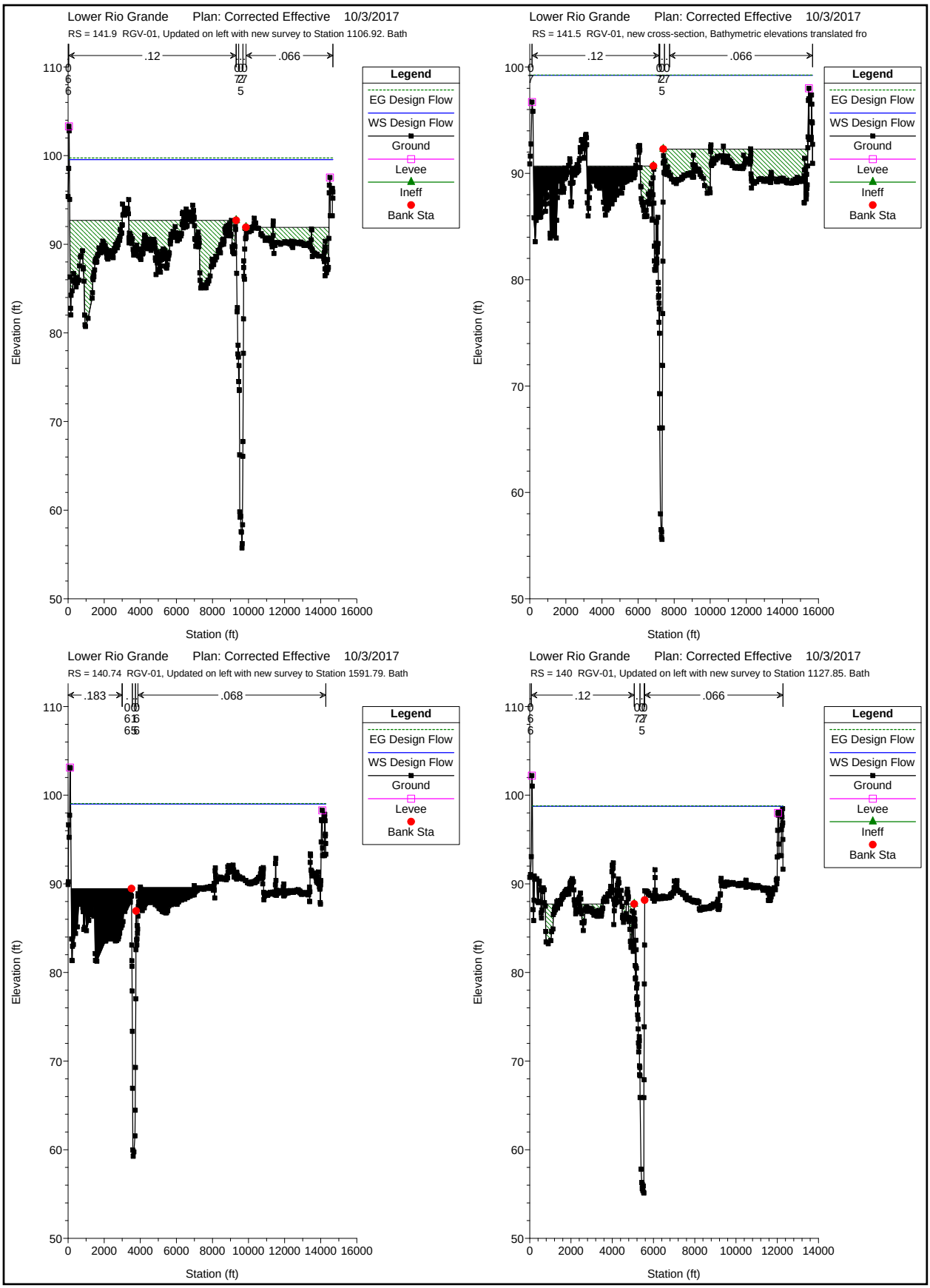

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 151.255 BR Pharr
.06
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 151.255 BR Pharr
.06
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 151.25 RGV-04, Original IBWC Cross-section data applied to this section
.06
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 151.24 RGV-04, Updated on left with new survey to Station1031.87. Bathy
.06
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

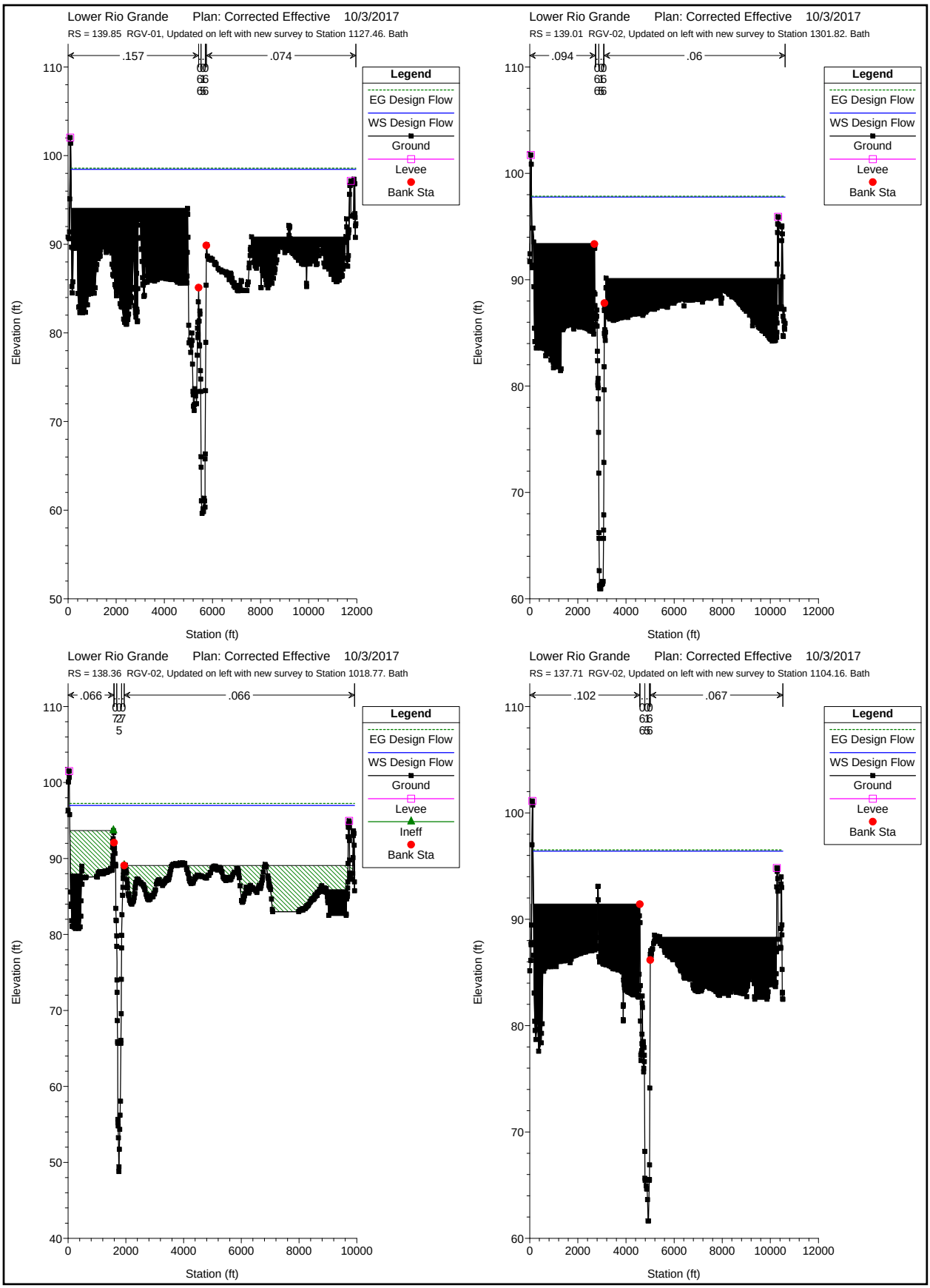

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 150.78 RGV-04, Updated on left with new survey to Station1090.94. Bathy
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 150.31 RGV-04, Updated on left with new survey to Station1086.76. Bathy
.09
.102
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 149 RGV-04, Updated on left with new survey to Station 1081.98. Bath
.066
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 147.68 RGV-04, Updated on left with new survey to Station 1061.90. Bath
.105
.095
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

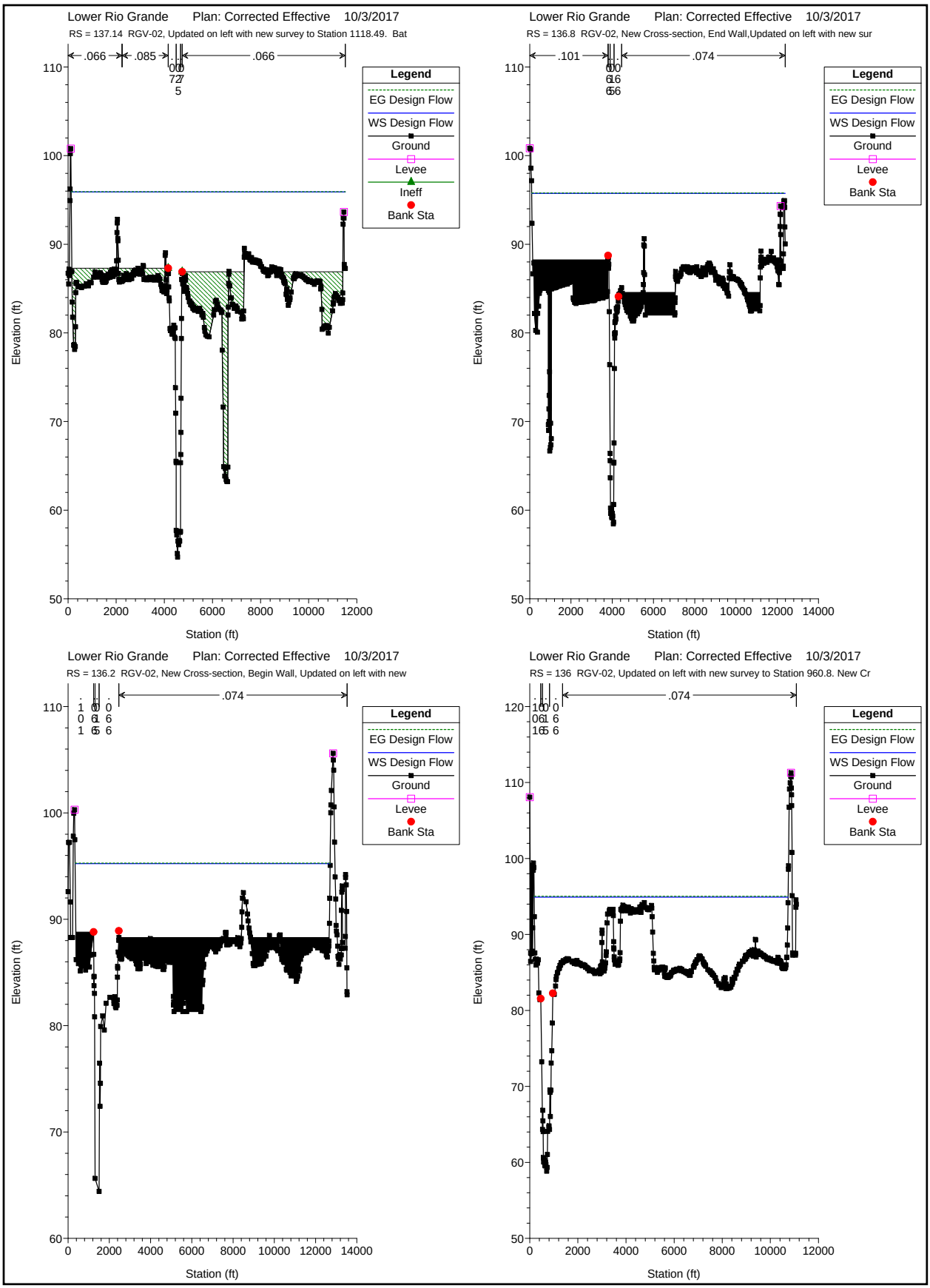

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 146 RGV-04, Updated on left with new survey to Station 1100.15. Exte
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 145.5 RGV-04 (end wall), RGV-01 (begin wall), new cross-section, Bathy
.066
.088
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 145.2 RGV-01, new cross-section, Bathymetric elevations translated fro
.066
.088
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 145 RGV-01, Updated on left with new survey to Station 1176.05. Bath
.066
.088
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

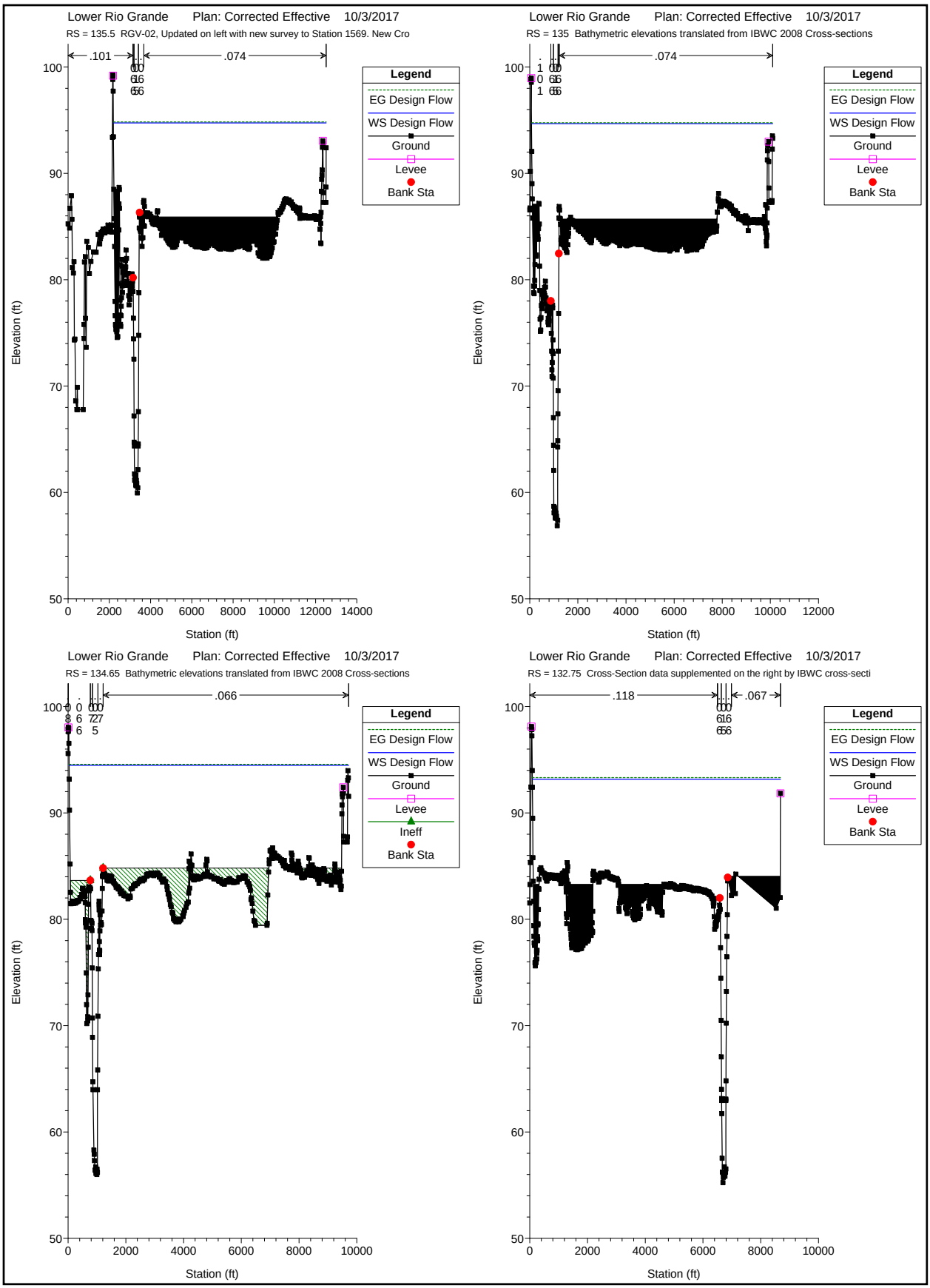

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 144.7 RGV-01, new cross-section, Bathymetric elevations translated fro
.09
.088
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 144.55 RGV-01, Updated on left with new survey to Station 1231.74. Bath
.172
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 144 RGV-01, new cross-section, Bathymetric elevations translated fro
.172
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 143.5 RGV-01, new cross-section, Bathymetric elevations translated fro
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

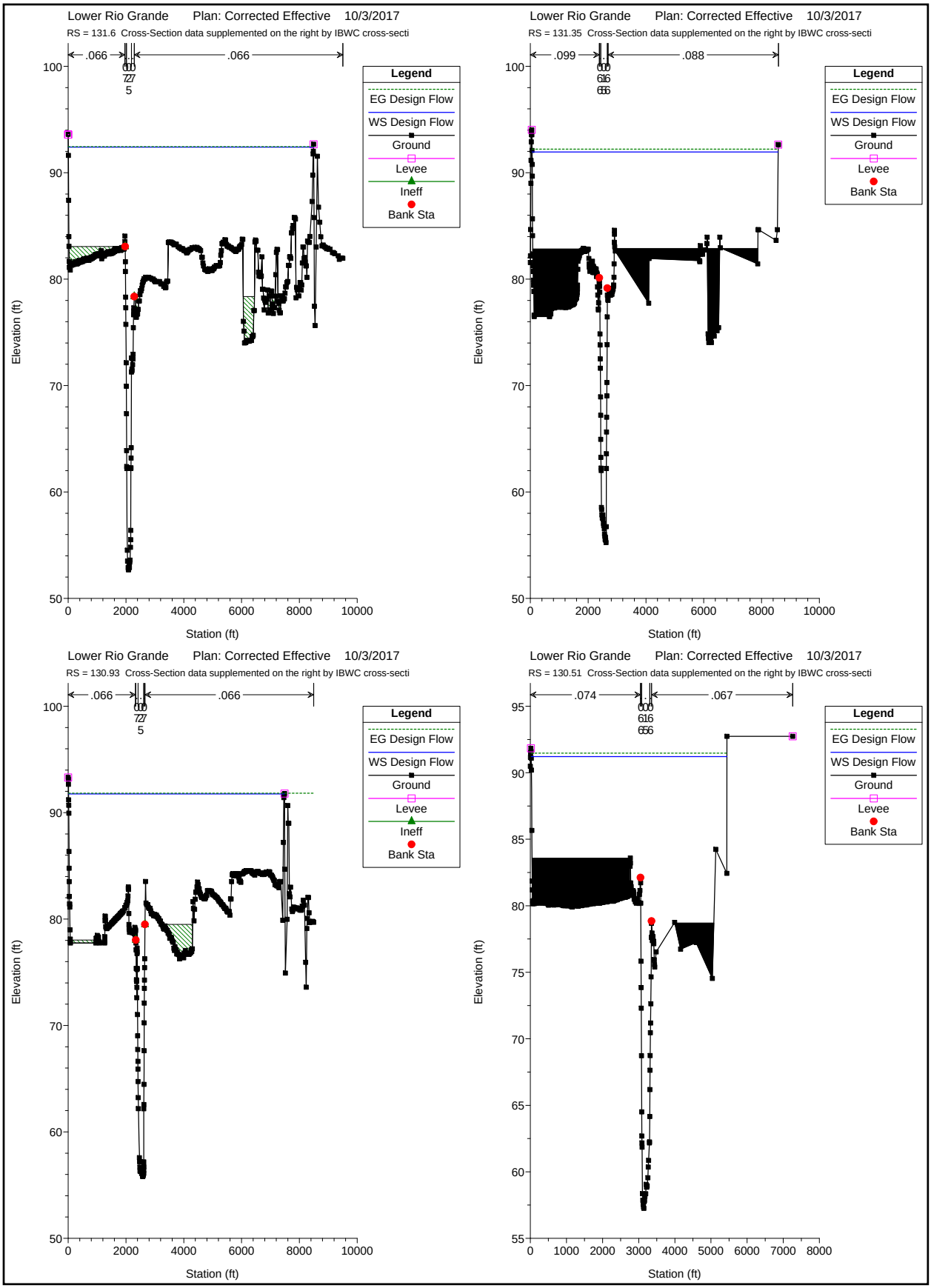

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 143.25 RGV-01, Updated on left with new survey to Station 1138.37. Bath
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 143 RGV-01, new cross-section, Bathymetric elevations translated fro
.12
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 142.5 RGV-01, Updated on left with new survey to Station 1146.86. Bath
.192
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 142 RGV-01, new cross-section, Bathymetric elevations translated fro
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

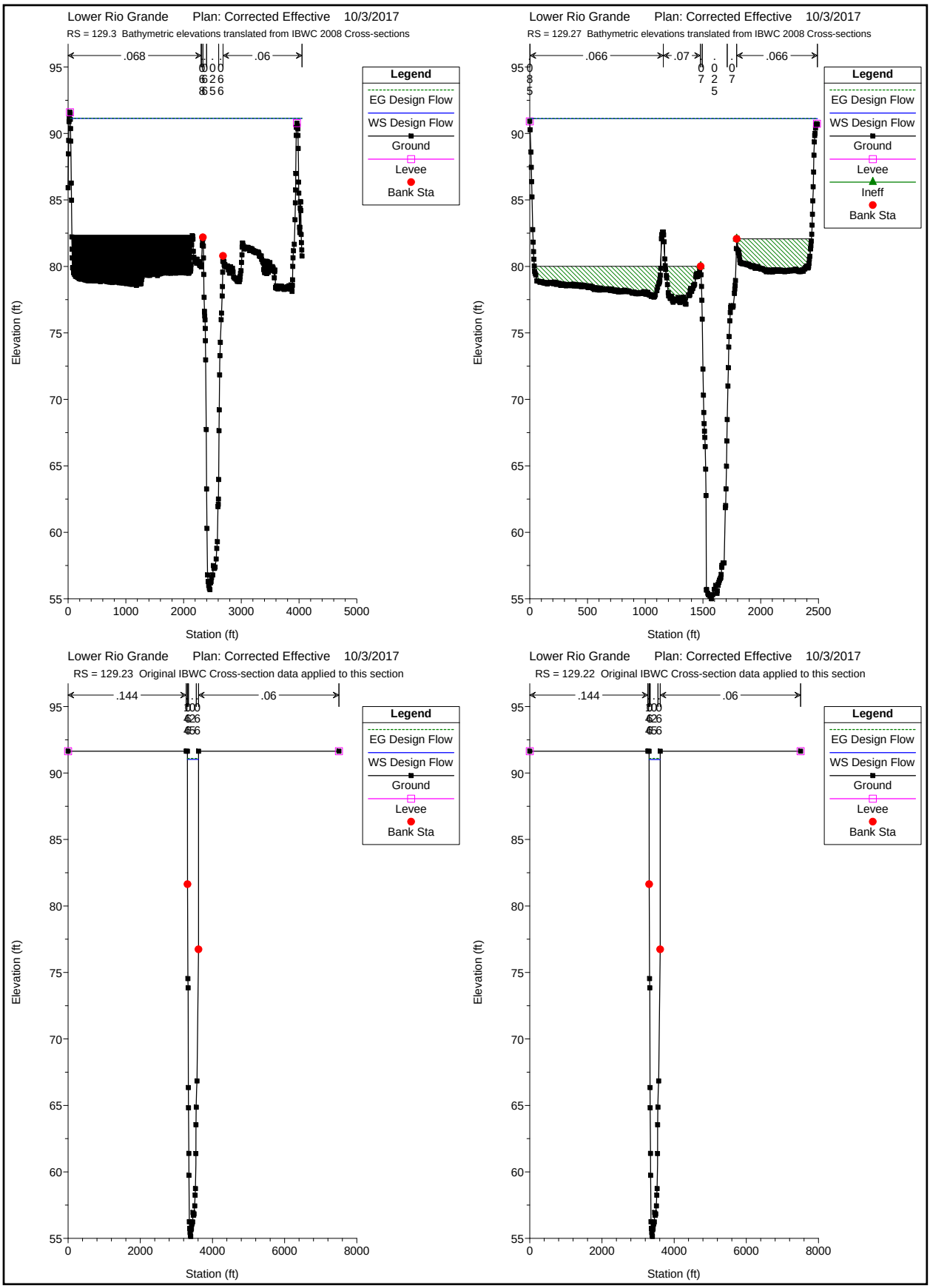

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 141.9 RGV-01, Updated on left with new survey to Station 1106.92. Bath
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 141.5 RGV-01, new cross-section, Bathymetric elevations translated fro
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 140.74 RGV-01, Updated on left with new survey to Station 1591.79. Bath
.183
.068
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 140 RGV-01, Updated on left with new survey to Station 1127.85. Bath
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

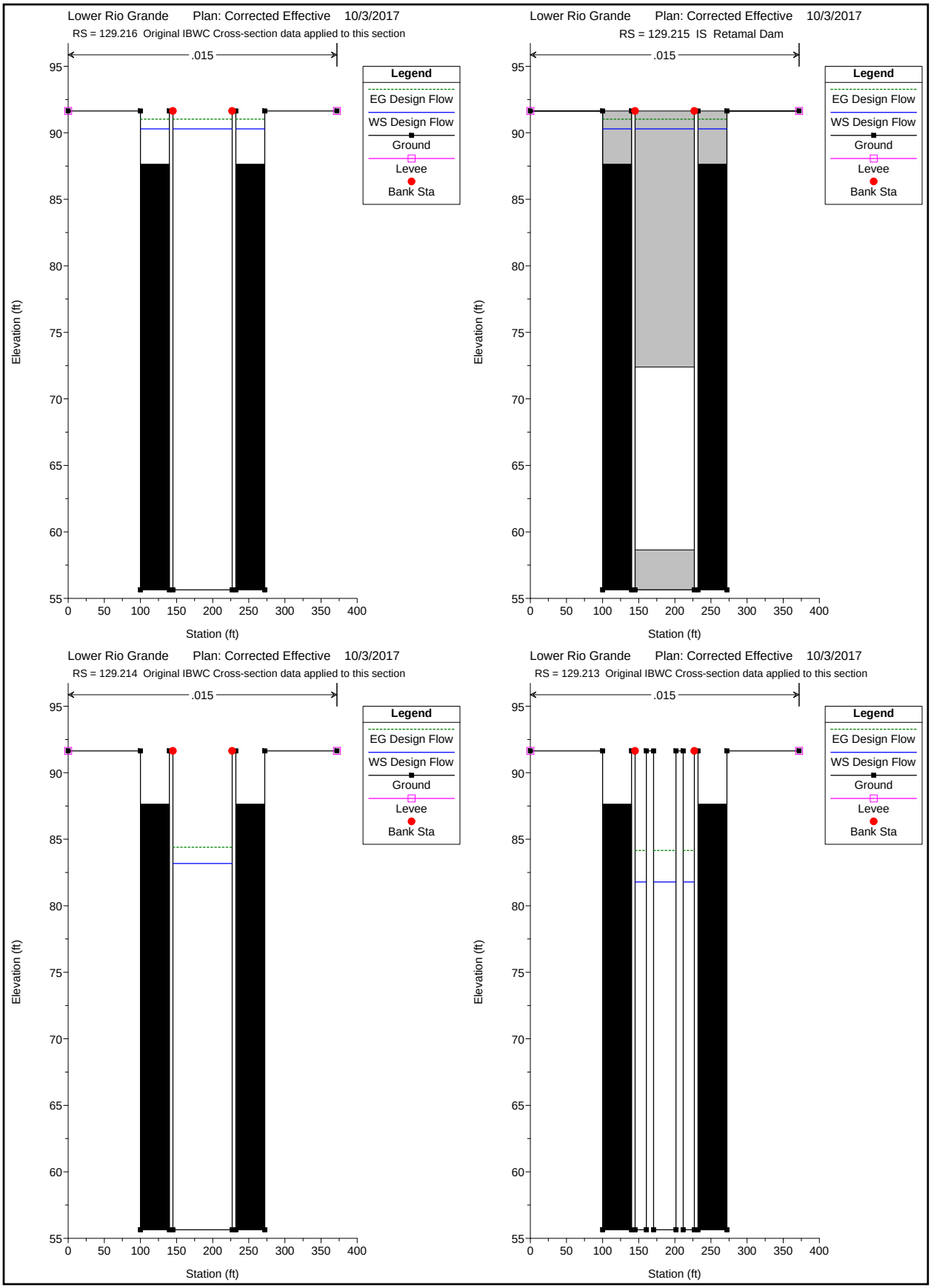

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 139.85 RGV-01, Updated on left with new survey to Station 1127.46. Bath
.157
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 139.01 RGV-02, Updated on left with new survey to Station 1301.82. Bath
.094
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 138.36 RGV-02, Updated on left with new survey to Station 1018.77. Bath
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 137.71 RGV-02, Updated on left with new survey to Station 1104.16. Bath
.102
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

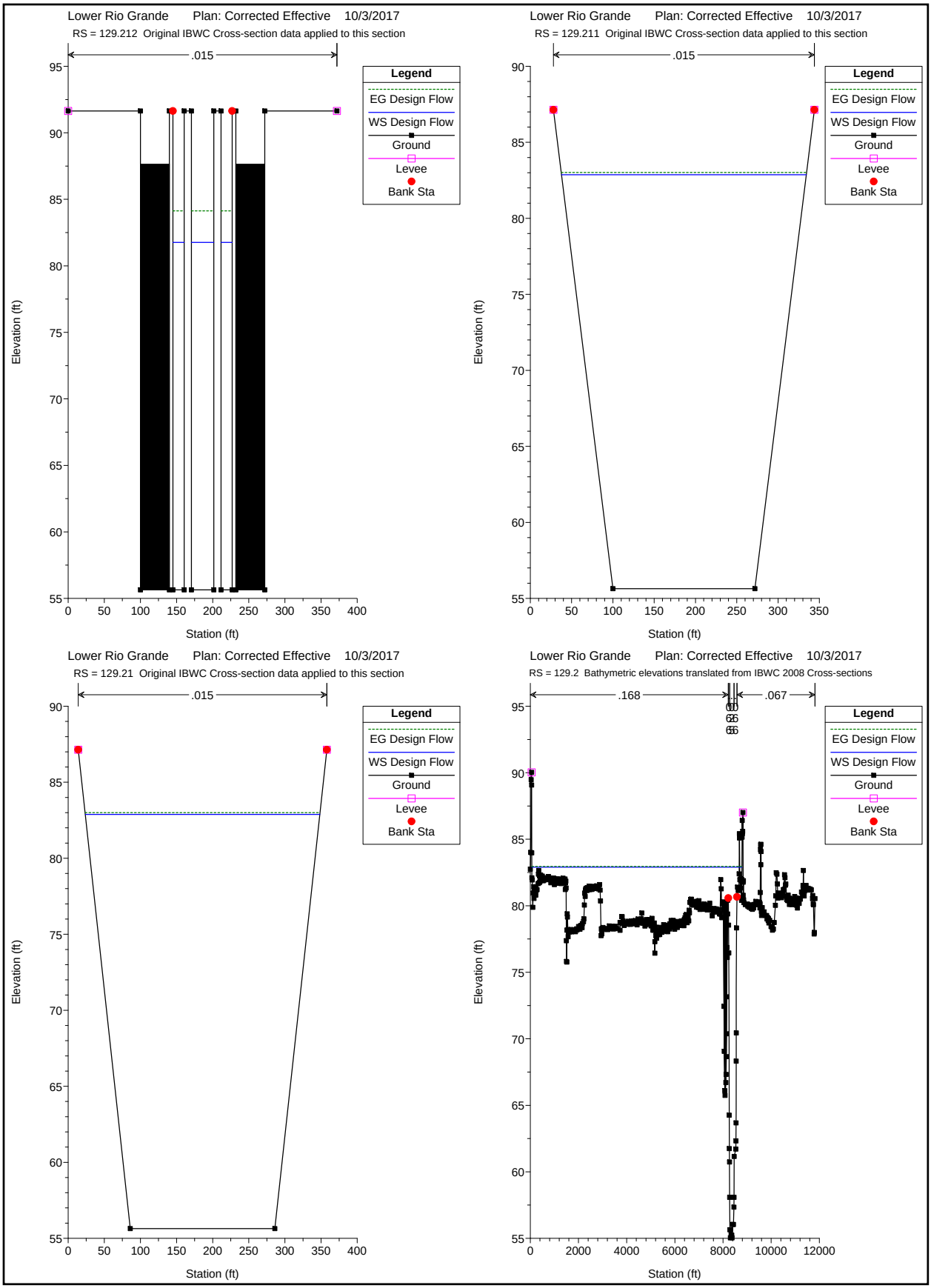

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 137.14 RGV-02, Updated on left with new survey to Station 1118.49. Bat
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 136.8 RGV-02, New Cross-section, End Wall,Updated on left with new sur
.101
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 136.2 RGV-02, New Cross-section, Begin Wall, Updated on left with new
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 136 RGV-02, Updated on left with new survey to Station 960.8. New Cr
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

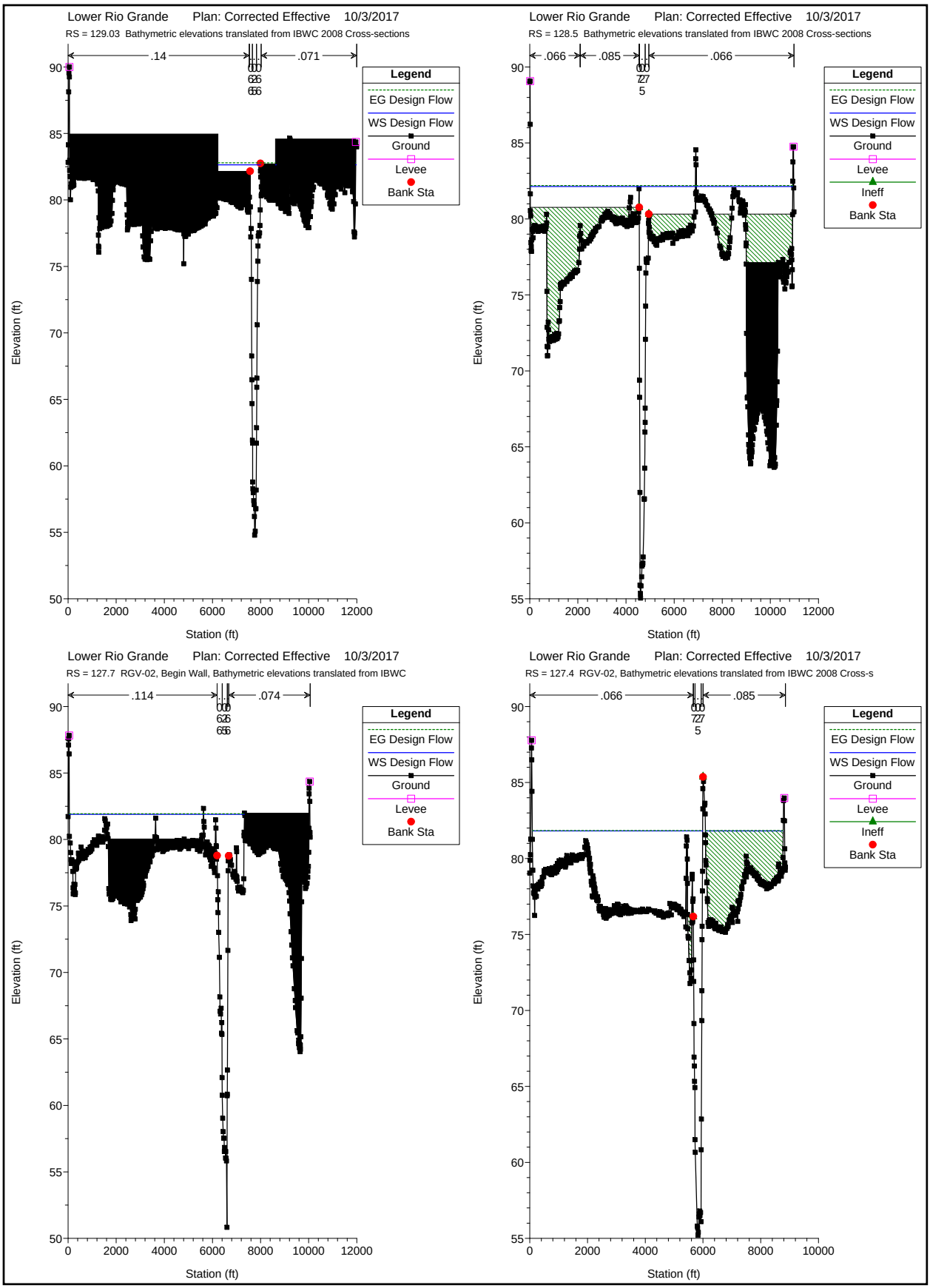

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 135.5 RGV-02, Updated on left with new survey to Station 1569. New Cro
.101
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 135 Bathymetric elevations translated from IBWC 2008 Cross-sections
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 134.65 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 132.75 Cross-Section data supplemented on the right by IBWC cross-secti
.118
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

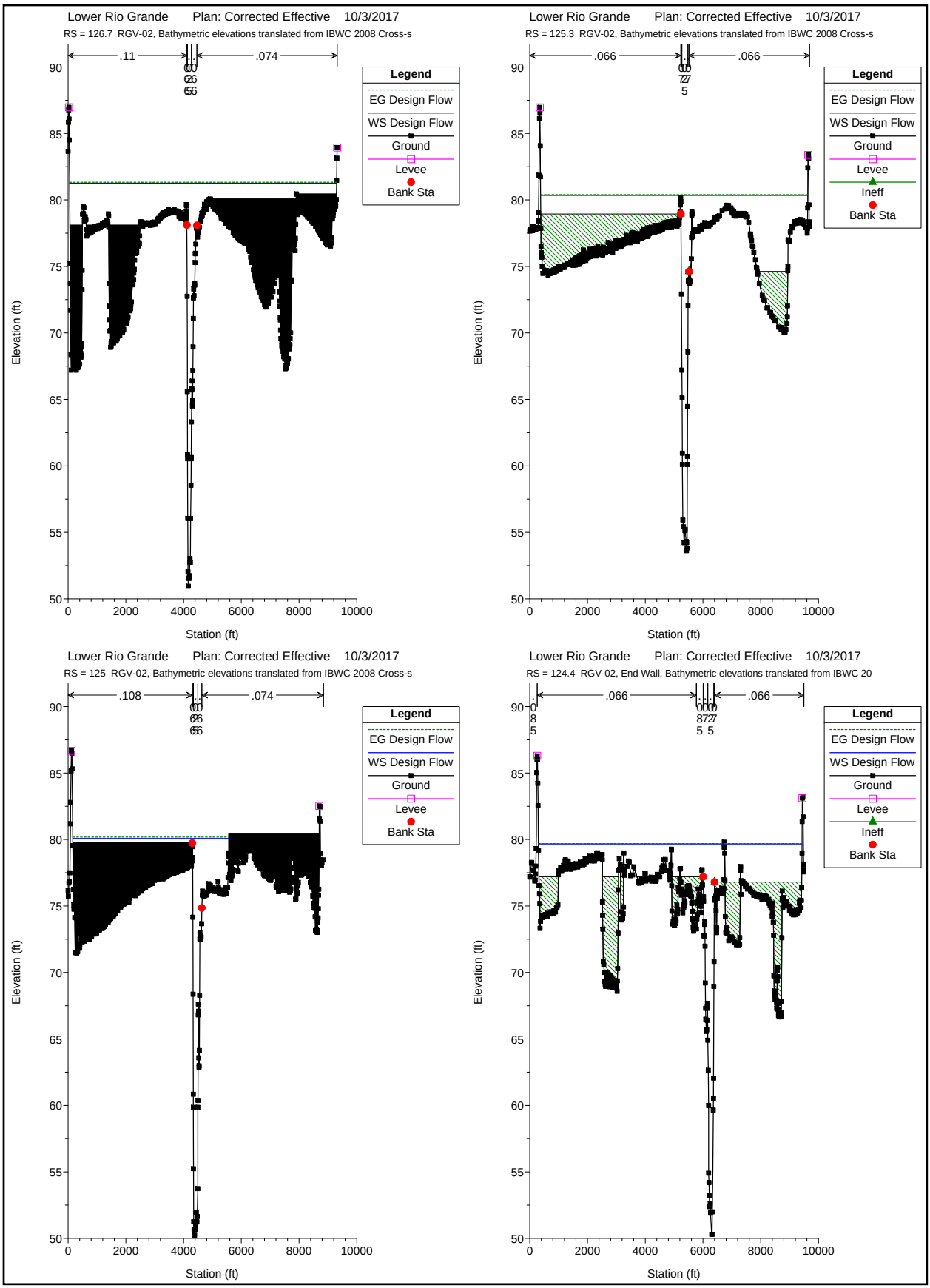

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 131.6 Cross-Section data supplemented on the right by IBWC cross-secti
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 131.35 Cross-Section data supplemented on the right by IBWC cross-secti
.099
.088
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 130.93 Cross-Section data supplemented on the right by IBWC cross-secti
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 130.51 Cross-Section data supplemented on the right by IBWC cross-secti
.074
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

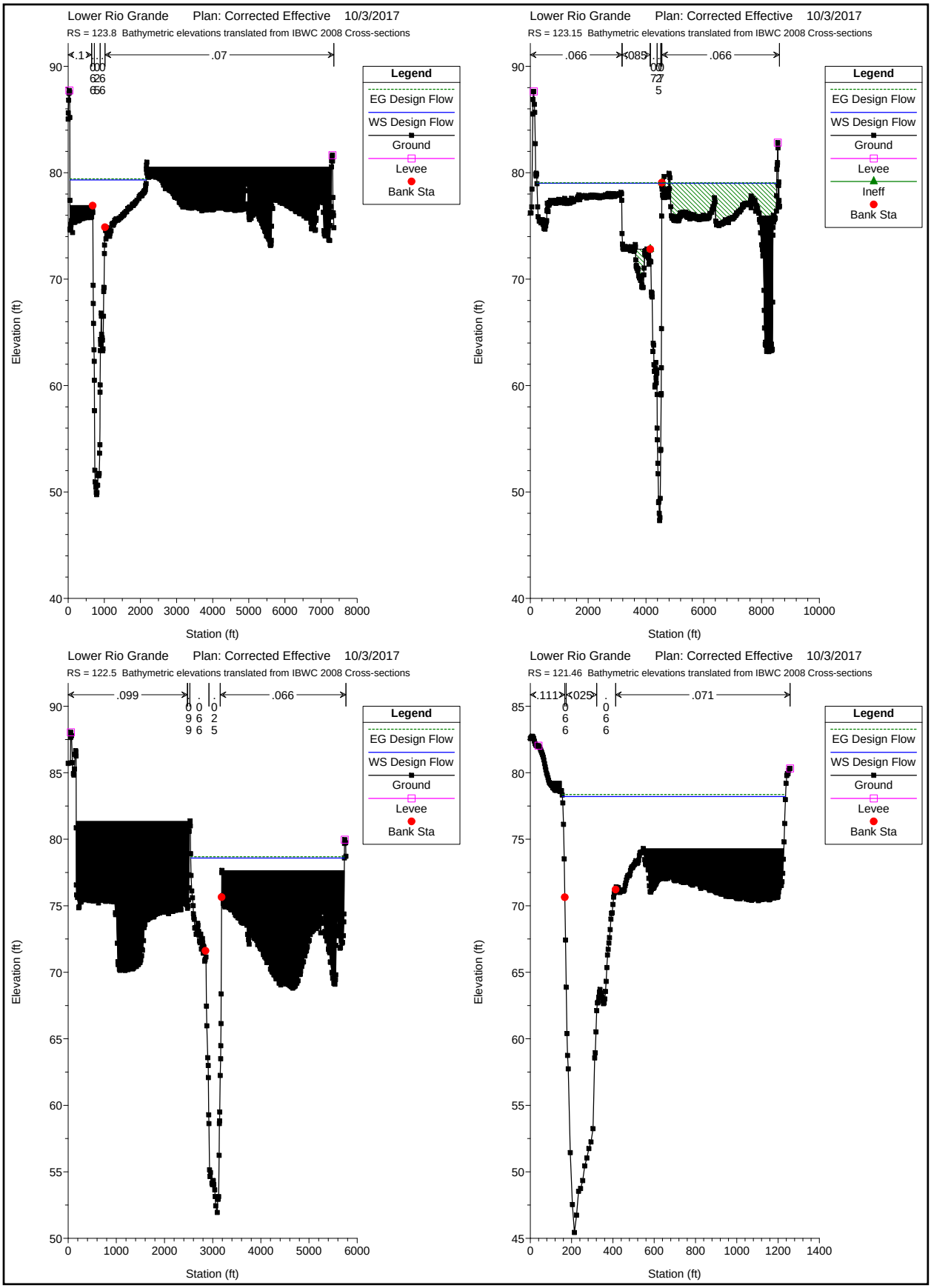

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.3 Bathymetric elevations translated from IBWC 2008 Cross-sections
.068
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.27 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.07
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.23 Original IBWC Cross-section data applied to this section
.144
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.22 Original IBWC Cross-section data applied to this section
.144
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

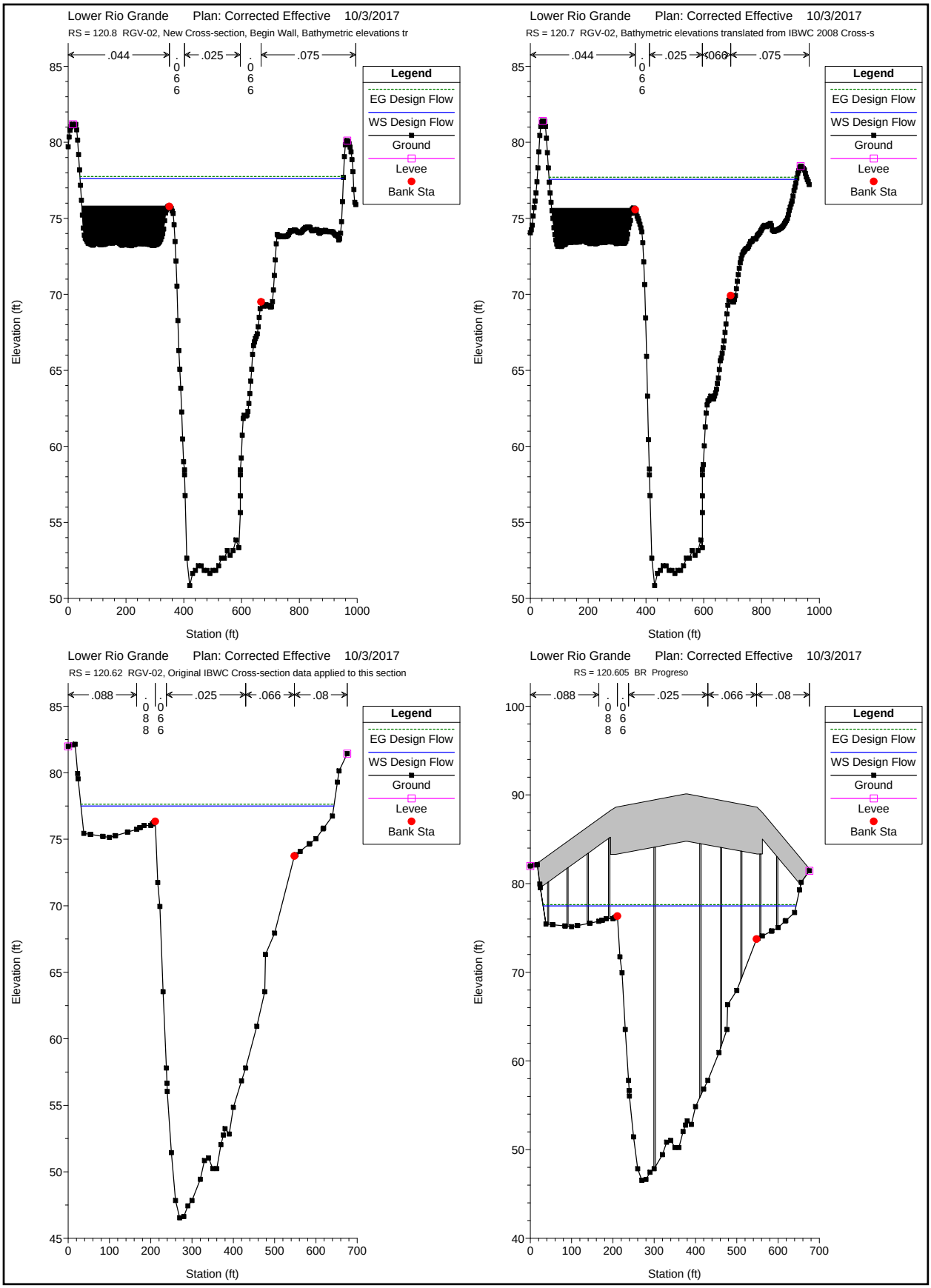

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.216 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.215 IS Retamal Dam
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.214 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.213 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

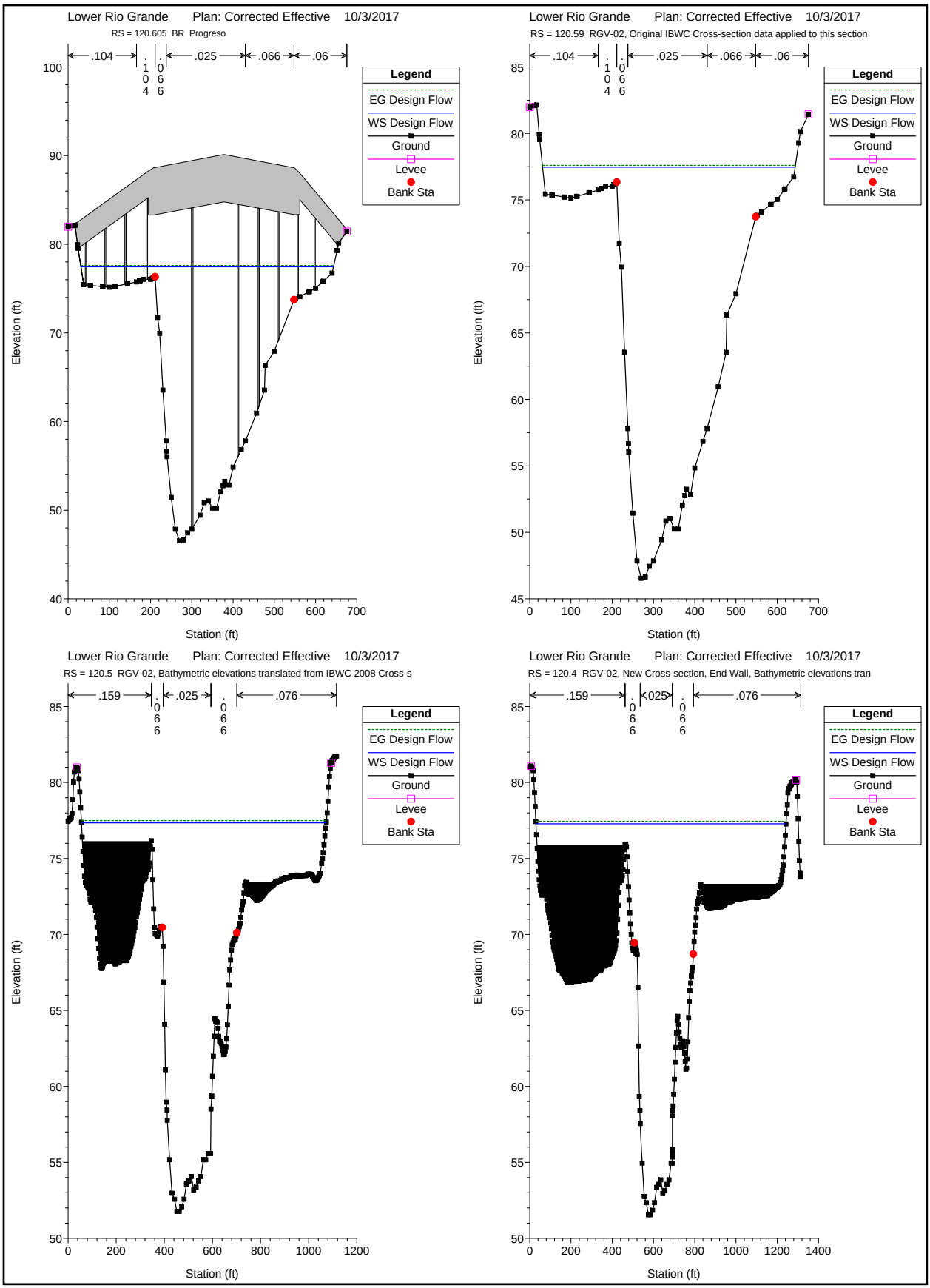

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.212 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.211 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.21 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.2 Bathymetric elevations translated from IBWC 2008 Cross-sections
.168
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

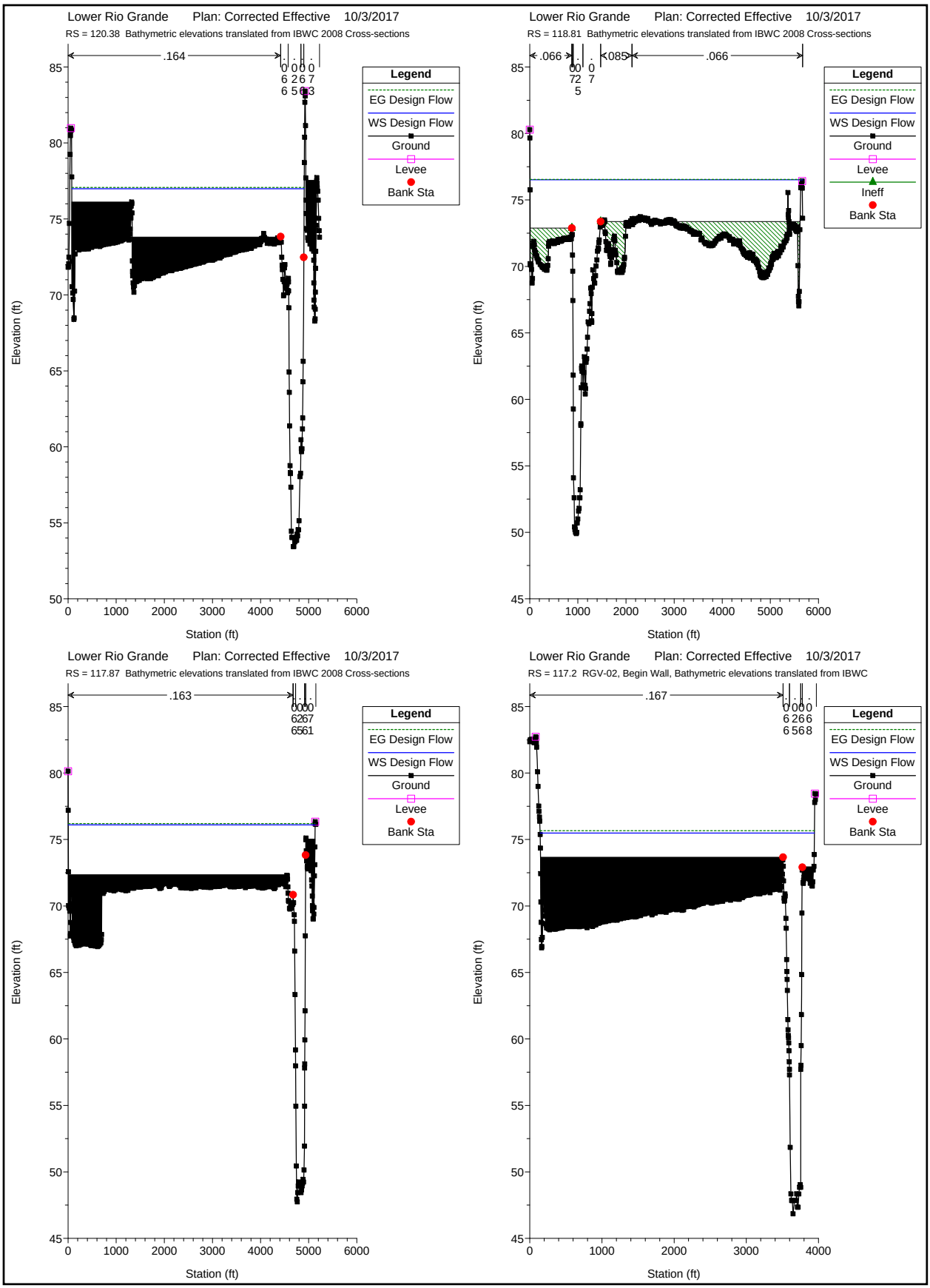

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 129.03 Bathymetric elevations translated from IBWC 2008 Cross-sections
.14
.071
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 128.5 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 127.7 RGV-02, Begin Wall, Bathymetric elevations translated from IBWC
.114
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 127.4 RGV-02, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

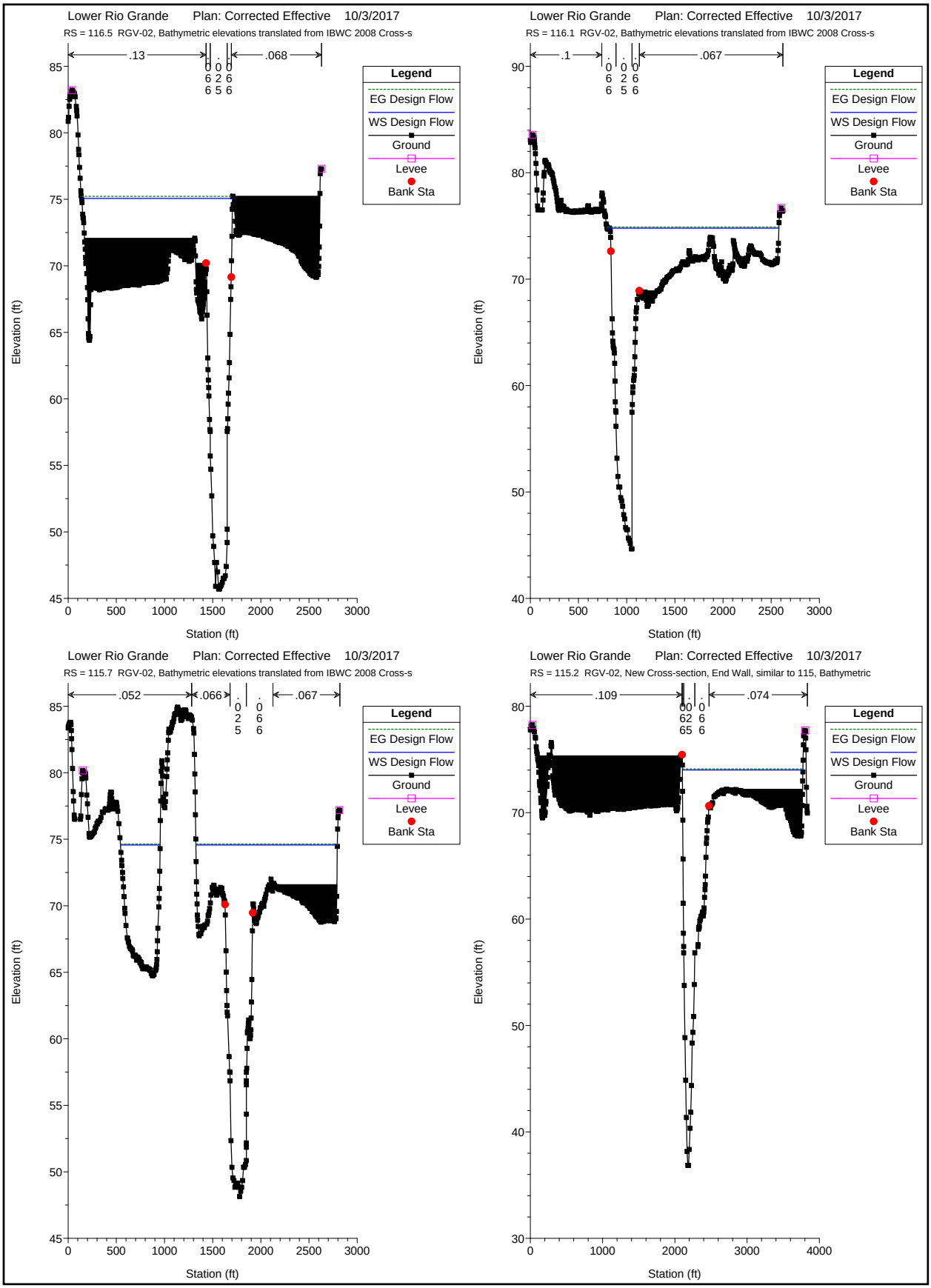

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 126.7 RGV-02, Bathymetric elevations translated from IBWC 2008 Cross-s
.11
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 125.3 RGV-02, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 125 RGV-02, Bathymetric elevations translated from IBWC 2008 Cross-s
.108
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 124.4 RGV-02, End Wall, Bathymetric elevations translated from IBWC 20
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

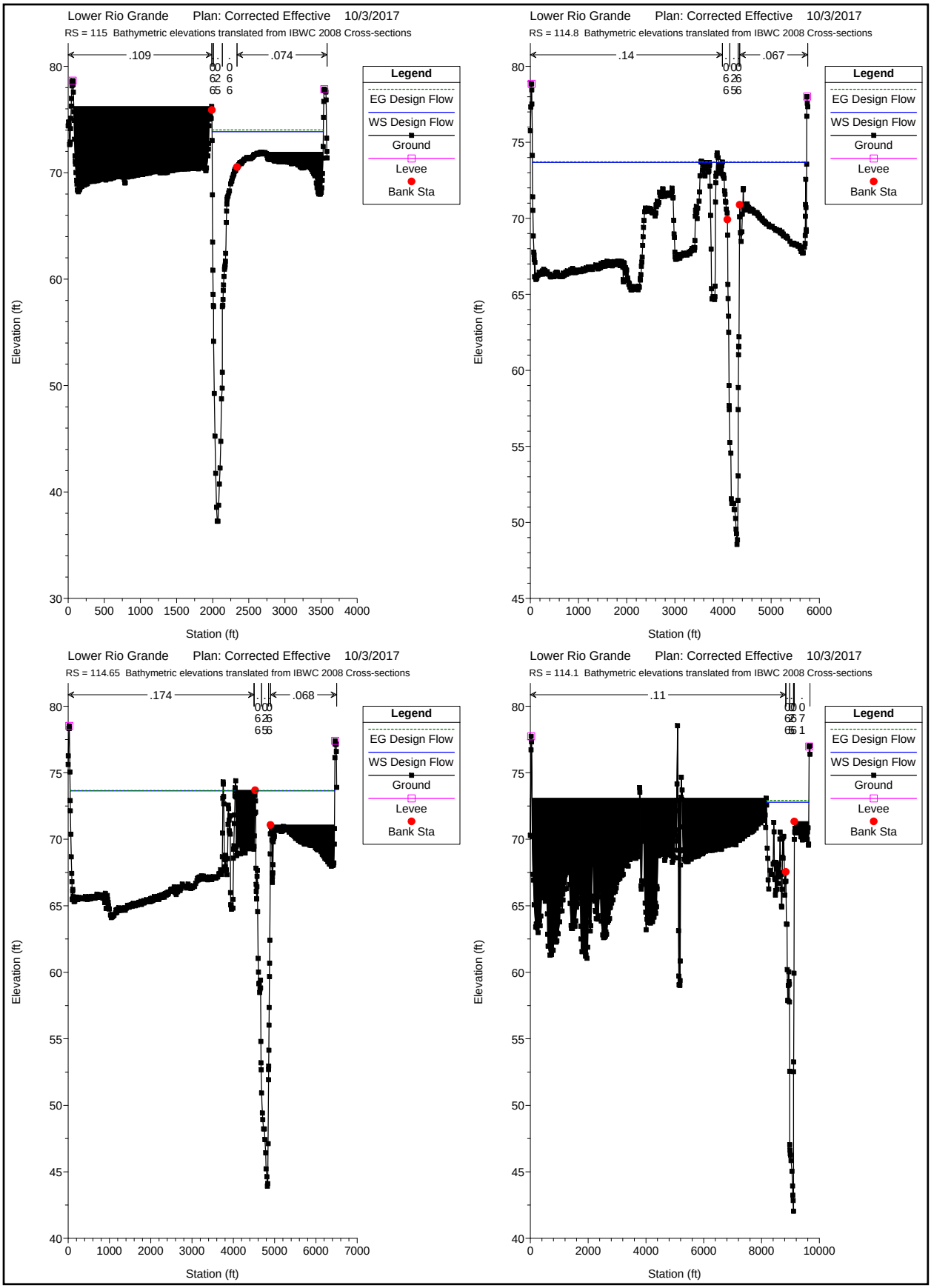

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 123.8 Bathymetric elevations translated from IBWC 2008 Cross-sections
.1
.07
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 123.15 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 122.5 Bathymetric elevations translated from IBWC 2008 Cross-sections
.099
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 121.46 Bathymetric elevations translated from IBWC 2008 Cross-sections
.111
.025
.071
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

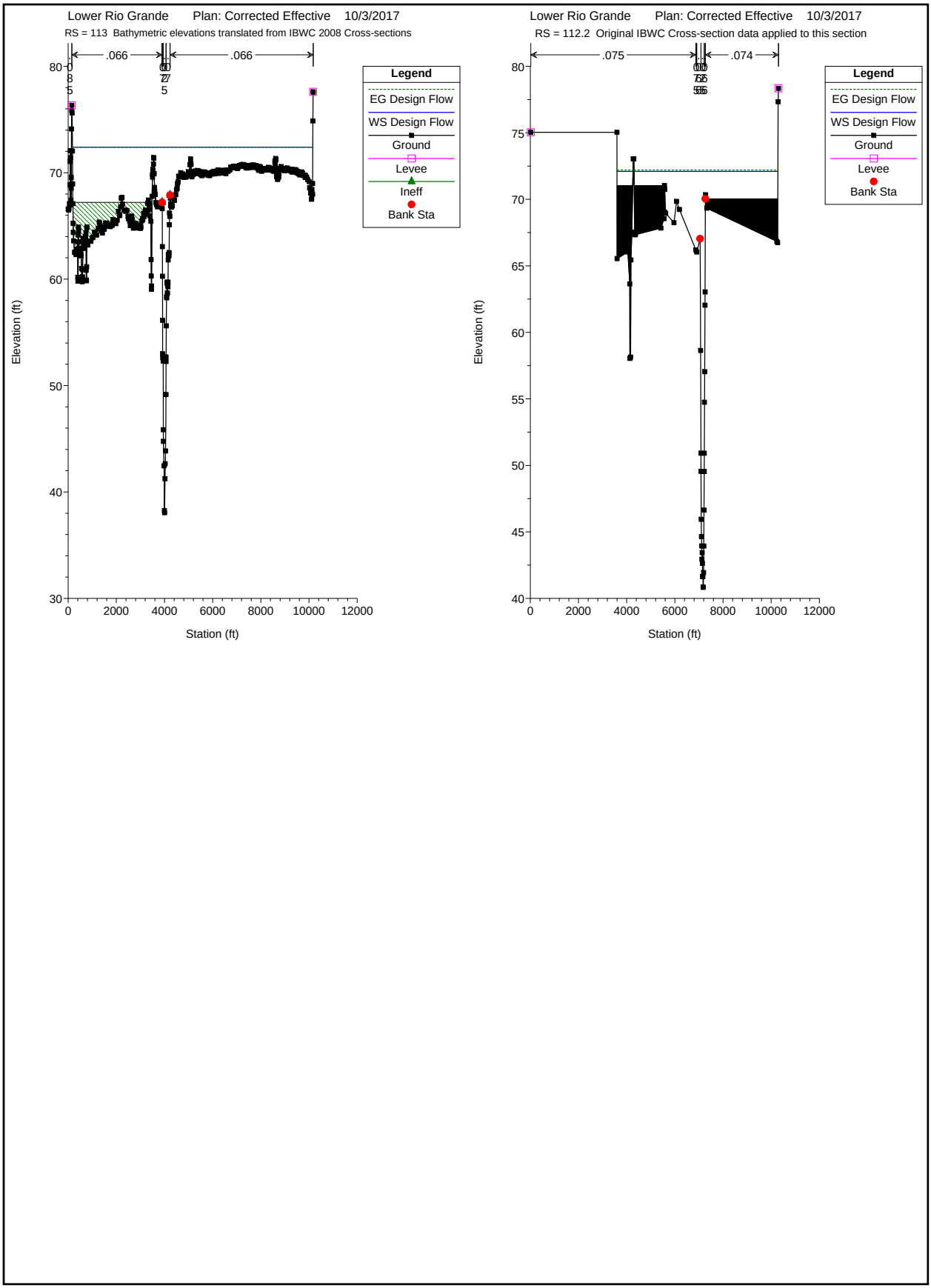

Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 120.8 RGV-02, New Cross-section, Begin Wall, Bathymetric elevations tr
.044
.066
.025
.066
.075
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 120.7 RGV-02, Bathymetric elevations translated from IBWC 2008 Cross-s
.044
.066
.025
.066
.075
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 120.62 RGV-02, Original IBWC Cross-section data applied to this section
.088
.088
.066
.025
.066
.08
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 120.605 BR Progreso
.088
.088
.066
.025
.066
.08
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 120.605 BR Progreso
.104
.104
.066
.025
.066
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 120.59 RGV-02, Original IBWC Cross-section data applied to this section
.104
.104
.066
.025
.066
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 120.5 RGV-02, Bathymetric elevations translated from IBWC 2008 Cross-s
.159
.066
.025
.066
.076
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 120.4 RGV-02, New Cross-section, End Wall, Bathymetric elevations tran
.159
.066
.025
.066
.076
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 120.38 Bathymetric elevations translated from IBWC 2008 Cross-sections
.164
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 118.81 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 117.87 Bathymetric elevations translated from IBWC 2008 Cross-sections
.163
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 117.2 RGV-02, Begin Wall, Bathymetric elevations translated from IBWC
.167
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 116.5 RGV-02, Bathymetric elevations translated from IBWC 2008 Cross-s
.13
.068
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 116.1 RGV-02, Bathymetric elevations translated from IBWC 2008 Cross-s
.1
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 115.7 RGV-02, Bathymetric elevations translated from IBWC 2008 Cross-s
.052
.066
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 115.2 RGV-02, New Cross-section, End Wall, similar to 115, Bathymetric
.109
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 115 Bathymetric elevations translated from IBWC 2008 Cross-sections
.109
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 114.8 Bathymetric elevations translated from IBWC 2008 Cross-sections
.14
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 114.65 Bathymetric elevations translated from IBWC 2008 Cross-sections
.174
.068
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 114.1 Bathymetric elevations translated from IBWC 2008 Cross-sections
.11
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 113 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Corrected Effective 10/3/2017
RS = 112.2 Original IBWC Cross-section data applied to this section
.075
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

HEC-RAS Plan: Corrected Effective River: Rio Grande Reach: Lower Reach Profile: Design Flow

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	186	235000.00	85.94	134.47	122.25	134.56	0.000056	4.28	181418.80	10519.00	0.12
Lower Reach	185	235000.00	74.90	134.34	122.19	134.39	0.000099	2.56	165883.90	11527.83	0.08
Lower Reach	184	235000.00	86.64	133.70	123.67	134.14	0.000062	7.69	130866.90	8180.56	0.24
Lower Reach	183.2	235000.00	89.30	133.66	121.45	133.71	0.000066	3.43	187558.60	12242.89	0.10
Lower Reach	182.4	235000.00	81.47	133.39	122.57	133.48	0.000038	4.62	237880.10	15447.46	0.14
Lower Reach	181.35	235000.00	93.63	133.17	118.93	133.20	0.000042	2.83	215078.00	11846.41	0.09
Lower Reach	180.32	235000.00	88.56	132.89	120.12	132.98	0.000050	4.34	177130.20	10004.96	0.13
Lower Reach	180.3	235000.00	88.48	132.76	122.23	132.93	0.000120	5.62	159814.20	9906.49	0.16
Lower Reach	179.4	235000.00	86.78	132.45	117.33	132.49	0.000059	2.80	203606.60	11059.48	0.08
Lower Reach	178.5	235000.00	89.55	131.98	118.78	132.07	0.000104	4.27	204219.80	11162.46	0.13
Lower Reach	177.7	235000.00	88.45	131.46	119.10	131.53	0.000184	3.37	164895.80	9732.60	0.10
Lower Reach	176.8	235000.00	88.84	130.06	120.17	130.74	0.000159	9.08	141650.00	8724.16	0.27
Lower Reach	175.6	235000.00	90.39	129.70	116.76	129.78	0.000087	3.85	157414.60	9058.73	0.12
Lower Reach	174.6	235000.00	87.41	128.82	118.75	129.43	0.000071	8.45	182921.20	11948.83	0.25
Lower Reach	174.2	235000.00	86.71	129.08	114.02	129.10	0.000048	2.10	209464.80	11242.58	0.07
Lower Reach	174	235000.00	86.00	128.99	114.93	129.03	0.000041	3.47	208595.80	11126.15	0.11
Lower Reach	172	235000.00	76.31	128.77	115.89	128.84	0.000044	4.13	196432.30	11810.39	0.12
Lower Reach	171.8	235000.00	76.31	128.43	116.04	128.56	0.000089	4.54	140409.40	8997.97	0.14
Lower Reach	171.15	235000.00	73.72	128.15	114.61	128.36	0.000091	5.91	138170.80	7475.09	0.17
Lower Reach	170.5	235000.00	75.96	124.17	118.83	127.55	0.000295	17.14	66724.70	4922.35	0.52
Lower Reach	170.26	235000.00	77.47	125.45	116.54	125.76	0.001370	6.47	70885.03	4963.40	0.20
Lower Reach	170.02	235000.00	89.64	121.80	112.24	124.50	0.000272	15.53	73441.59	5338.71	0.48
Lower Reach	169.9	235000.00	89.64	122.23	114.16	124.16	0.000210	13.68	80440.89	5466.26	0.43
Lower Reach	169.83	130000.00	100.84	122.96	114.80	123.57	0.000960	8.11	50272.75	3857.52	0.31
Lower Reach	169.49	130000.00	84.30	122.63	103.20	122.90	0.000282	4.93	39421.48	2515.81	0.16
Lower Reach	169.14	130000.00	84.64	122.07	97.06	122.75	0.000043	6.63	19605.04	523.80	0.19
Lower Reach	169.13	Inl Struct									
Lower Reach	169.12	130000.00	72.14	120.66	84.56	121.07	0.000019	5.11	25416.00	523.80	0.13
Lower Reach	169.1	130000.00	83.64	120.55	95.38	121.05	0.000030	5.64	23036.52	658.45	0.17
Lower Reach	168.85	130000.00	71.64	120.64	94.09	120.87	0.000711	4.62	62146.12	5483.22	0.14
Lower Reach	168.58	130000.00	69.86	119.97	96.46	120.08	0.000365	3.68	75064.48	6382.42	0.11
Lower Reach	168.3	130000.00	79.02	118.97	99.09	119.15	0.001177	4.43	63955.11	6762.83	0.15
Lower Reach	168	130000.00	76.54	118.02	98.92	118.08	0.000384	2.80	79322.47	7173.39	0.09
Lower Reach	167.4	130000.00	77.24	117.38	102.41	117.56	0.000214	5.13	90107.92	8282.76	0.16
Lower Reach	167	130000.00	71.28	117.04	99.15	117.11	0.000176	3.12	86105.66	9835.36	0.11
Lower Reach	166.6	130000.00	73.61	116.69	98.82	116.77	0.000144	3.89	132496.10	11568.05	0.12
Lower Reach	166	130000.00	71.28	116.33	99.68	116.47	0.000275	4.48	98795.84	11709.46	0.15
Lower Reach	165	130000.00	70.77	116.07	107.37	116.12	0.000124	3.31	152949.80	15020.63	0.11
Lower Reach	163	130000.00	70.26	115.93	102.35	115.95	0.000103	1.71	158544.30	14406.32	0.05
Lower Reach	162.1	130000.00	72.94	115.61	96.63	115.64	0.000125	2.11	126019.70	11944.35	0.07
Lower Reach	161.4	130000.00	71.66	115.03	97.27	115.43	0.000059	6.00	103389.00	10234.25	0.20
Lower Reach	161.35	130000.00	71.66	115.09	95.92	115.29	0.000034	5.24	220963.90	21779.40	0.16
Lower Reach	161.3	130000.00	71.66	115.07	95.81	115.27	0.000049	5.18	192937.30	19824.66	0.15
Lower Reach	160	130000.00	71.60	115.06	94.33	115.10	0.000040	2.68	226609.80	19804.05	0.08
Lower Reach	159	130000.00	71.38	114.86	100.41	114.91	0.000100	3.39	173620.90	13911.77	0.10
Lower Reach	157.2	130000.00	68.90	113.71	102.89	113.78	0.000144	3.73	103307.90	7714.54	0.12
Lower Reach	157.15	130000.00	69.64	112.82	93.60	113.20	0.000264	6.15	49660.95	3468.36	0.19
Lower Reach	156.93	125000.00	57.14	111.79	80.83	112.67	0.000190	7.64	18894.58	541.00	0.20
Lower Reach	156.915	Bridge									
Lower Reach	156.9	125000.00	57.14	111.32	80.83	112.17	0.000189	7.57	18641.60	541.00	0.20
Lower Reach	156.87	125000.00	61.04	111.37	80.12	112.08	0.000088	7.14	24118.64	819.90	0.18
Lower Reach	156.855	Bridge									
Lower Reach	156.84	125000.00	61.04	111.25	80.12	112.02	0.000093	7.31	24025.63	819.90	0.19
Lower Reach	156.7	125000.00	75.00	110.64	95.13	111.84	0.000570	9.67	19991.56	1143.07	0.30
Lower Reach	156.6	125000.00	58.38	110.92	82.38	111.48	0.000205	6.68	30566.47	2064.54	0.18
Lower Reach	156.15	125000.00	67.33	110.66	91.61	110.83	0.000255	4.38	52052.12	4348.38	0.14
Lower Reach	155.7	125000.00	68.64	110.30	95.25	110.44	0.000128	4.89	82724.20	7384.21	0.15
Lower Reach	155.36	125000.00	69.65	110.13	92.56	110.24	0.000067	3.88	92557.17	8006.96	0.13
Lower Reach	155.2	125000.00	70.85	110.08	97.30	110.14	0.000107	3.01	90803.18	8007.30	0.10
Lower Reach	155.01	125000.00	69.28	109.72	95.38	110.02	0.000085	5.46	80336.37	7103.24	0.19
Lower Reach	154.81	125000.00	66.95	109.62	94.22	109.80	0.000352	4.77	53605.74	5520.31	0.16
Lower Reach	154.6	125000.00	59.06	108.69	92.52	109.10	0.000652	5.89	37964.20	5176.94	0.21
Lower Reach	154.23	125000.00	48.83	107.68	78.20	108.08	0.000595	5.46	34928.07	6162.41	0.18
Lower Reach	153.85	125000.00	66.44	106.12	91.35	106.73	0.001089	7.16	34551.45	6557.37	0.27
Lower Reach	153.61	125000.00	54.25	105.93	90.14	106.25	0.000179	5.93	62097.04	8332.71	0.22
Lower Reach	153.36	125000.00	68.44	105.89	92.55	105.98	0.000204	3.87	103332.90	13748.67	0.13
Lower Reach	152.53	125000.00	66.64	105.13	91.80	105.21	0.000367	3.81	100435.00	14511.48	0.14
Lower Reach	151.7	125000.00	66.34	104.45	91.49	104.49	0.000157	2.85	120907.50	14259.58	0.10
Lower Reach	151.49	125000.00	57.26	104.28	86.83	104.32	0.000126	2.65	115261.40	14189.88	0.08
Lower Reach	151.27	125000.00	65.88	104.15	89.83	104.19	0.000094	2.80	117549.20	14880.70	0.10
Lower Reach	151.255	Bridge									
Lower Reach	151.25	125000.00	65.88	104.14	89.83	104.17	0.000088	2.71	117381.60	14880.60	0.10
Lower Reach	151.24	125000.00	68.61	104.14	96.57	104.17	0.000078	2.07	129196.80	14914.38	0.08
Lower Reach	150.78	125000.00	56.38	103.88	84.99	103.92	0.000138	2.48	111420.80	16069.49	0.09
Lower Reach	150.31	125000.00	63.27	103.49	91.80	103.53	0.000176	3.01	123710.10	16850.21	0.11

HEC-RAS Plan: Corrected Effective River: Rio Grande Reach: Lower Reach Profile: Design Flow (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	149	125000.00	55.60	103.22	87.32	103.24	0.000090	2.10	138811.80	15894.81	0.07
Lower Reach	147.68	125000.00	62.04	102.87	89.24	102.92	0.000199	2.88	121387.80	15372.06	0.11
Lower Reach	146	125000.00	54.47	102.09	89.73	102.11	0.000097	1.63	131386.80	15939.20	0.06
Lower Reach	145.5	125000.00	53.91	101.90	84.69	101.93	0.000047	2.67	162116.10	14695.54	0.08
Lower Reach	145.2	125000.00	59.17	101.83	91.16	101.85	0.000061	2.03	157852.60	14698.44	0.06
Lower Reach	145	125000.00	63.40	101.78	90.90	101.80	0.000049	1.92	164138.80	14681.70	0.06
Lower Reach	144.7	125000.00	58.64	101.67	92.83	101.69	0.000077	2.12	158592.80	14430.71	0.07
Lower Reach	144.55	125000.00	59.86	101.62	92.66	101.64	0.000072	2.27	155790.20	13933.28	0.08
Lower Reach	144	125000.00	57.62	101.32	92.00	101.34	0.000208	1.56	144061.00	14707.46	0.05
Lower Reach	143.5	125000.00	49.57	101.07	83.88	101.09	0.000122	1.48	147289.80	14472.39	0.05
Lower Reach	143.25	125000.00	59.30	100.78	91.09	100.81	0.000099	2.21	135362.90	13408.22	0.08
Lower Reach	143	125000.00	55.70	100.48	82.44	100.52	0.000177	2.66	126771.40	13897.96	0.09
Lower Reach	142.5	125000.00	56.94	99.85	88.24	100.35	0.000107	7.14	123030.90	13821.64	0.26
Lower Reach	142	125000.00	55.80	99.96	93.37	100.00	0.000156	3.13	134759.60	14557.85	0.10
Lower Reach	141.9	125000.00	55.73	99.55	83.09	99.74	0.000104	4.81	112222.60	14607.18	0.17
Lower Reach	141.5	125000.00	55.58	99.22	86.63	99.24	0.000179	1.84	126527.90	15672.45	0.07
Lower Reach	140.74	125000.00	59.26	99.00	92.32	99.05	0.000083	3.50	135759.40	14141.88	0.11
Lower Reach	140	125000.00	55.10	98.75	80.89	98.79	0.000090	2.40	129934.30	12152.27	0.08
Lower Reach	139.85	125000.00	59.64	98.46	86.22	98.59	0.000211	4.72	94413.84	11844.61	0.15
Lower Reach	139.01	125000.00	60.94	97.77	84.99	97.85	0.000212	3.65	79243.95	10538.57	0.13
Lower Reach	138.36	125000.00	48.80	96.99	92.44	97.25	0.000162	6.28	75790.02	9869.54	0.23
Lower Reach	137.71	125000.00	61.64	96.40	85.40	96.52	0.000267	4.26	77058.95	10379.94	0.15
Lower Reach	137.14	125000.00	54.70	95.90	82.69	95.93	0.000120	2.29	107565.70	11392.94	0.08
Lower Reach	136.8	125000.00	58.44	95.75	87.85	95.78	0.000121	2.54	117464.60	12292.47	0.09
Lower Reach	136.2	125000.00	64.41	95.23	85.41	95.27	0.000214	2.34	95613.79	12368.16	0.10
Lower Reach	136	125000.00	58.84	94.92	78.39	95.02	0.000123	3.74	94666.93	10558.11	0.12
Lower Reach	135.5	125000.00	59.94	94.74	88.08	94.83	0.000137	4.16	98697.33	10318.00	0.14
Lower Reach	135	125000.00	56.87	94.67	82.48	94.76	0.000134	3.90	98102.98	10020.30	0.13
Lower Reach	134.65	125000.00	56.00	94.47	87.48	94.57	0.000086	4.07	98533.35	9683.39	0.15
Lower Reach	132.75	125000.00	55.23	93.17	86.81	93.32	0.000250	5.22	88356.83	8595.28	0.17
Lower Reach	131.6	125000.00	52.70	92.41	83.35	92.45	0.000106	2.88	96860.48	8484.78	0.10
Lower Reach	131.35	125000.00	55.24	91.95	85.86	92.21	0.000181	6.24	83803.25	8513.89	0.20
Lower Reach	130.93	125000.00	55.80	91.76	82.62	91.82	0.000126	3.37	85466.36	7468.63	0.11
Lower Reach	130.51	125000.00	57.25	91.21	82.62	91.47	0.000226	6.06	57685.63	5414.95	0.20
Lower Reach	129.3	20000.00	55.69	91.14	64.28	91.14	0.000010	0.93	44257.45	4011.31	0.03
Lower Reach	129.27	20000.00	55.00	91.11	63.97	91.13	0.000016	1.27	30541.56	2490.42	0.04
Lower Reach	129.23	20000.00	55.14	91.02	63.74	91.10	0.000040	2.21	9066.79	308.90	0.07
Lower Reach	129.22	20000.00	55.14	91.02	63.74	91.10	0.000040	2.21	9065.91	308.90	0.07
Lower Reach	129.216	20000.00	55.64	90.30	67.92	91.03	0.000097	6.91	3054.55	162.00	0.21
Lower Reach	129.215	Inl Struct									
Lower Reach	129.214	20000.00	55.64	83.18	67.92	84.40	0.000191	8.86	2257.98	82.00	0.30
Lower Reach	129.213	20000.00	55.64	81.79	70.42	84.16	0.001074	12.33	1621.44	62.00	0.43
Lower Reach	129.212	20000.00	55.64	81.76	70.42	84.13	0.001077	12.35	1619.31	62.00	0.43
Lower Reach	129.211	20000.00	55.64	82.87	62.88	83.02	0.000018	3.14	6377.17	296.46	0.12
Lower Reach	129.21	20000.00	55.64	82.88	62.24	83.00	0.000014	2.80	7144.03	324.53	0.11
Lower Reach	129.2	20000.00	55.04	82.91	63.09	82.95	0.000072	1.98	35043.48	8700.72	0.08
Lower Reach	129.03	20000.00	54.78	82.64	65.09	82.79	0.000324	3.09	7102.10	1776.70	0.14
Lower Reach	128.5	20000.00	55.05	82.14	64.68	82.20	0.000136	2.31	22341.72	10887.56	0.10
Lower Reach	127.7	20000.00	50.83	81.89	63.50	81.94	0.000095	1.88	24434.77	7268.20	0.08
Lower Reach	127.4	20000.00	55.20	81.82	63.58	81.84	0.000045	1.67	29613.60	8596.47	0.07
Lower Reach	126.7	20000.00	50.94	81.26	63.03	81.33	0.000182	2.48	22928.23	9250.23	0.11
Lower Reach	125.3	20000.00	53.62	80.34	62.68	80.40	0.000079	2.39	24903.57	9252.31	0.10
Lower Reach	125	20000.00	50.24	80.08	59.59	80.19	0.000191	2.81	10931.51	5397.10	0.11
Lower Reach	124.4	20000.00	50.30	79.66	60.86	79.70	0.000082	1.84	27247.13	9120.94	0.08
Lower Reach	123.8	20000.00	49.74	79.32	59.67	79.42	0.000151	2.65	11543.28	2111.62	0.11
Lower Reach	123.15	20000.00	47.30	79.01	59.92	79.05	0.000116	1.91	18472.30	8252.70	0.08
Lower Reach	122.5	20000.00	51.94	78.59	60.45	78.69	0.000092	2.65	10994.30	3189.85	0.10
Lower Reach	121.46	20000.00	45.44	78.21	59.55	78.37	0.000183	3.39	8639.19	1081.28	0.13
Lower Reach	120.8	20000.00	50.84	77.62	59.47	77.75	0.000154	3.02	8020.86	911.09	0.12
Lower Reach	120.7	20000.00	50.84	77.57	59.62	77.71	0.000187	3.07	7635.90	856.68	0.12
Lower Reach	120.62	20000.00	46.54	77.50	58.15	77.63	0.000159	2.96	7258.38	612.58	0.12
Lower Reach	120.605	Bridge									
Lower Reach	120.59	20000.00	46.54	77.46	58.15	77.59	0.000160	2.96	7235.52	612.28	0.12
Lower Reach	120.5	20000.00	51.77	77.35	61.04	77.50	0.000164	3.18	7961.95	1017.53	0.13
Lower Reach	120.4	20000.00	51.55	77.28	61.40	77.44	0.000219	3.34	8143.88	1212.31	0.13
Lower Reach	120.38	20000.00	53.44	76.99	61.37	77.07	0.000162	2.47	18071.79	4831.68	0.11
Lower Reach	118.81	20000.00	49.90	76.52	59.77	76.54	0.000103	1.50	24314.51	5663.62	0.07
Lower Reach	117.87	20000.00	47.74	76.10	56.53	76.20	0.000098	2.81	23692.01	5128.77	0.11
Lower Reach	117.2	20000.00	46.84	75.49	56.42	75.66	0.000225	3.50	11811.84	3799.63	0.14
Lower Reach	116.5	20000.00	45.70	75.07	55.11	75.22	0.000131	3.22	9927.58	1567.17	0.12
Lower Reach	116.1	20000.00	44.66	74.78	55.86	74.89	0.000154	2.88	11004.63	1777.73	0.11
Lower Reach	115.7	20000.00	48.14	74.57	57.36	74.64	0.000106	2.47	13116.35	1880.79	0.10
Lower Reach	115.2	20000.00	36.85	74.00	52.23	74.11	0.000173	2.68	9576.30	1667.85	0.11
Lower Reach	115	20000.00	37.25	73.85	52.46	74.02	0.000407	3.40	7886.60	1539.87	0.15
Lower Reach	114.8	20000.00	48.55	73.68	58.69	73.72	0.000075	2.16	32950.76	5631.24	0.09

HEC-RAS Plan: Corrected Effective River: Rio Grande Reach: Lower Reach Profile: Design Flow (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	114.65	20000.00	43.92	73.64	54.88	73.66	0.000061	1.59	40904.45	5907.60	0.07
Lower Reach	114.1	20000.00	42.04	72.78	53.90	72.91	0.000231	3.11	9725.84	1464.54	0.13
Lower Reach	113	20000.00	38.05	72.39	53.01	72.40	0.000048	1.23	38993.09	9982.95	0.05
Lower Reach	112.2	20000.00	40.84	72.10	52.36	72.20	0.000116	2.93	19131.64	6639.64	0.11

HEC-RAS HEC-RAS 5.0.3 September 2016
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Lower Rio Grande
Project File : LowerRioGrande.prj
Run Date and Time: 10/3/2017 1:24:18 PM

Project in English units

Project Description:
Rio Grande Valley, Texas Fence Replacement
US Army Corps of Engineers Fort
Worth District
This model is not for public release until final
approval.
Last run date: October 3, 2017
HEC-RAS Version 5.0.3
The following
information was provided on the base model used for the duplicate effective
plan:
MARCH 2007

AN ADDITIONAL 70 XSECS THAT WERE SURVEYED ON MARCH 2007
WERE ADDED TO THE IBWC'S 2003 HECRAS BACKWATER MODEL. THE EARLIER 2003 MODEL'S
GEOMETRY WAS CONVERTED FROM 1929 DATUM TO CURRENT NAVD 88 DATUM.
THIS MODEL
WAS PREPARED USING HEC-RAS VERSION 4.0. THE FINAL PLAN MODEL ADDRESSED ASBUILT
CHANGES TO THE 2003 MODEL'S BRIDGES AT HIDALGO REYNOSA AND
PROGRESO

January
2003 (Earlier Model)

CURRENT MAINTENANCE WITH CONTROLLED GROWTH

HEC-RAS BACKWATER MODEL OF THE RIO GRANDE,
FROM BELOW BROWNSVILLE TO PEÑITAS.

This model used HEC-RAS Version 3.1.1.
Newer versions may give slightly different results.

River sections generally
surveyed during 1990. A few sections were surveyed earlier. This version
contains 24 additional sections with respect to the 1992 model, that were
surveyed in 2001.

Some of the geometry data at the dams, bridges, and
floodway inlets were taken from construction drawings and other sources.

The
flow of 235,000 cfs represents an attenuated flow from 250,000 cfs at Rio
Grande City. An additional 5000 cfs attenuation in the flood peak is assumed
to occur between Anzalduas Dam and Retamal Dam. Flows have been input to
simulate this attenuation. Flow diversions at the Main Floodway in the United
States and the Mexican Floodway are 105,000 cfs at each one, as agreed with
Mexico in Minute No. 238.

Starting elevation at River Mile 28 does not
include storm surge or tidal effects.

All elevations are referenced to Mean
Sea Level Datum.

The following description for the corrected effective plan
by Michael Baker International July 2017:
July 2017

The duplicate
effective river reach and cross-sections were re-cut using the 2008
IBWC-provided surface integrated with 2017 survey data (at cross-sections
145-139.85, 161.4- 160, and 155.2-135.5).

Reach lengths were approximated
between structures based on the duplicate effective model, then cross-sections,
and cross-section configurations were approximated using USIBWC-provided
hardcopy maps. Reach lengths for 169.83 and 169.49 were revised to 1300 feet,
and for 167.4 and 167 were revised to 2500 feet. Applied reach lengths were
imported from GeoRAS and not copied from Duplicate Effective Model, and the
reach was truncated at cross-section 112.2.

Cross-sections 186, 169.14,
169.12, 169.1, 156.93, 156.9, 156.87, 156.84, 151.27, 151.25, 129.23, 129.22,
129.216, 129.214, 129.213, 129.212, 129.211, 129.21, 120.62, 120.59, and 112.2;
and structures at river stations at 169.13, 156.915, 156.855, 151.255, 129.215,
and 120.605 were duplicated from the USIBWC 2008 model, except 169.14 was
elevated on the left bank to match the surface elevations.

Manning's
n-values, Contraction and expansion coefficients, blocked obstructions, levees,
and ineffective flow areas were approximated following associated duplicate
effective sections. Bathymetric stations and elevations were translated from
the associated duplicate effective cross-sections by graphical interpretations.

New cross-sections were placed at the beginning and ending of the proposed
floodwall. New cross-sections (excluding interpolated sections) include
180.32, 174, 172, 169.9, 166, 165, 163, 161.35, 161.3, 160, 159, 157.2, 155.2,
145.5, 145.2, 144.7, 144, 143.5, 143, 142, 141.5, 136.8, 136.2, 136, and 135.5.
Cross-sections 155.01, 154.6, 154.23, and 153.85 were extended on the left
bank to the levee. Bathymetric elevations, n-values, blocked obstructions,
levees, and ineffective flow areas for these new sections were placed based on
similar upstream or downstream cross-sections.

Cross-section 159.16 was
removed due to conflicts with new cross-sections and cross-sections downstream
of 112.2 were eliminated.

Control System Group: United States / State Plane
1983
Zone: Texas South 4205 (GROUND)
Datum Transformation: NAD 1983 (Conus)
(Molodensky)
Geoid Model: GEOID12B
Units: US Survey Feet
Vertical Datum:
NAVD88

The corrected effective and proposed flow boundary condition matches
the water surface elevation of the duplicate effective at cross-section 112.2
(72.10 ft)

Proposed cross-sections with 150-foot enforcement zone
cross-section: 180.32 - 169.9, 161.35 (not standard 150' section), 161.3, 155.2
- 145.67* (151.27 and 151.25 not standard 150' sections), 145.5 - 139.85
(75-foot enforcement zone for RGV-01 cut from proposed surface), 139.57* -
135.5, 127.7 - 124.4, 120.8, 120.7, 120.5, 120.4, 117.2 - 115.2.

PLAN DATA

Plan Title: Corrected Effective
Plan File : w:\Proj\160298_ATP\DRAINAGE\RGVPDR\Hydraulics\HEC RAS\Current\LowerRioGrande.p01

Geometry Title: Corrected Effective
Geometry File : w:\Proj\160298_ATP\DRAINAGE\RGVPDR\Hydraulics\HEC RAS\Current\LowerRioGrande.g01

Flow Title : Design Flow
Flow File : w:\Proj\160298_ATP\DRAINAGE\RGVPDR\Hydraulics\HEC RAS\Current\LowerRioGrande.f01

Plan Description:
July 2017

The Duplicate Effective river reach and cross-sections were
re-cut using the 2008 IBWC-provided surface integrated with 2017 survey data
(at cross-sections 145-139.85).

Reach lengths were approximated between
structures based on the duplicate effective model, then cross-sections, and
cross-section configurations were approximated using USIBWC-provided hardcopy
maps. Reach lengths for 169.83 and 169.49 were revised to 1300 feet, and for
167.4 and 167 were revised to 2500 feet. Applied reach lengths were imported
from GeoRAS and not copied from Duplicate Effective Model, and the reach was
truncated at cross-section 112.2.

Cross-sections 186, 169.14, 169.12, 169.1,
156.93, 156.9, 156.87, 156.84, 151.27, 151.25, 129.23, 129.22, 129.216,
129.214, 129.213, 129.212, 129.211, 129.21, 120.62, 120.59, and 112.2; and
structures at river stations at 169.13, 156.915, 156.855, 151.255, 129.215, and
120.605 were duplicated from the USIBWC 2007 model.

Manning's n-values,
Contraction and expansion coefficients, blocked obstructions, levees, and
ineffective flow areas were approximated using engineering judgement.
Bathymetric elevations were not obtained with the 2017 survey. Bathymetric
stations and elevations were translated from the associated duplicate effective
cross-sections using engineering judgement.

New cross-sections were placed
at the begining and ending of the proposed floodwall. New cross-sections
include 180.32, 169.9, 161.35, 161.3, and 155.2. Bathymetric elevations,
n-values, blocked obstructions, levees, and ineffective flow areas for these
new sections were placed based on similar upstream or downstream
cross-sections.

Cross-section 159.16 was removed due to conflicts with new
cross-sections.
This model was prepared using HEC-RAS Version 5.0.3.

Coordinate system NAD 1983 State Plane Texas South FIPS 4205 Feet, Lambert
Conformal Conic projection.

Plan Summary Information:
Number of: Cross Sections = 234 Multiple Openings = 0
Culverts = 0 Inline Structures = 2
Bridges = 4 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Design Flow
Flow File : w:\Proj\160298_ATP\DRAINAGE\RGVPDR\Hydraulics\HEC RAS\Current\LowerRioGrande.f01

Flow Data (cfs)

River	Reach	RS	Design Flow
Rio Grande	Lower Reach	186	235000
Rio Grande	Lower Reach	169.83	130000
Rio Grande	Lower Reach	156.93	125000
Rio Grande	Lower Reach	129.3	20000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Rio Grande	Lower Reach	Design Flow		Known WS = 72.1

Inline Structure Gate Openings
River = Rio Grande
Reach = Lower Reach RS = 169.13
Gate = Gate #1

# Open	Open Ht
34.75	6

River = Rio Grande
Reach = Lower Reach RS = 129.215
Gate = Gate #1

# Open	Open Ht
13.75	1

GEOMETRY DATA

Geometry Title: Corrected Effective
Geometry File : w:\Proj\160298_ATP\DRAINAGE\RGVPDR\Hydraulics\HEC RAS\Current\LowerRioGrande.g01

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 186

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	125.24	4	124.94	20	118.94	39	118.44	53	118.64
56	116.94	64	116.94	72	118.94	81	118.54	101	117.94
743	116.94	2095	117.64	2115	117.61	2134	119.86	2141	117.84
2147	113.94	2161	102.98	2169	96.64	2179	89.94	2189	87.94
2199	86.94	2209	86.64	2219	85.94	2239	87.94	2249	89.64
2259	90.44	2269	90.94	2279	91.94	2289	92.74	2299	93.64
2309	93.64	2329	95.64	2349	95.64	2359	95.94	2369	96.64
2379	96.94	2389	96.74	2399	96.94	2409	97.64	2419	97.94
2439	99.94	2449	99.94	2459	101.94	2462	102.98	2465	103.56
2497	109.74	2514	117.74	2526	118.11	2567	117.04	2576	117.08
2623	115.34	4197	113.74	4239	114.74	4255	119.24	4263	118.54
4270	119.24	4276	117.24	4288	116.74	4523	118.24	4528	120.24
4534	119.74	6507	116.44	6541	119.44	6563	118.74	6819	119.14
6847	119.74	9100	117.74	9111	121.14	9125	120.94	10226	120.54
10519	125.94								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.114	2141	.066	2161	.015	2465	.066	2514	.062

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2141 2514 850 1950 1075 .1 .3
Left Levee Station= 0 Elevation= 125.04
Right Levee Station= 10519 Elevation= 125.94

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	134.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.114	0.029	0.062
W.S. Elev (ft)	134.47	Reach Len. (ft)	850.00	1950.00	1075.00
Crit W.S. (ft)	122.25	Flow Area (sq ft)	36456.34	14044.55	130918.00
E.G. Slope (ft/ft)	0.000056	Area (sq ft)	36456.34	14044.55	130918.00
Q Total (cfs)	235000.00	Flow (cfs)	23487.43	60137.48	151375.10
Top Width (ft)	10519.00	Top Width (ft)	2141.00	373.00	8005.00
Vel Total (ft/s)	1.30	Avg. Vel. (ft/s)	0.64	4.28	1.16
Max Chl Dpth (ft)	48.53	Hydr. Depth (ft)	17.03	37.65	16.35
Conv. Total (cfs)	31355950.0	Conv. (cfs)	3133918.0	8024120.0	20197920.0
Length Wtd. (ft)	1250.28	Wetted Per. (ft)	2152.47	385.94	8015.75
Min Ch El (ft)	85.94	Shear (lb/sq ft)	0.06	0.13	0.06
Alpha	3.33	Stream Power (lb/ft s)	0.04	0.55	0.07
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	333412.30	98786.07	350802.80
C & E Loss (ft)	0.01	Cum SA (acres)	31173.01	3711.40	33909.66

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 185.50*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	123.96	9.9	124.57	21.45	124.62	37.95	124.29	54.45	124.29
75.9	124.11	89.1	124.12	103.95	124.31	120.46	124.05	128.71	124.16
184.81	123.86	221.11	124	245.86	123.96	292.06	124.1	303.61	124.54
308.56	125.88	316.81	128.82	325.06	130.83	327.5	129.93	342.17	122.81
347.06	121.14	349.37	120.85	381.28	120.42	388.61	120.75	399.52	120.44

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  404.08  119.44  413.05  119.14  428.39  119.46  437.49  119.16   454.6  118.17
  461.29117.9901  471.71  117.71  481.49  117.74  523.04  117.54  545.03  117.65
  562.14  117.54  601.25  117.76  635.47  117.87  650.13  117.78  694.12  117.99
  716.12  117.91  750.34  118.15  755.23  118.27  801.66  118.31  808.99  118.17
  816.33  118.68  833.44  118.74  835.88  118.37  845.66  115.83  850.55  114.89
  857.88   114.3   870.1  114.57  879.88  115.05  887.21  115.16  894.54  114.55
  906.76  114.85   914.1  114.62  933.64  114.88  958.09   114.5  970.31  114.48
   992.3  114.65 1002.08   115.2 1011.86  114.43 1019.19  114.26 1024.08  114.49
 1043.63  114.74 1050.97  114.99 1082.74  115.42 1129.18  115.63 1138.95  115.49
 1151.17  115.69  1163.4  115.56 1173.17  115.73 1236.72  115.38 1248.94  115.25
 1270.94  115.35  1285.6  115.69 1305.16  115.77 1314.93  115.43 1354.03  115.56
 1363.81  115.31 1378.48  115.43 1388.25  115.02 1402.92  114.88  1429.8  114.95
 1454.25  114.77 1488.46   114.8 1495.79  114.71 1542.23  114.76 1561.79  114.87
 1569.12  114.74 1581.34  114.96 1615.56  115.11 1637.55  115.28 1649.77  115.21
 1693.77  115.35  1701.1  115.26 1730.43  115.34 1776.87   115.8 1791.53  116.26
 1811.09  115.98 1818.42  116.19 1845.31  116.48 1879.53  116.58 1894.18  116.06
 1901.52  116.18 1911.29     116  1928.4  116.07 1935.74  115.94 1952.85  116.07
 1960.18  115.87 1974.84   115.8  1994.4   115.9 2013.95  116.25  2033.5  115.86
 2094.61  116.34 2104.38  116.52 2114.16  116.45 2128.82  116.73 2143.49  116.56
 2155.71  116.87  2177.7  117.14 2185.04     117  2221.7  117.08 2238.81  117.22
 2246.14  116.96  2265.7  117.11 2295.02   116.8 2329.24  117.01 2339.02  116.65
 2353.68  116.49 2368.35  116.65 2385.46  117.05 2400.12  116.86 2414.79  117.46
 2419.68  117.23 2436.78  117.13 2441.67  117.28 2453.89  116.92 2475.89  116.85
 2502.76  116.92 2529.62  117.28 2539.39  117.26 2556.49  118.09 2578.47  118.43
 2593.12  118.16 2619.99  118.03 2627.31  118.17 2639.53  118.03 2666.38  118.32
 2676.15  118.14 2683.48   117.7 2698.14  117.39 2727.44  117.71 2734.76  117.68
 2776.28  117.98 2790.94  117.32 2798.26  116.73 2810.47  116.57 2822.68  116.89
 2832.45  116.69 2839.78  116.22  2847.1   116.5 2866.64  116.45 2873.97  116.78
 2895.95  116.75 2908.16  117.29 2913.04  117.23 2927.69  117.57  2939.9  117.35
    2957  117.61 2978.98  116.89  2986.3  117.06  3003.4  117.87 3015.61  117.47
 3022.93  117.52 3037.58  118.09 3069.34  118.09 3083.99   117.9 3091.31  118.03
 3101.08  117.46 3108.41  117.39 3115.73  116.61 3123.06  117.03 3135.26  116.73
  3142.6  116.82  3154.8  117.71 3164.57  117.84  3171.9  118.31 3179.22  119.12
 3193.87  118.85  3201.2  117.57 3218.29  117.99 3230.51  118.61 3242.71  118.56
 3259.81  118.25 3272.02  119.19 3281.78  118.79 3286.67  119.04    3294  118.72
 3301.32  118.88 3303.77   118.6 3311.09  116.34 3313.54  116.06 3328.19  116.59
 3340.39  117.62 3345.28  117.72 3367.26  117.59 3377.03  117.39 3391.68  117.74
 3401.45  116.93 3418.54  117.38 3423.42  117.79 3442.96  116.28 3455.17     117
  3462.5  116.95 3474.71  116.12 3484.48  116.18 3494.24  116.85 3511.34  116.65
 3523.55  117.06 3535.76  117.26 3550.41  118.52 3561.75  118.92 3572.39  118.47
 3584.21   117.2 3590.12  115.86 3598.12114.8935 3611.78   112.1 3615.72  111.76
 3625.57  109.98 3637.39  108.46  3649.2  106.56 3659.06  105.54  3668.9  103.81
 3674.81  101.94 3680.72  100.69 3690.57  100.48 3696.48  100.02 3704.36   98.96
 3711.7797.17587 3717.81   95.93 3720.81   95.87 3734.04    94.8 3746.06   94.16
 3759.88   92.74 3765.89   90.95 3770.28 90.2082 3774.3789.18606 3784.53    84.8
 3789.93   82.89 3797.15   81.41 3804.36   80.42 3815.48   81.78 3826.59   82.52
 3829.56   83.36 3847.59   87.34 3857.47   88.35 3871.57    91.1 3879.97   92.28
 3892.06   93.64 3901.94   95.32 3910.58   97.07 3921.97   97.67 3938.77   98.83
 3955.57   99.49 3972.37  100.65 3989.15 102.308 3997.58  102.64 4003.61   103.6
 4015.76   107.3 4023.85  112.41  4037.9  114.11 4052.18  118.19 4061.18  118.38
 4091.93  117.83 4098.67  117.85 4133.92  116.97 4209.51  116.89 4307.84  117.01
  4322.6  116.88 4425.84  116.96  4470.1  116.82  4504.5  116.89  4529.1  116.76
 4548.78  116.85  4627.5  116.73 4652.11  116.92 4716.08  116.76 4794.81  116.81
 4888.31  116.55 4952.27  116.57 5001.48  116.47 5119.57  116.37 5178.63   116.4
 5247.51  116.28 5314.28  116.28 5345.78   116.8 5357.78  119.05 5363.78  118.68
 5369.03  119.01 5373.53     118 5382.53  117.75 5498.47  118.25 5558.76  118.55
  5562.5  119.54    5567  119.29 5596.88  119.19 5655.93  119.19  5695.3  119.05
  5744.5  119.03 5808.47  118.87 5882.29  118.85 5936.41  118.77 6015.15  118.51
 6024.99  118.56 6059.44   118.2 6069.26  118.27 6143.08  118.03 6177.53  118.04
 6221.82   117.9 6251.33  117.96 6325.15  117.86 6394.04  118.03 6418.63  117.93
 6438.32  118.04 6472.77     118 6531.82   117.7 6571.17  117.59 6625.31  117.59
 6817.22  117.37 6866.43  117.25 6989.44  117.22 7033.73  117.15 7046.58  117.26
 7072.08  118.75 7088.58  118.38  7122.3  118.37  7146.9  118.03  7215.8  117.85
 7280.56  117.76 7301.55  118.02 7338.81  117.99 7392.94  117.78 7481.51  117.56
 7496.27   117.6 7540.56  117.41 7761.98  116.86 7870.25  116.65 8008.03  116.25
 8022.79  116.02 8062.16  116.06    8072  115.92 8096.61  116.07 8116.29  116.87
 8135.98  116.93 8160.58  116.59 8214.71  116.46 8278.69  116.42 8357.43  116.48
 8377.11  116.75 8386.95  116.41 8396.79  115.56 8411.56  115.25 8450.93  115.37
 8455.85  115.63 8475.54  117.77 8485.38  118.11 8529.68  117.67  8603.5  117.76
 8667.47  117.66 8711.76  117.77 8805.27  117.61 8849.56  117.68  8952.9  117.59
 8991.11  117.49 8999.36  119.18 9009.86  119.09 9253.09  119.26 9331.83  119.16
 9405.64  119.15 9440.09  119.24 9568.04  119.21 9602.49  119.29 9641.86  119.24
 9671.39  119.42 9686.15  119.24 9700.91  117.47 9710.76  117.37 9725.52   119.3
 9740.28  120.75 9755.04  121.77 9779.65  122.67 9794.41  122.19 9819.02  122.68
 9868.23  122.83    9883  123.13  9907.6  124.01 9956.81  124.77 9991.26  125.51
10025.71  126.0310055.23  126.2610065.08  126.4810071.64  126.2610129.04  126.48
10142.16  126.4610155.28  126.7110166.76  126.6210174.96  126.7910188.08  126.64
10194.64  126.84 10209.4  126.6210220.88  126.93 10225.8  126.4810232.36  127.02
10240.56  126.7410263.52  126.82   10275  126.5410288.12  126.5610301.24  126.25
10329.12  126.6310337.32  126.3510370.12  126.89 10389.8  126.5110407.84  126.71
 10422.6  126.36 10430.8  126.5910443.92  126.0510452.12   126.110460.32  126.52
10470.16   126.410486.56  126.5110506.24  126.3410539.04  126.3210560.36  126.49
10566.92  126.3510634.17  126.4910642.37  125.8210652.21  126.0610666.96  125.93
10734.21   126.210745.69  126.4510763.72  126.1710842.45  125.8410886.72  125.89
10898.21  125.8110927.72  125.8510990.04  125.8311017.92  125.7111026.12  125.76
11063.85  125.6711075.33  125.7611136.01  125.5511180.29  125.6211198.33  125.48
11222.93  125.5211226.21  125.4211249.17  125.4711321.33   125.511349.21  125.45

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  833.44    .066 3572.39     .07 3598.12    .025 3989.15     .07
 4052.18    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3572.39 4052.18              850    1950    1075             .1       .3
Left Levee      Station=  325.05      Elevation=  130.83
Right Levee     Station=10065.08      Elevation= 126.475

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 185

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.67    9.84  122.85   19.68   123.9   42.64  124.01    49.2  123.25
   55.76  123.66   75.44  123.38  108.23   123.4  150.87  123.05  177.11  123.09
  206.63  123.48  239.43  122.97  255.83   123.2  367.34  122.66   439.5  122.96
  488.69  122.91  531.33  123.13  564.13  123.05  580.53  123.23  603.49  124.12
```

```
  613.32  126.81  629.72   132.7  639.56  135.55  646.12  136.72   649.4  135.53
  669.08   124.9  675.64  122.77  692.04  122.77  721.56  122.38   731.4  122.97
   764.2  121.34  770.75  121.35  787.15  119.75  796.99  119.64  819.95  118.04
  842.91  117.47  856.03  117.54  911.79  117.19   941.3  117.44  964.26  117.24
 1016.74  117.72 1062.66  117.96 1082.34   117.8 1141.37  118.27 1170.89  118.12
 1216.81  118.64 1223.37  118.88 1285.68  119.02 1295.52  118.74 1305.36  119.78
 1328.32  119.91  1331.6  119.17 1344.72   114.1 1351.28  112.23 1361.12  111.05
 1377.52   111.6 1390.64  112.57 1400.48   112.8 1410.32  111.59 1426.72   112.2
 1436.56  111.75 1462.79   112.3 1495.59  111.55 1511.99  111.53 1541.51   111.9
 1554.63     113 1567.75  111.48 1577.59  111.14 1584.15   111.6 1610.39  112.12
 1620.23  112.64 1662.86  113.52 1725.18  113.99  1738.3  113.72  1754.7  114.13
  1771.1  113.89 1784.22  114.23 1869.49   113.6 1885.89  113.35 1915.41  113.57
 1935.09  114.27 1961.33  114.45 1974.45  113.78 2026.92  114.09 2040.04  113.59
 2059.72  113.85 2072.84  113.04 2092.52  112.78  2128.6  112.95  2161.4   112.6
 2207.31  112.64 2217.15  112.46 2279.47  112.55 2305.71  112.77 2315.55   112.5
 2331.95  112.94 2377.87  113.22 2407.38  113.56 2423.78  113.42 2482.82  113.67
 2492.66  113.49 2532.02  113.65 2594.33  114.55 2614.01  115.46 2640.25   114.9
 2650.09  115.32 2686.17  115.88 2732.09  116.08 2751.76  115.03  2761.6  115.26
 2774.72   114.9 2797.68  115.04 2807.52  114.78 2830.48  115.03 2840.32  114.62
    2860  114.48 2886.24  114.67 2912.48  115.37 2938.71  114.59 3020.71  115.51
 3033.83  115.88 3046.95  115.74 3066.63  116.28 3086.31  115.95 3102.71  116.55
 3132.22  117.09 3142.06   116.8 3191.26  116.96 3214.22  117.23 3224.06  116.71
  3250.3     117 3289.65  116.37 3335.57  116.77 3348.69  116.06 3368.37  115.74
 3388.05  116.04 3411.01  116.85 3430.69  116.46 3450.37  117.66 3456.93  117.18
 3479.88  116.98 3486.44  117.29 3502.84  116.56 3532.36   116.4 3568.42  116.54
 3604.47  117.25 3617.58   117.2 3640.52  118.86 3670.02  119.53 3689.68  118.98
 3725.73  118.73 3735.56     119 3751.95  118.71 3787.99  119.29  3801.1  118.93
 3810.93  118.03  3830.6  117.42 3869.92  118.05 3879.75  117.99 3935.47  118.57
 3955.13  117.25 3964.96  116.06 3981.35  115.73 3997.73  116.38 4010.84  115.96
 4020.67  115.02  4030.5  115.59 4056.72  115.48 4066.55  116.13 4096.05  116.06
 4112.43  117.14 4118.99  117.02 4138.65  117.69 4155.03  117.26 4177.97  117.76
 4207.47  116.32  4217.3  116.65 4240.24  118.28 4256.62  117.47 4266.45  117.56
 4286.11  118.69 4328.72  118.69 4348.38  118.31 4358.21  118.56 4371.32  117.41
 4381.15  117.27 4390.98  115.71 4400.81  116.55 4417.19  115.95 4427.03  116.12
 4443.41   117.9 4456.52  118.15 4466.35  119.09 4476.18  120.72 4495.84  120.16
 4505.67   117.6 4528.61  118.44    4545  119.67 4561.38  119.56 4584.32  118.94
 4600.71  120.81 4613.81  120.02 4620.37  120.52  4630.2  119.88 4640.03  120.19
 4643.31  119.63 4653.14  115.11 4656.42  114.55 4676.08  115.59 4692.46  117.65
 4699.02  117.86 4728.51  117.59 4741.62  117.18 4761.28  117.87 4774.39  116.25
 4797.33  117.14 4803.88  117.96  4830.1  114.94 4846.48  116.38 4856.31  116.28
  4872.7  114.61 4885.81  114.73 4898.91  116.06 4921.85  115.67 4938.24  116.51
 4954.62  116.68 4974.28  118.06 4993.95  117.95 5003.78  119.11 5016.89  118.76
 5023.44  119.14 5033.27  117.75 5049.66  117.97 5069.32  115.94 5075.87  116.28
 5092.26  115.33 5111.92  115.42 5131.58  114.75 5147.97   115.2 5164.35  113.97
 5174.18  111.56 5184.01  110.39  5200.4  111.36 5210.23  110.84 5223.34  109.26
 5233.17  106.41 5239.72  105.82 5245.72     104 5245.72  103.92 5250.72     104
 5272.72   102.3 5292.72   101.4 5315.72    98.7 5325.72   95.18 5337.72    92.8
 5356.72    83.2 5365.72    79.5 5377.72   76.72 5389.72    74.9 5398.72    76.3
 5407.72      76 5424.72    83.6 5432.72    84.5 5450.72    90.9 5460.72    92.2
 5468.72      95 5475.72    98.5 5551.04  105.82 5560.87  109.95 5567.42  118.32
 5590.36  118.65 5695.22  118.55 5760.76  118.91  5770.6  118.68 5839.41  118.98
 5868.91  118.76 5891.84  118.94 5908.23  118.72 5921.35  118.93 5973.82  118.78
 5990.22   119.2 6032.86  118.97 6085.33  119.18 6147.65  118.79 6190.28  118.91
 6223.08  118.77 6301.79  118.73 6341.15  118.88 6387.06  118.72 6459.22  118.88
 6469.06  118.76 6554.33  118.78 6590.41  118.89 6619.92  118.71 6659.28  118.83
 6685.52  118.65 6718.31  118.71 6760.95  118.54 6810.15  118.67 6846.22  118.63
  6898.7  118.28 6905.26   118.4 6928.22  117.76 6934.77  117.93 6983.97  117.61
 7006.93  117.71 7036.45  117.53 7056.12   117.7 7105.32  117.68 7151.24  118.17
 7167.63  118.01 7180.75  118.28 7203.71  118.28 7243.07  117.82  7269.3  117.68
 7305.38  117.81 7433.29  117.78 7466.09  117.66 7548.08  117.88  7577.6  117.84
 7587.44  118.11 7636.63  117.93 7653.03   117.2 7698.95  116.69  7754.7   116.3
 7780.94  116.28 7817.02  115.93 7876.05   115.6 7885.89   115.7 7915.41  115.37
 8062.99  114.52 8135.15  114.24 8226.98  113.59 8236.82  113.15 8263.06  113.29
 8269.62  113.01 8286.02  113.34 8299.14  114.97 8312.26   115.1 8328.66  114.45
 8364.74  114.26 8407.38  114.25 8459.86  114.47 8472.98  115.03 8479.54  114.36
  8486.1  112.67 8495.94  112.08 8522.18  112.37 8525.46  112.89 8538.58  117.19
 8545.14  117.88 8574.67  117.06 8623.87  117.32 8666.51  117.19 8696.03  117.46
 8758.35  117.27 8787.87  117.45 8856.75   117.4 8886.27  117.21 9056.83   117.7
 9109.31  117.53 9158.51  117.56 9181.47  117.74 9266.75  117.76 9289.71  117.93
 9315.95  117.85 9335.63  118.22 9345.47  117.87 9355.31  114.34 9361.87  114.14
 9371.71  118.01 9381.55  120.91 9391.39  122.96 9407.79  124.77 9417.63  123.83
 9434.03  124.81 9447.15  124.86 9466.83  124.31 9476.67  124.55 9493.07   125.7
 9525.87  126.01 9548.83  126.66 9571.79  126.84 9591.47  126.57 9611.16  127.01
 9624.28  126.58 9643.96  126.75 9689.88  126.75 9739.08  127.02 9765.32  126.99
 9791.56  127.48 9814.52  127.31 9830.92  127.63 9857.16  127.33 9870.28  127.74
  9899.8   127.3 9922.76  127.91  9932.6  127.02 9945.72   128.1 9962.12  127.53
 9978.52   127.8 9994.92 127.4410008.04  127.71   10031 127.1310057.24  127.17
10083.48 126.5610139.24 127.3210155.64 126.7610221.24 127.8310240.92   127.3
 10260.6 127.0910296.68  127.48 10326.2  126.78 10342.6 127.2410349.16  126.62
10368.84 126.1610385.24 126.2510401.64  127.110421.32 126.8510454.12  127.09
10493.48 126.7410559.08 126.6910601.72 127.0310614.84 126.7510696.85  126.95
10713.25 126.7410726.37 127.0710749.33 127.0410765.73  125.710785.41  126.18
10814.93 125.9210949.41 126.4610972.37 126.9611008.45  126.411054.37  126.23
11074.05 126.3211087.17 126.0511119.97 126.0311165.89 125.7411201.97   125.7
11254.45 125.8311277.41 125.6711336.45 125.7611421.73 125.6811461.09  125.72
11516.85 125.4811533.25 125.5711608.69 125.3911631.65 125.5811753.02  125.16
11785.82 125.1211841.58 125.3111877.66 125.0211926.86  125.111933.42   124.9
11979.34    12512028.54 124.8512044.94    12512123.66 125.0612179.42  124.96

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  646.12    .066 5003.78     .07 5174.18    .025 5245.72     .07
 5250.72    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5003.78 5590.36              850    1950    1075             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5003.78  119.11       T
 5590.3612179.42  118.65       T
Left Levee      Station=  646.12      Elevation=  136.72
Right Levee     Station= 9611.16      Elevation=  127.01

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            134.39    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                0.066      0.059     0.066
  W.S. Elev (ft)            134.34    Reach Len. (ft)          850.00    1950.00    1075.00
  Crit W.S. (ft)            122.19    Flow Area (sq ft)      65589.01   18172.04   82122.85
  E.G. Slope (ft/ft)      0.000099    Area (sq ft)           79063.79   18172.04   87162.91
  Q Total (cfs)           235000.00    Flow (cfs)            89601.98   46551.23   98846.80
  Top Width (ft)          11527.83    Top Width (ft)         4352.19     586.58    6589.06
```

Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)	1.37	2.56	1.20		
Max Chl Dpth (ft)	59.44	Hydr. Depth (ft)	15.07	30.98	12.46		
Conv. Total (cfs)	23597500.0	Conv. (cfs)	8997373.0	4674437.0	9925691.0		
Length Wtd. (ft)	1328.14	Wetted Per. (ft)	4360.95	602.28	6602.31		
Min Ch El (ft)	74.90	Shear (lb/sq ft)	0.09	0.19	0.08		
Alpha	1.31	Stream Power (lb/ft s)	0.13	0.48	0.09		
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	331105.80	97305.11	345406.20		
C & E Loss (ft)	0.04	Cum SA (acres)	31039.95	3668.44	33549.50		

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 184.50*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	125.93	7.29	125.96	14.59	126.42	31.6	126.41	70.57	125.35
110.91	124.88	126.03	125.25	153.15	125.33	171.4	125.15	177.46	124.86
196.6	125.29	216.76	124.46	236.94	124.3	247.01	124.46	267.17	124.38
292.37	124.96	312.55	125.13	337.75	124.87	368.81	124.8348	393.2	125.11
403.28	125.1	423.44	125.74	438.58	127.13	447.3	128.29	454.58	130.18
466.74	133.95	474.03	135.86	478.9	136.64	480.68	136.05	491.42	130.74
495	129.68	520.05	129.51	525.42	129.81	543.31	129.01	555.83	128.22
561.2	128.17	573.73	127.38	623.83	126.3	639.93	126.1	652.46	125.74
675.38	125.47	706.14	125.39	716.87	125.23	749.08	125.21	765.18	125.01
793.81	124.97	827.81	124.19	833.17	123.92	838.54	124.3	851.07	124.05
863.59	119.99	868.96	119.31	890.44	119.95	895.8	119.29	904.75	119.51
910.12	119.24	924.43	119.37	942.32	118.83	967.37	118.76	974.53	119.24
981.69	118.41	1004.95	118.57	1010.32	118.8	1033.58	119.12	1083.68	119.15
1092.63	118.99	1146.3	119.12	1171.36	119.32	1182.09	119.72	1196.41	119.87
1203.56	119.57	1232.19	119.81	1239.35	119.53	1250.08	119.63	1257.24	119.21
1267.98	119.05	1287.66	119.07	1304.11	118.86	1335.97	119	1369.97	119.28
1398.6	119.68	1439.75	120.46	1448.7	120.49	1480.91	120.99	1486.27	120.97
1541.74	121.57	1552.48	122.01	1566.79	121.71	1591.84	122.21	1616.9	122.31
1627.63	121.79	1670.57	121.74	1686.68	121.3	1700.99	121.19	1715.31	121.33
1729.62	120.68	1788.67	120.18	1799.4	120.34	1810.14	120.18	1819.09	120.49
1854.22	120.97	1879.92	121.1	1885.29	120.83	1899.6	120.95	1921.07	120.54
1946.12	120.5	1953.28	120.08	1964.02	119.87	1987.28	120.31	1998.02	120.06
2008.75	120.61	2012.33	120.35	2028.43	120.3	2037.38	119.88	2073.15	119.64
2099.97	119.82	2112.49	120.6	2128.58	120.87	2139.31	120.55	2173.28	120.42
2192.94	120.71	2205.46	119.99	2216.19	119.61	2273.4	119.81	2284.12	119.14
2289.49	118.53	2298.43	118.36	2307.36	118.67	2319.88	117.97	2325.24	118.25
2339.55	118.18	2344.91	118.49	2361	118.44	2369.94	118.96	2384.24	119.22
2393.18	119.01	2405.69	119.26	2421.79	118.55	2439.67	119.54	2453.97	119.18
2464.69	119.75	2504.02	119.7	2516.54	119.06	2521.9	118.28	2527.26	118.71
2541.57	118.5	2550.51	119.39	2557.66	119.52	2568.38	120.79	2579.11	120.48
2584.47	119.18	2596.99	119.57	2605.93	120.16	2627.38	119.74	2636.32	120.65
2643.47	120.25	2647.05	120.5	2659.56	120.07	2666.71	117.53	2677.44	118.06
2689.95	119.21	2713.19	118.89	2723.92	119.19	2731.07	118.33	2743.59	118.68
2747.16	119.06	2761.46	117.44	2770.4	118.09	2775.76	117.99	2784.7	117.14
2791.86	117.2	2799	117.86	2811.52	117.66	2829.4	118.28	2840.12	119.07
2850.85	119.11	2856.21	119.74	2868.63	119.72	2875.21	19.0129	2885.18	119.09
2897.59	118.01	2901.73	118.11	2924.48	116.84	2936.9	115.67	2947.24	115.1
2957.58	113.64	2969.99	110.69	2980.34	109.88	2998.17	106.68	3003.7	100.98
3006.22	100.4952	3008.95	99.97	3027.74	99.06	3038.62	98.22	3053.14	96.34
3059.46	94.67	3067.03	93.59	3069.29	2.75314	3073.69	1.05616	3084.71	85.59
3092.28	82.94	3099.86	80.77	3112.09	81.89	3124.33	82.32	3131.5	83.5
3147.44	86.78	3158.31	87.63	3171.04	89.74	3186.86	92.12	3196.37	92.57
3202.68	93.38	3216.76	96.1	3226.41	97.06	3234.32	98.2	3250.14	99.91
3258.05	101.2	3273.86	102.78	3307.72	105.32	3311.85	106.0442	3319.15	108.37
3333.67	114.53	3341.41	118.88	3351.83	119.61	3372.59	120.15	3377.69	119.99
3385.33	117.52	3390.44	116.66	3400.63	115.63	3413.37	114.89	3433.76	114.8
3449.05	114.41	3466.89	114.34	3502.57	114.56	3553.53	114.68	3591.75	114.97
3611.71	115.21	3647.82	115.26	3680.95	115.55	3688.6	115.44	3726.82	116.03
3759.95	117.11	3772.7	117.86	3805.82	117.61	3854.24	117.78	3905.21	117.68
3933.7	117.99	3956.18	117.89	4012.24	117.86	4075.95	118.1	4129.47	118.05
4223.76	118.61	4239.05	118.56	4269.63	118.66	4295.12	118.61	4346.09	118.67
4381.77	118.6	4397.06	118.68	4499	118.6	4542.32	118.84	4567.81	118.78
4591.83	118.91	4611.13	118.84	4623.87	118.98	4639.16	118.92	4662.1	119.1
4669.74	119.02	4700.32	119.24	4738.56	119.27	4809.91	119.42	4817.33	119.31
4850.68	119.44	4886.36	119.47	4901.66	119.33	4919.49	119.42	4983.2	119.47
5034.17	119.26	5052.02	119.11	5164.14	118.68	5207.47	118.41	5217.74	118.48
5248.25	118.06	5259.15	118.17	5299.22	117.87	5304.31	117.92	5345.09	117.69
5360.41	117.72	5416.44	117.44	5434.28	117.47	5495.45	117.25	5562.91	117.39
5592.29	117.26	5604.32	117.39	5645.81	117.24	5676.39	116.99	5747.74	116.69
5760.48	116.75	5801.26	116.71	5816.55	116.62	5893	116.5	5921.04	116.38
5938.88	116.41	5997.49	116.22	6028.07	116.21	6051.01	116.3	6073.94	116.17
6094.33	116.28	6150.39	116.15	6196.26	116.26	6209.01	116.15	6244.03	116.12
6257.43	115.87	6295.65	115.64	6356.82	115.52	6379.75	115.31	6395.04	115.4
6420.53	115.27	6440.92	115.33	6456.2	115.2	6519.92	115.03	6540.31	115.08
6560.69	115.5	6565.78	115.94	6578.53	117.81	6621.85	117.39	6660.08	117.37
6680.47	117.22	6718.69	117.19	6784.95	116.97	6800.24	117.05	6846.11	116.93
6858.85	116.82	6932.76	116.75	6999.02	116.47	7042.34	116.38	7072.45	116.22
7086.25	116.05	7118.79	116.1	7132.28	115.88	7155.29	116.03	7173.71	116.85
7192.12	116.91	7218.18	116.54	7253.86	116.34	7271.7	116.39	7307.38	116.28
7322.67	116.34	7353.25	116.27	7399.24	116.32	7417.65	116.63	7426.85	116.29
7436.06	115.44	7449.87	115.13	7486.69	115.18	7491.29	115.51	7509.7	117.62
7518.91	117.98	7529.09	117.8	7574.96	117.52	7625.93	117.56	7643.77	117.64
7689.22	117.55	7717.67	117.63	7791.58	117.61	7801.77	117.52	7859.52	117.64
7873.13	117.55	7926.64	117.63	7985.26	117.52	7990.35	117.42	8026.03	117.53
8110.13	117.54	8143.26	117.65	8204.42	117.54	8250.29	117.39	8268.13	117.26
8288.52	117.38	8303.81	116.61	8314	116.41	8354.78	116.51	8375.17	116.38
8446.52	116.53	8502.58	116.39	8525.52	116.47	8599.42	116.41	8628.17	116.58
8641.97	116.41	8655.78	114.59	8664.99	114.46	8678.79	116.4	8692.6	117.84
8706.41	118.83	8729.42	119.74	8743.23	119.19	8766.25	119.68	8790.56	119.66
8812.27	119.42	8826.08	119.53	8849.09	120.05	8874.65	120.22	8887.39	120.01
8900.14	118.14	8915.42	118.12	8928.16	119.21	8930.71	119.1	8943.45	120.15
8948.55	121.75	8956.2	123.01	8961.29	125.06	8981.68	125.57	8999.52	125.82
9014.8	126.21	9021.63	126	9095.04	126.17	9108.69	126.4	9129.18	126.47
9142.83	126.31	9149.66	126.51	9165.02	126.29	9176.97	126.58	9182.09	126.14
9188.92	126.67	9197.46	126.38	9221.36	126.46	9233.31	126.17	9246.96	126.18
9260.62	125.87	9289.64	126.23	9298.17	125.95	9332.31	126.48	9352.8	126.11
9371.58	126.31	9386.94	125.96	9395.47	126.19	9398.89	125.88	9417.67	125.69
9426.2	126.12	9436.44	126	9453.51	126.12	9474	125.94	9508.14	125.92
9530.33	126.09	9537.16	125.95	9607.15	126.04	9615.69	125.36	9625.93	125.59

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 9641.29  125.44 9711.28  125.63 9723.23  125.87 9742.01  125.57 9823.95   125.2
 9870.04  125.21 9881.98  125.13 9977.58  125.14 10054.4  124.9710066.34  125.06
10129.51  124.85 10175.6  124.9310194.38   124.810322.41  124.8710351.42  124.83

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .112 1033.58    .066 3006.22    .015 3372.59    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2856.21 3372.59              850    1950    1075             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2856.21  119.74       T
 3372.5910351.42  120.15       T
Left Levee      Station=   478.8      Elevation=  136.64
Right Levee     Station=9014.805      Elevation= 126.215
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3385.3310351.42  117.52

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 184

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  129.19   13.12  128.84   19.68  128.85   29.53  128.39   45.93   127.3
   55.77  127.12   62.33  126.75   72.18  126.69   82.02  127.43  104.98  127.11
  111.55   127.2  114.83  126.72  127.95  127.42  141.07   125.9   154.2  125.71
  160.76   126.1  173.88  126.07  183.72  126.54  190.28  127.14  203.41  127.37
  219.81   126.8  242.78  126.68   255.9  127.09  262.46  127.11  275.58  128.36
  285.43   130.6  291.99  132.76  308.39  136.15  311.67  136.56  328.08  136.73
  334.64  135.72  344.48  133.31  360.88  131.77  364.16  131.09  374.01  128.14
  377.29  127.46  396.97  125.19  416.66  123.92   426.5  125.02  436.34  125.56
  449.47   125.1  465.87  126.47  482.27  128.78  492.12  128.52  508.52  128.56
   511.8  128.39  518.36  127.25  531.48  124.39  538.05  124.44  541.33  125.05
  551.17  124.85  557.73  124.11  567.57  123.54   580.7  122.52  590.54  122.04
   597.1   122.2  610.22  121.07  629.91  120.75  659.44  120.89  672.56  120.47
  685.68   120.6  695.52  119.68  702.09  119.65  708.65  120.37  725.05  120.15
  731.61  119.58  738.17  117.99  744.74   115.7  754.58  111.84  764.42   105.9
   767.7  105.64     770   95.94     780   95.94     790   93.94     800   94.64
     810   86.64     820   86.94     830   87.94     840   88.64     850   88.64
     860   89.64     870   89.94     880   90.64     890   90.94     900   91.64
     910   91.94     920   92.94     940   92.94     950   93.94     960   93.64
     970   94.94     980   96.64     990   97.64    1000   98.94    1010  100.94
    1030  102.98 1072.81  105.64 1076.09  105.94 1079.37  107.08 1089.22  111.89
 1095.78  114.28 1102.34  117.09 1105.62  118.02 1118.74  119.92 1128.58  120.79
 1138.43  121.27 1154.83  121.65 1161.39  121.33 1167.95  117.79 1171.23   116.4
  1177.8  114.69 1190.92  112.63 1207.32  111.16 1220.45  111.06 1227.01  110.76
 1233.57     111 1253.25  110.23 1276.22   110.1 1302.46  110.26 1322.15  110.55
 1338.55  110.49 1351.67  110.69 1387.76  110.68 1420.57  111.02 1436.97   111.1
 1463.22  111.51 1499.31  111.84 1509.15  111.78  1551.8  112.24 1561.64      112
 1584.61  112.62 1597.73  112.75 1610.85   113.1 1633.82   114.2  1653.5  115.44
 1669.91   116.9 1686.31  116.64 1692.87  116.69 1712.55  116.38  1722.4  116.63
 1765.05  116.55 1774.89  116.66 1827.38  116.69  1840.5  116.57 1860.19  116.79
 1883.15  116.79 1906.12  116.67 1942.21  116.77 1978.29   116.7 1984.86  116.61
 2017.66  116.89 2040.63  116.87 2060.31  117.06 2129.21  117.19 2142.33  117.52
  2165.3  117.58 2198.11  117.95 2204.67  117.93  2250.6  118.34 2270.28  118.28
 2309.65  118.55 2342.46  118.46 2408.08   118.6 2444.17  118.54 2454.01  118.44
  2473.7  118.56 2513.07  118.43 2529.47  118.54 2549.15  118.49 2572.12  118.52
 2591.81  118.72 2604.93  118.46 2621.33  118.74 2627.89  118.64  2660.7  118.87
 2677.11  118.87 2693.51  118.72 2700.07  118.85 2732.88  118.96 2749.28  118.92
 2765.69  119.19 2785.37  119.08  2814.9  119.44 2824.74  119.26 2844.43  119.41
 2864.11  119.71 2913.33  119.74 2955.98  119.87 2972.38  119.82 3005.19   120.1
 3011.75  119.91    3038  119.95 3057.68   120.1 3077.37  119.98 3103.61  120.18
  3123.3  119.98 3146.26  120.17 3169.23  120.12 3198.76  120.23 3215.16  120.17
 3228.28   120.3 3267.65   120.2  3293.9  119.94 3307.02  119.99 3316.87  119.61
 3366.08  119.25 3412.01     119  3431.7  118.95 3451.38  119.12 3461.22  118.87
 3497.31  118.75    3517  118.53 3543.24  118.58 3569.49  118.33 3579.33  118.43
 3599.02  118.36 3635.11  117.99 3641.67  118.11 3684.32  117.86 3694.16  117.72
 3723.69  117.73 3736.81  117.59  3756.5  117.59 3786.02  117.26 3808.99  117.24
  3858.2  117.05 3887.73  116.82 3900.85  116.92 3920.54  116.69  3943.5  116.78
 3953.35  116.61 4002.56  116.63  4012.4  116.42 4018.96  116.55 4051.77  116.35
  4081.3  116.28 4120.67  116.03 4156.76  115.99 4179.72  115.83 4186.28   115.9
 4212.53  115.66 4228.93  115.73 4258.46  115.55 4281.43  115.62 4301.11  115.43
 4373.29  115.29 4399.53   115.2 4412.66  115.05 4425.78  115.11 4435.62  114.97
 4458.59  115.03 4474.99  114.86 4488.11  114.92 4534.04  114.77 4543.89  114.86
 4566.85  114.83 4573.41  114.71 4602.94  114.85 4616.06  114.62 4632.47  114.55
 4658.71  114.73 4698.08  114.48 4711.21  114.62 4730.89  114.45 4737.45  114.54
 4760.42  114.31 4783.38  114.33 4789.94  114.47 4806.35  114.28 4862.12  114.32
 4868.68  114.24 4885.09  114.44 4901.49  114.46 4917.89  114.31  4950.7  114.47
 4983.51  114.32 4996.63  114.47 5006.47  114.27 5026.16  114.17 5045.84  114.43
 5058.97  114.43 5078.65  114.24  5104.9  114.38 5124.58  114.19 5157.39  114.32
 5163.95   114.2  5206.6  114.23 5232.85  114.41 5259.09  115.33 5265.65  116.23
  5275.5  118.76 5282.06  120.01 5301.74  119.57 5321.43  119.57 5337.83   119.3
 5370.64  119.43 5373.92  119.29 5387.04  119.48 5413.29  119.26 5426.41  119.33
 5449.38  119.27  5462.5  119.35  5478.9  119.18 5492.03  119.33 5521.55  119.21
 5528.12  119.33  5547.8  119.19 5567.48   119.4 5587.17  119.27 5597.01   119.4
 5626.54  119.36 5642.94  119.17 5669.19  119.26 5685.59  119.15    5702  119.28
 5721.68  119.09 5738.08  119.23 5777.45  119.16 5797.14  119.04 5813.54  119.14
 5823.38  118.97 5852.91  118.95 5879.16  119.02 5885.72  118.86 5895.56  118.98
 5925.09  118.81 5934.93  118.96 5967.74  118.76 5977.58  118.93  5990.7  118.75
 6016.95  118.77 6036.63  118.66 6043.19  118.76 6062.88  118.68 6092.41  118.81
 6105.53  118.64 6121.93  118.67 6128.49  118.41 6141.62  118.53 6151.46  118.37
 6174.43  118.52 6220.36   118.3 6240.04  118.43 6279.41  118.21 6325.34  118.31
  6331.9  118.14 6354.87  118.23 6407.36  118.18 6427.04  117.97 6440.17  118.07
 6450.01  117.96 6456.57  118.14 6466.41  118.03 6499.22  118.09 6505.78  117.92
 6525.47  118.08 6551.71  118.12 6564.84  117.93  6571.4  118.03 6594.36  117.86
 6610.77  117.86 6620.61  118.06 6630.45  117.82 6653.42  117.99 6666.54  117.94
 6732.15  117.91 6738.72  118.06 6748.56  117.89 6755.12  118.04  6774.8  117.73
 6814.17  117.84 6830.58  117.74  6843.7   117.9 6856.82  117.74 6873.23  117.85
 6889.63  117.78 6938.84  117.83 6948.69  117.66 6988.05  117.72 6991.33  117.83
 7017.58  117.84 7050.39  117.62 7053.67  117.75 7093.04  117.78  7099.6  117.59
 7125.85  117.77 7145.53  117.79 7175.06  117.67 7181.62  117.76 7230.83  117.67
 7247.23  117.85  7253.8  117.63  7270.2  117.76 7296.45  117.79 7319.41  117.53
 7332.53  117.64  7355.5  117.45 7375.18  117.44 7421.11  117.09 7434.24  117.12
  7457.2  116.89 7483.45  117.18 7493.29   116.7 7503.13  115.67 7516.26  115.29
 7549.06   115.3 7568.75  115.48    7595  115.21 7621.24  115.26 7631.08  115.13
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7657.33	115.16	7686.86	115.31	7726.23	115.12	7736.07	115.23	7759.03	115.03
7788.56	115.19	7808.24	115.14	7837.77	114.91	7850.89	115.04	7860.74	114.92
7883.7	114.96	7890.26	115.09	7916.51	114.95	7949.32	114.95	7959.16	114.78
7995.25	114.79	8041.18	114.64	8047.74	114.75	8073.99	114.5	8093.67	114.57
8113.36	114.46	8129.76	114.57	8182.25	114.49	8192.09	114.36	8215.06	114.42
8231.46	114.35	8238.02	114.56	8251.14	114.36	8254.42	114.07	8270.83	110.17
8277.39	109.78	8290.51	109.83	8300.35	110.66	8306.91	111.75	8310.19	111.52
8326.59	113.54	8333.16	116.73	8339.72	117.98	8343	119.19	8349.56	123.29
8359.4	123.51	8375.8	124.51	8398.77	124.88	8418.45	125.42	8441.41	125.13
8461.1	125.15	8474.22	124.77	8487.34	124.57	8507.02	124.53	8523.43	124.71

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.112	708.65	.066	725.05	.015	1102.34	.066

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
708.65	1154.83	1037.5	1525	1100	.1	.3

Left Levee Station= 328.08 Elevation= 136.73
Right Levee Station= 8418.45 Elevation= 125.42
Blocked Obstructions num= 1

Sta L	Sta R	Elev
1167.95	8523.43	117.64

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	134.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.112	0.015	0.066
W.S. Elev (ft)	133.70	Reach Len. (ft)	1037.50	1525.00	1100.00
Crit W.S. (ft)	123.67	Flow Area (sq ft)	3331.15	14275.03	113260.70
E.G. Slope (ft/ft)	0.000062	Area (sq ft)	3331.15	14275.03	113260.70
Q Total (cfs)	235000.00	Flow (cfs)	1509.70	109718.10	123772.20
Top Width (ft)	8180.56	Top Width (ft)	365.78	446.18	7368.60
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)	0.45	7.69	1.09
Max Chl Dpth (ft)	47.06	Hydr. Depth (ft)	9.11	31.99	15.37
Conv. Total (cfs)	29897970.0	Conv. (cfs)	192072.5	13958940.0	15746960.0
Length Wtd. (ft)	1291.82	Wetted Per. (ft)	367.67	463.55	7380.41
Min Ch El (ft)	86.64	Shear (lb/sq ft)	0.03	0.12	0.06
Alpha	8.75	Stream Power (lb/ft s)	0.02	0.91	0.06
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	329701.20	95855.66	340464.50
C & E Loss (ft)	0.01	Cum SA (acres)	30947.65	3622.21	33205.04

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 183.80*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	130.91	14.86	130.66	34.68	129.49	47.06	129.08	54.5	129.04
61.92	129.59	79.26	129.35	86.7	129.06	96.6	129.58	106.51	128.45
116.42	128.3	121.37	128.6	131.28	128.57	143.66	129.38	153.57	129.55
165.96	129.12	183.3	129.03	198.16	129.35	208.06	130.29	215.5	131.97
220.45	133.59	232.83	136.13	235.31	136.44	247.7	136.57	249.7	133.28
273.65	131.72	282.63	130.52	293.6	129.82	305.57	129.34	315.55	129.93
325.53	129.29	364.45	128.49	385.7	128.16	399.5	127.61	440.94	125.4
454.74	124.92	471.22	124.52	492.18	124.17	514.13	123.61	530.09	123.32
542.07	123.25	549.05	123.42	578.99	123.01	601.94	122.84	620.38	122.57
635.87	122.98	643.85	123.43	649.84	121.82	679.78	122.17	703.17	122.24
712.7	122.06	758.42	121.77	827.41	122.8	896.41	124.53	937.85	124.34
1006.85	124.36	1020.65	124.24	1048.25	123.38	1079.92	122.15	1103.45	121.52
1124.83	121.61	1131.09	121.49	1144.89	122.04	1170.73	121.79	1193.68	121.68
1213.89	121.14	1249.56	120.86	1260.54	120.92	1264.53	120.67	1282.49	120.43
1299.46	120.05	1345.36	119.6	1363.32	119.71	1378.29	120.17	1385.27	119.69
1393.25	119.74	1399.24	119.49	1418.2	119.12	1437.16	118.92	1442.15	119.21
1448.14	118.84	1468.1	118.76	1475.08	119.01	1482.07	118.8	1500.03	118.83
1519.98	118.57	1533.95	119.16	1545.93	120.54	1556.9	119.4	1559.9	119.5
1562.89	120.65	1572.87	120.23	1587.84	119.99	1629.74	120.19	1643.72	120.17
1658.68	119.91	1666.66	120.16	1672.65	119.82	1683.63	119.6	1687.62	118.89
1692.61	118.92	1695.6	119.54	1717.51	119.58	1755.32	119.88	1765.27	120.37
1773.23	120.08	1778.2	119.07	1784.17	118.62	1797.11	118.51	1801.09	119.2
1807.06	118.22	1817.01	118.56	1821.98	118.39	1836.91	119.22	1844.87	119.09
1848.85	119.4	1857.62	118.97	1866.41	116.5	1872.74	115.88	1879.57	114.37
1886.41	112.32	1896.65	108.86	1906.89	103.18	1910.31	102.65	1912.7	95.22
1923.11	94.67	1933.52	92.93	1943.92	93.38	1954.33	87.31	1963.4	87.56
1981.53	88.89	1990.6	88.92	1999.67	89.75	2008.74	90.07	2017.8	90.66
2026.87	90.93	2035.94	91.48	2045.01	91.71	2054.07	92.45	2072.21	92.37
2081.28	93.13	2090.34	92.95	2099.41	93.98	2108.48	95.39	2126.61	97.36
2135.68	98.97	2153.82	100.7	2192.63	103.09	2198.58	104.24	2207.51	107.95
2218.99	111.84	2224.33	115.11	2243.2	118.02	2252.13	118.88	2267	119.76
2273.4	119.74	2282.98	116.14	2289.38	114.8	2302.16	112.99	2309.75	112.29
2318.14	112.18	2330.93	112.29	2337.32	111.84	2359.62	111.77	2370.31	111.36
2398.81	111.16	2409.49	110.62	2416.61	110.48	2430	110.9	2441.55	110.96
2462.93	110.37	2493.91	110.4	2525.88	110.71	2541.85	110.78	2567.42	111.07
2602.58	111.34	2612.54	111.33	2653.72	111.64	2663.3	111.45	2685.68	111.91
2711.24	112.3	2733.66	113.11	2752.79	114.09	2768.77	115.18	2810.31	114.76
2819.91	114.95	2922.17	114.99	2934.95	114.89	2954.13	115.07	2976.5	115.1
3000.82	115.01	3034.03	115.12	3075.64	115.04	3107.53	115.27	3129.91	115.26
3149.08	115.4	3216.2	115.47	3228.98	115.72	3251.36	115.8	3283.32	116.08
3334.45	116.37	3353.63	116.3	3391.98	116.46	3423.94	116.37	3487.86	116.43
3532.61	116.3	3551.79	116.37	3590.14	116.23	3606.12	116.38	3645.71	116.33
3667.09	116.52	3679.63	116.32	3695.6	116.53	3701.99	116.46	3749.94	116.66
3765.92	116.54	3772.31	116.64	3820.25	116.68	3836.23	116.88	3855.4	116.81
3884.17	117.09	3893.76	116.95	3932.11	117.26	3952.15	117.32	3987.78	117.28
4005.59	117.36	4016.29	117.2	4051.92	117.61	4069.73	118.87	4120.68	118.85
4139.86	118.68	4165.42	118.77	4184.6	118.65	4206.97	118.79	4274.08	118.74
4286.87	118.85	4325.22	118.77	4350.79	118.6	4363.57	118.66	4373.17	118.4
4401.11	118.33	4426.06	118.15	4485.03	117.91	4504.2	118.01	4513.79	117.82
4548.94	117.73	4568.12	117.58	4593.69	117.57	4619.26	117.39	4648.02	117.4
4683.18	117.1	4689.57	117.19	4740.71	116.82	4769.47	116.82	4801.43	116.7
4830.19	116.43	4852.57	116.4	4900.51	116.23	4929.27	116.06	4942.05	116.13
4961.23	115.96	4983.6	116.03	4993.2	115.9	5041.13	115.86	5117.84	115.55
5156.19	115.33	5220.11	115.21	5245.68	115	5281.21	114.94	5306.16	115.18
5323.97	114.32	5334.66	114.83	5363.16	114.59	5427.84	114.51	5463	114.3
5485.38	114.35	5558.88	114.14	5568.47	114.21	5597.23	114.09	5626	114.19
5638.78	114.06	5680.33	114.2	5718.68	114.15	5731.47	114.23	5750.64	114.08

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 5757.03  114.16 5779.41  114.03 5808.16  114.12 5824.15  113.98 5878.48  114.05
 5900.86  114.16 5932.81  114.08  5954.6  114.18 5996.73  114.15 6009.51  114.29
 6038.28  114.07 6057.45  114.29 6089.41  114.18 6114.98  114.31 6134.16  114.22
 6166.12  114.34 6172.51  114.25 6214.06   114.3 6239.63  114.49 6265.19  115.18
 6271.58  115.87 6281.18  117.79 6287.57  118.73 6306.74  118.39 6325.92  118.39
 6341.89  118.21 6389.83   118.4  6415.4  118.26 6428.19  118.32 6463.34  118.31
 6479.32  118.18 6492.11  118.31 6520.87  118.25 6527.27  118.35 6546.44  118.27
 6565.61  118.41 6584.79  118.32 6594.38  118.42 6623.14  118.41 6639.12  118.26
 6664.69  118.31 6680.67  118.24 6696.65  118.36 6715.82  118.24  6731.8  118.36
 6770.15  118.32 6789.33  118.23 6805.31  118.35  6814.9  118.21 6843.66  118.16
 6869.23  118.25 6913.98   118.1 6923.56  118.21 6955.52   118.1 6965.11  118.25
 6977.89  118.13 7003.46  118.15 7022.63  118.07  7048.4   118.2 7051.96  118.13
 7069.78  116.17 7084.04  115.98 7091.15  116.57 7101.84  118.39 7119.66  120.45
 7126.79  120.68 7148.16  120.27 7156.87   120.3 7201.62  120.11 7220.79  120.22
 7259.14  120.07 7303.88  120.12 7310.27  119.99 7332.65  120.08 7369.06  120.02
 7390.43  120.36 7408.25  120.08 7418.94  120.21 7425.33  119.96 7441.31  119.76
 7473.27  119.82 7479.66  119.69 7498.84  119.82  7524.4  119.82 7565.95  119.61
 7581.94   119.6 7591.52  119.75 7601.11  119.58 7623.48  119.74  7643.4  119.66
 7689.72  119.63 7706.58  119.78 7722.55  119.78 7741.73  119.53 7780.08   119.6
 7796.06  119.52 7808.84  119.64 7821.63  119.52 7901.53  119.58 7911.12  119.45
 7949.46  119.49 7978.23  119.59 8010.19  119.39 8013.39  119.49 8051.74  119.51
 8058.13  119.36 8092.33  119.56 8131.64  119.41 8138.03  119.48 8185.97  119.38
 8201.95   119.5 8208.35  119.33 8224.32  119.42 8249.89  119.42 8272.26  119.22
 8285.04   119.3 8326.59  119.15 8371.33  118.89 8384.12  118.89 8406.49   118.7
 8432.06  118.92 8441.65  118.56 8451.23   117.8 8464.02  117.52 8495.97  117.53
 8515.16  117.65 8540.73  117.42 8575.88  117.39 8630.21  117.53 8668.57  117.37
 8678.15  117.47 8700.52  117.34 8729.29  117.43 8777.22  117.23    8790  117.34
  8799.6  117.25 8828.36  117.36 8851.22  117.25 8869.03  117.55 8885.89  117.66
 8904.66  117.51 8915.34  117.75 8975.38  117.58 8981.77  117.66 9007.34  117.48
 9018.67  117.55 9032.92  117.42 9061.67  117.52 9122.38  117.32 9160.74  117.45
 9167.13  117.62 9179.91  117.43  9183.1   117.2 9199.09  114.26 9205.48  113.99
 9218.26  114.06 9227.85  114.72 9234.24  115.55 9237.43  115.39 9253.41  116.91
 9259.81  119.43  9266.2   120.4 9269.39  121.31 9275.79   124.4 9285.37   124.6
 9301.35  125.42 9321.51  125.44  9342.9  126.21 9351.12  125.75 9359.34   124.5
 9373.04  124.18 9394.96  124.85 9419.62  124.54 9433.32  124.57 9455.24  124.94

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .112 1848.85    .066 1866.41    .015  2243.2    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1848.85    2267          1037.5    1525    1100             .1       .3
Left Levee      Station=   247.7      Elevation=136.5675
Right Levee     Station=9342.896      Elevation=  126.21
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 2282.98 9455.24  116.14

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 183.60*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  132.64   10.04  132.46   23.42  131.69   36.81  131.39   41.83  131.76
   58.56   131.4   65.25  131.75   71.95  130.99   88.68  131.07   97.04  131.61
  103.74  131.73   112.1  131.44  123.82  131.38  133.85   131.6  140.55  132.22
  148.91  134.42  158.95  136.32  167.32   136.4  170.84  129.91   172.6  129.38
  188.42  128.96  197.22  128.31  204.25  128.23  213.04  127.66  228.87  125.74
  248.22  124.98  269.31  124.71  279.86  125.53   286.9  126.49  292.17  125.97
  304.48  125.47  334.38   125.1  373.07  124.74  410.51  124.55  471.55  123.45
  507.87  122.67   554.2   122.2  561.23  122.03   584.1  121.88  598.16  121.91
  636.85  121.39  664.99  121.25  679.05  121.61  686.09  121.38   698.4  121.82
  721.26   121.8  728.29  121.54  735.33  121.67  751.16  121.47   791.6  121.49
  817.98  121.24  833.81  121.32   851.4  121.64  858.43  122.18  865.46  122.31
  868.98  121.86  876.02  118.94  883.05  119.02  904.15  118.85  909.43  119.05
  928.77  119.09  970.01  118.92   986.8  118.63 1067.36  118.44 1188.96  119.12
 1310.56  120.28 1383.59  120.15 1505.18  120.17  1529.5  120.08 1578.14  119.51
 1633.96  118.69 1665.61  118.85 1681.44  118.63 1697.27  118.74 1702.54  118.56
  1713.1  118.79 1724.13  118.55 1757.06  119.22 1762.33  118.99 1779.92  118.87
 1785.19  119.29 1793.99  118.66 1834.43   118.7 1837.95   118.5 1853.78  118.33
 1860.81  118.44 1870.05  118.17 1908.29  118.08 1924.12  118.24 1932.91  118.09
 1952.26  118.41 1959.29  117.98  1971.6   117.8 1990.95  117.81 2020.84  117.38
 2054.26  117.29 2101.74  117.08 2133.39  117.32 2159.77  118.15 2165.04  118.03
 2172.08  117.31 2186.15  117.57  2196.7  117.19 2203.73  117.31 2209.01  117.03
 2219.56  117.06 2230.11  116.82  2238.9  116.97 2251.21  116.73 2263.52  116.77
 2272.32  117.39 2282.87  116.66 2296.94  116.72 2318.04  116.58 2330.35   117.1
 2342.66   116.7 2356.73  116.65 2374.32  116.84 2381.35  116.59 2400.69  116.56
 2409.48  116.39 2420.03  116.68  2434.1  117.55 2444.65  119.17 2449.93  119.33
 2455.21   120.3 2465.76   119.4 2474.54  118.01 2479.82  118.21  2485.1   120.5
 2502.68  119.66 2518.51  119.49 2529.06  119.15  2578.3  119.29 2602.92  119.51
 2615.23  119.37 2627.54  119.47 2653.91  119.06 2667.98  119.62 2678.53  118.98
 2697.88  118.63 2704.91  117.24  2713.7  117.34 2718.97  118.59 2736.54  118.59
 2745.31  118.77 2757.58  118.64 2776.87  118.73 2803.17  119.03 2810.18  118.81
 2815.45  119.23 2824.21  119.23 2836.49  119.85 2841.75  120.43 2855.78  120.02
 2864.54  118.11 2875.06  117.34 2878.57  117.56 2890.85  117.25 2897.86  117.35
 2904.87  118.72 2915.39  116.78 2924.17  116.88 2932.93  117.47  2941.7  117.11
 2948.71   117.5 2955.72  117.52    2968  118.39 2975.01   118.4 2982.03  117.92
 2989.04  118.42 2995.12  118.38 2998.16  117.68 3004.25  114.04 3007.29  112.89
 3013.87  112.19 3020.97  110.74 3036.37  106.68 3041.02  104.86 3049.36  100.47
 3052.91   99.66  3055.4    94.5 3066.22    93.4 3077.03   91.92 3087.85   92.12
 3098.67   87.97  3106.8   88.18 3123.07   89.14  3131.2    89.2 3139.34   89.85
 3155.61   90.68 3171.88   91.32 3180.01   91.47 3188.15   91.96 3204.42    91.8
 3212.55   92.32 3220.69   92.25 3227.12   92.83 3236.96   94.14 3253.23   95.79
 3261.36   96.99 3277.63   98.43 3302.37   99.88 3315.13  100.76 3325.81  104.01
  3336.1  106.79 3340.89  111.89 3362.16  116.04 3379.18  117.88  3385.4  118.15
 3394.73  115.88  3413.4  113.36 3420.79  112.65  3431.2  113.44 3441.59  113.52
 3447.63  112.91 3453.85  112.79 3469.33  113.17 3479.74  112.53 3490.14  112.55
 3507.48  112.14 3517.88  110.99 3524.82   110.6 3535.23  111.17 3549.09  111.42
 3562.97  110.34 3569.91  110.04  3580.3  110.01 3614.98   110.3 3646.74  110.45
 3705.85  110.83 3755.63  111.04 3764.96  110.91 3811.63   111.5 3833.45  112.02
 3867.64  113.45 3908.07  113.13 3940.95  113.35 3967.19  113.28 4016.97  113.28
 4029.41  113.22 4048.08  113.35 4079.66  113.42 4093.53  113.35 4125.86  113.46
 4166.36  113.47 4197.41  113.64 4237.86  113.73 4303.19  113.75 4315.64  113.92
 4391.77  114.36 4418.31  114.41 4436.97  114.33 4474.31  114.36 4505.42  114.29
 4567.65  114.26  4611.2  114.16 4629.88  114.19 4667.21  114.03 4679.68   114.2
 4721.31  114.15 4741.88  114.32 4754.32  114.19 4822.77  114.44 4891.21  114.44
 4906.77  114.57 4925.44  114.54 4953.44  114.75 4962.77  114.64 5019.62  114.92
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  5054.3   114.8 5071.64  114.89 5082.05  114.55 5116.74  115.28 5123.68  116.07
 5134.08  117.65 5144.48  117.87 5183.67  117.61 5202.34  117.39  5245.9  117.31
 5267.67   117.4 5333.01  117.31 5356.08  117.42 5369.95  117.33 5429.46   117.2
 5456.67  117.25 5480.95  117.08 5505.23  117.06 5538.36  116.86 5557.02  116.91
 5566.35  116.76  5630.1  116.65 5669.02  116.46 5697.03  116.44 5731.25  116.21
 5744.57  116.23 5787.25  115.92 5846.37  115.81 5874.36   115.6 5942.81  115.41
 5970.82  115.29 5983.26  115.35 6001.93  115.23 6035.94  115.19  6129.6  114.97
 6191.71  114.63 6253.93  114.51 6299.54  114.22 6313.42  114.27  6337.7  114.75
 6344.63  114.22 6351.57  113.23 6355.04  113.14 6365.44  114.23 6393.19  113.81
 6438.29  113.74 6462.56  113.81 6490.38  113.64 6512.17  113.68 6559.67   113.5
 6593.06  113.55 6621.05  113.46  6661.5   113.5 6674.13  113.62 6701.94  113.66
 6726.16  113.82 6751.73  113.85 6841.95  113.68 6894.84  113.78 6932.17   113.9
 7009.95  113.98  7022.4  114.11  7050.4  113.96 7069.06  114.14 7100.18  114.12
 7125.07  114.24 7174.85  114.35 7222.13  114.38 7246.41  114.56 7271.29  115.02
 7277.51  115.51 7293.07  117.44 7311.73   117.2 7345.96  117.11 7392.62  117.31
 7464.18  117.27 7545.08  117.34 7563.74  117.43 7582.41  117.36 7619.75  117.47
  7635.3  117.35 7675.74  117.34  7691.3  117.44 7709.97  117.38 7745.85  117.51
 7781.53  117.41 7797.08  117.55 7839.49  117.37 7859.31  117.48 7902.86  117.39
 7943.31  117.45 7952.64  117.56 8008.64  117.48 8033.53  117.72 8037.19  117.55
  8047.6  115.32 8054.53  113.56    8058  113.27 8068.41  113.24 8075.34  114.49
 8085.75  118.12 8103.09  122.42 8110.03  122.86 8130.83  122.07 8182.87  121.92
 8201.53  122.01 8238.87  121.93 8310.43  121.93 8345.88  121.85 8356.28  122.01
 8366.68  122.61 8384.02  122.15 8394.43   122.4 8408.31  121.54 8472.21  121.56
 8497.09  121.52 8537.54  121.35 8585.19  121.49 8612.93  121.39 8658.03  121.34
 8689.99  121.52 8708.65  121.33 8773.99  121.38 8817.54  121.28 8864.21  121.34
 8873.55  121.25 8910.88  121.26 8938.88  121.34 8973.11  121.22 9010.44  121.24
 9016.66  121.13 9043.01  121.18 9049.95  121.34 9063.82  121.23 9162.89  121.03
 9203.34  121.05 9225.11  120.91 9254.58  120.93    9334  120.66 9355.78  120.52
 9380.67  120.65    9390  120.43 9399.33  119.93 9411.79  119.76 9461.56  119.82
 9486.46  119.63 9573.57  119.74 9604.88  119.61 9620.23   119.7 9670.01  119.66
 9716.68  119.55 9766.45  119.63 9788.71  119.54 9806.05  120.15 9830.33  120.39
 9840.74  120.24 9851.13  120.71 9930.91  120.46 9951.71  120.55 9965.59   120.3
    9976  120.49 9993.57  120.4810038.43  120.2810052.68  120.2810090.02  120.54
10096.24  120.6810111.79  120.3310127.35  118.3510146.01   118.310164.68  119.25
10180.23  120.2710186.46  122.1310195.79  123.4310202.01   125.510211.34   125.7
10225.72  126.3310246.53  126.0410253.46  126.1810267.34     127 10276.1  126.18
10284.86  123.78 10290.7   123.310299.46  123.2310314.06  123.8710322.82  124.73
10328.65  124.98 10349.1  124.51 10363.7   124.610369.53  124.8610387.05  125.18

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2989.04     .07 3049.36    .025  3336.1     .07 3379.18    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2989.04 3379.18          1037.5    1525    1100             .1       .3
Left Levee      Station=  167.32      Elevation= 136.405
Right Levee     Station=10267.34      Elevation=     127
Blocked Obstructions     num=      2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 3394.73    5500  114.36    900010743.06  121.18

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 183.40*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  134.36   19.13  133.73   21.73  133.92   37.38  133.54   50.42  133.85
   64.34  133.73   73.03  134.15   82.59   136.2   86.94  136.24   91.98  126.53
    94.5  125.76  117.17  125.29  129.77  124.42  139.85  124.36  152.44   123.6
  162.52  122.62  175.12  120.96  202.83  120.14  220.46  120.28  233.05  120.09
  238.09  120.84  248.17   121.5  253.21  122.76  258.24  123.04   265.8  122.33
  273.36  122.27  283.44  121.64  296.03  121.65  326.27  121.28  381.69  120.98
  432.08  120.96  477.42  120.58  522.76  120.37  552.99  120.04  641.17  119.74
  651.25  119.55   671.4  119.64     684   119.5  704.15  119.65  721.79  119.38
  729.35  119.46  759.58  119.16  769.65  119.29  799.88  119.18  820.03  119.82
  830.11   119.5  847.74  120.23   880.5  120.29  890.57  119.93  900.65  120.15
  923.32  119.93  951.04  120.08  958.59  119.97  981.27  120.13  993.86  119.94
 1014.02  120.06 1019.06  119.87 1041.73  119.95 1051.81  120.29 1066.92  120.29
    1077  121.05 1087.08  121.19 1092.12   120.5 1102.19  116.05 1104.71  115.54
 1112.27  116.13 1122.35  115.86 1129.91  116.03  1142.5  115.73 1150.06  116.02
 1177.77     116 1236.84   115.6  1260.9  115.21 1376.31  115.11  1550.5  115.45
  1724.7  116.03 1829.32  115.96 2003.52  115.97 2038.36  115.93 2108.03  115.65
 2187.99  115.24 2198.07  115.48 2233.34  115.93 2256.02  115.74 2278.69   115.9
 2286.25  115.64 2301.36  115.97 2308.92  115.54 2352.01  116.03 2364.34  116.31
  2371.9  115.97 2397.09  115.82 2404.65  116.46 2417.24  115.52 2427.32  115.68
 2434.88   115.4 2447.47  115.64 2475.19  115.73 2480.23  115.46  2502.9  115.31
 2512.98  115.54 2525.57  115.21 2540.69  115.14 2550.77  115.44 2558.32  115.22
    2581  115.21 2603.67  115.52 2616.27  115.33 2643.98  115.89 2654.06  115.28
 2671.69  115.07  2699.4   115.2 2706.96  114.93  2724.6  115.02 2742.23   114.7
 2752.31  114.86 2762.39  114.67  2790.1  114.73 2830.41  114.55 2858.12  114.56
 2903.46  114.92 2941.25  116.12 2948.81  115.96 2958.88  114.92 2966.44   114.9
 2979.04  115.39 2994.15  114.89 3004.23   115.1 3011.79  114.72  3026.9  114.82
 3042.02  114.53 3054.62  114.81 3072.25  114.51 3089.89  114.63 3102.48  115.56
  3117.6  114.49 3137.75  114.58 3155.39  114.36 3162.95  114.69 3167.99   114.4
 3185.62  115.19 3203.26  114.61 3223.41  114.55  3248.6  114.85 3258.68  114.49
 3276.31  114.34 3286.38  114.46 3298.98  114.21  3314.1  114.64 3334.25  115.95
 3339.29  116.53 3349.37  118.37 3356.92  118.61 3364.48  120.06 3372.04  119.03
  3379.6  118.71 3392.19  116.62 3399.75  116.91  3407.3  120.35  3432.5  119.08
 3455.17  118.83 3470.29  118.31 3510.59  118.38 3533.26  118.63 3540.82  118.51
 3576.09  118.82 3593.72  118.61 3611.36  118.76 3634.02  118.57 3649.14  118.21
 3669.29  119.07 3684.41  118.15 3694.49  118.15 3712.12  117.65  3722.2  115.58
 3734.79  115.76 3742.35  117.65 3767.51  117.64 3780.07   117.9 3797.66   117.7
 3825.29  117.82 3862.97  118.25 3873.01  117.92 3880.55  118.54 3893.11  118.58
 3910.69  119.59 3918.23  120.49 3938.33  119.97 3950.89  117.16 3958.42  116.37
 3965.96  116.07 3970.98  116.41 3988.57  116.03 3998.62  116.18 4006.15  118.11
 4008.66  118.25 4018.71  115.96 4023.73  115.34  4036.3  115.48 4048.86  116.38
 4061.41  115.83 4071.46  116.37 4081.51  116.34  4099.1  117.55 4109.14  117.52
 4119.19  116.74 4129.24  117.44 4135.55  117.42  4138.7   116.4 4145.02  110.96
 4148.18  109.28 4155.01  108.49 4178.35  103.68 4183.17  102.01 4191.84   97.75
 4195.52   96.67  4198.1   93.78 4205.37   92.46 4220.55   90.91 4231.77   90.86
    4243   88.64  4264.6    89.4 4271.81   89.48 4293.41   90.69 4322.22   91.47
 4336.63   91.23 4356.72   91.92 4387.04   95.02 4401.45   96.15 4434.64   98.16
 4453.22  101.73 4457.46  108.66 4461.22  109.18 4476.28  113.54 4491.35  115.99
 4497.41  116.55 4514.97  114.86 4531.83     113 4541.95  114.58 4552.07  114.75
 4562.19  113.54 4579.05  114.58 4589.18   113.7 4599.29  113.77 4616.16  113.12
 4626.27  111.36 4633.02  110.73 4643.15  111.51 4656.64  111.87 4670.13  110.19
 4676.88  109.72    4687  109.67 4720.73  110.03 4775.83   110.2 4798.32  110.19
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 4818.55  110.41 4866.62  110.36 4899.91  110.58 4933.25  110.93  4966.5  111.73
 5005.83  111.51 5037.82  111.73 5054.68  111.56 5123.86  111.54 5172.75  111.76
 5186.23  111.68 5287.28  112.02 5326.63  112.07 5390.19  112.03 5432.49  112.32
 5459.79  112.34 5476.35  112.49 5564.08  112.23 5604.57   112.2 5661.93  112.03
 5699.05  112.05 5722.67  111.88 5749.66  111.84 5756.41  112.05  5796.9  111.96
 5910.73  112.19 5962.18   112.2 6016.22   112.4 6073.59  112.35 6087.08  112.52
 6120.82  112.32 6137.69  112.43 6147.81   111.9 6164.69  112.55 6181.56  112.94
 6188.31  114.11 6198.42  116.42 6208.55  116.85 6235.54  116.55 6255.79  116.18
 6289.53  115.94 6328.38  116.02 6387.38  115.87 6414.37  115.99 6427.87  115.87
 6485.76  115.99 6512.22  116.18 6535.85  116.01 6559.46  116.05 6573.52  115.89
 6626.95  115.68 6680.93  115.69 6694.43  115.54 6727.87  115.54 6792.28  115.32
  6833.8  115.03 6900.26  114.89 6964.36  114.61 7042.62   114.5  7063.8  114.52
 7127.36  114.28 7166.82  114.29 7200.55  114.01 7305.14  113.76 7332.13  113.49
 7345.62   113.6 7359.12  114.17 7369.25  114.33 7375.99  113.53 7382.73  112.07
 7386.11  111.95 7396.23  113.64 7423.22  113.03 7467.09  112.97  7490.7  113.16
  7504.2  112.99 7538.96     113 7585.17  112.83 7617.64   112.9 7676.26  112.84
 7696.51  113.14 7723.49  113.12 7747.11  113.45 7763.98   113.5 7784.22  113.33
 7824.71   113.5 7859.75  113.38 7983.28   113.7 7996.78  113.63 8035.28  113.94
 8064.25  113.86 8080.67     114 8128.35  114.09 8151.97  114.27 8228.97  114.45
 8266.68  114.68 8283.44  115.14 8298.58  116.16 8316.73  116.02 8350.02  116.02
 8395.42  116.23 8431.73  116.29 8480.16  116.19 8546.71  116.44 8570.33   116.4
 8620.94  116.52  8651.3  116.39 8739.01  116.67 8772.75  116.59 8788.85  116.76
 8830.11  116.58 8849.38  116.71 8891.75  116.68 8940.17  116.88 9002.18  116.92
 9018.86  117.24 9022.41  116.98 9032.54   113.6 9039.29  110.95 9042.66  110.51
 9052.79  110.51 9059.52  112.42 9069.65  117.84 9086.52  124.38 9093.27  125.05
 9106.76  124.44 9113.51  123.88 9143.88  123.73 9182.28  123.79 9260.97  123.74
 9288.95  123.78 9322.69  123.67 9332.81  123.93 9342.92  124.86  9359.8  124.22
 9369.92  124.58 9383.42  123.25 9454.26   123.3  9481.9  123.14 9542.42  123.11
 9555.48  123.28 9582.47  123.12 9626.33  123.06 9657.42  123.26 9675.58  123.14
 9764.66  123.01 9815.27  123.11 9859.13  123.02 9916.48  123.07  9926.6  122.93
 9963.72  122.9810000.83  122.8810007.58  123.1310021.06  122.9610156.78  122.68
10177.96  122.5910206.62  122.6510240.37  122.5210263.98  122.5410305.07  122.33
10329.28  122.3910347.44  122.0510407.97  121.99 10442.8  121.7810473.16  121.95
10516.92  121.9610547.38  121.8410581.12  121.9910624.98  121.8310668.23  121.94
 10726.2  121.8310743.06  122.7510766.68  123.1910776.81  122.9610786.92  123.67
10864.53   123.410884.76  123.5610898.26  123.1910908.38   123.510969.12  123.18
11006.23  123.4311023.09  123.7411040.47  123.4611055.61  122.4511073.76  122.53
11088.89  123.1611107.05  123.6411113.11  124.8211122.19  125.5511128.24  126.61
 11151.3  127.2711171.54  126.6311178.29  126.7611191.79  127.7911201.09   126.6
11210.39  123.0511216.58  122.3711225.88  122.2711241.38  123.2411250.68   124.6
11256.87  125.0611278.57  124.4911294.08  124.6311300.27  125.0111318.87  125.41

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4129.24     .07 4191.84    .025 4461.22     .07 4491.35    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4129.24 4491.35          1037.5    1525    1100             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4129.24  117.44       T
 4491.3511318.87  115.99       T
Left Levee      Station=86.93999      Elevation=136.2425
Right Levee     Station=11191.79      Elevation=  127.79
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 3349.37  118.37 4514.97    6500  114.86 9383.4211107.05  123.25

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 183.2

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  136.08    6.56  136.08   13.12  123.16    16.4  122.14   45.92  121.62
   62.32  120.52   75.44  120.49   91.84  119.54  104.96   118.3  121.36  116.18
  127.92  115.86  157.44   115.3   180.4  115.62  196.79  115.47  203.35   116.5
  216.47  117.46  223.03  119.18  229.59   119.6  239.43  118.68  249.27  118.63
  262.39  117.82  278.79  117.87  318.15  117.46  390.31  117.23  455.91  117.35
  514.95  117.14  573.98  117.29  613.34  117.13  692.06  117.31  728.14  117.28
  741.26  117.06   767.5  117.26   783.9  117.11  810.14  117.39   833.1  117.09
  842.94  117.22   882.3  116.94  895.42  117.14  934.77  117.11  947.89  117.79
  961.01  118.03  974.13  117.63  997.09  118.63 1039.73  118.78 1052.85  118.32
 1065.97  118.64 1072.53  118.39 1085.65  118.63 1095.49  118.39 1131.57  118.65
 1141.41  118.51 1170.93  118.77 1187.33  118.55 1213.57  118.75 1220.13   118.5
 1249.65  118.58 1262.77  118.99 1272.61   118.7 1282.45  118.94 1295.57  119.92
 1308.69  120.07 1315.25  119.13 1328.37  113.17 1331.65  112.48 1341.49  113.24
 1354.61  112.84 1364.45  113.04 1380.85  112.62 1390.69  112.99 1426.77  112.92
  1518.6  112.15    1535  111.78 2742.03  111.78 2755.15  112.17 2801.07  113.02
 2830.59  112.86 2860.11  113.06 2869.95  112.71 2889.63  113.15 2899.47  112.57
  2958.5  113.04 2971.62  113.41 2981.46  112.96 3014.26  112.77  3024.1  113.63
  3040.5  112.39 3053.62  112.61 3063.46  112.24 3079.86  112.56  3089.7  112.31
 3096.26  112.64 3115.94  112.75  3122.5  112.41 3152.02   112.3 3165.14  112.63
 3181.54  112.24 3201.22  112.17 3214.34  112.59 3224.18  112.31  3253.7  112.34
 3283.22   112.8 3299.62  112.57  3335.7  113.37 3348.82  112.59 3371.78  112.35
 3407.86  112.59  3417.7  112.24 3440.66  112.41 3463.62  112.03 3476.74  112.26
 3489.86  112.04 3525.94  112.16 3578.42  111.99  3614.5  112.04 3637.46  112.34
 3673.53  112.53 3722.73   114.1 3732.57  113.89 3745.69  112.53 3755.53  112.52
 3771.93  113.22 3791.61  112.59 3804.73   112.9 3814.57  112.41 3834.25  112.58
 3853.93  112.24 3870.33  112.64 3893.29  112.29 3903.13  112.59 3916.25  112.48
 3932.65  113.73 3952.33  112.31 3978.57  112.45 4001.53  112.16 4011.37   112.6
 4017.93  112.22 4040.89  113.28 4063.85  112.52 4090.09  112.45 4122.89  112.86
 4136.01  112.38 4149.13  112.49 4158.96   112.2 4172.08  112.36 4188.48  112.03
 4208.16   112.6  4234.4  114.34 4240.96  115.11 4254.08  117.57 4263.92  117.89
 4273.76  119.82  4283.6  118.44 4293.44  118.02    4300   116.6 4309.83  115.23
 4319.67  115.62 4329.51   120.2 4332.79  120.81 4336.07  119.91 4362.31   118.5
 4391.83  118.16 4411.51  117.47 4463.98  117.56  4493.5  117.89 4503.34  117.72
 4549.26  118.14 4572.22  117.85 4595.18  118.06 4624.69  117.83 4644.37  117.36
 4670.61  118.53 4690.29  117.31 4703.41  117.33 4726.37  116.68 4739.49  113.93
 4755.88  114.18 4762.44  116.41 4765.72   116.7 4798.48  116.69 4814.84  117.03
 4837.73  116.76 4873.71  116.91 4922.76  117.48 4935.84  117.03 4945.66  117.86
 4962.01  117.93  4984.9  119.33 4994.71  120.55 5007.79  120.04 5020.88  119.91
 5027.42  118.79 5037.23   116.2 5047.04  115.17 5056.85   114.8 5063.39  115.27
 5086.29  114.81 5099.37  115.02 5109.18  117.59 5112.45  117.77 5125.53  114.72
 5132.07   113.9 5148.43  114.09 5164.78  115.29 5181.13  114.55 5194.21  115.23
 5207.29  115.16 5230.19  116.72 5243.27  116.64 5256.35  115.57 5269.43  116.47
 5275.97  116.46 5279.24  115.11 5285.79  107.89 5289.06  105.67 5292.33  105.44
 5320.33  100.67 5325.33   99.16 5336.33    94.1 5348.33    91.3 5360.33      90
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 5387.33    89.3 5414.33    89.8 5427.33    90.6 5441.33      91 5455.33      91
 5471.33    90.6 5486.33      91 5503.33   92.43 5527.33   94.01 5544.33    94.9
 5570.33   96.68 5574.02  105.44  5577.3  105.88 5590.41  111.04 5603.53   114.1
 5613.36  115.54 5626.48  115.06 5642.87  113.36 5652.71  115.73 5662.54  115.98
 5672.38  114.41 5688.77  115.98 5698.61  114.87 5708.44  114.98 5724.84   114.1
 5734.67  111.73 5741.23  110.86 5751.07  111.84 5764.18  112.33  5777.3  110.04
 5783.86   109.4 5793.69  109.33 5826.48  109.76 5862.54  109.82 5901.89  109.68
 5921.56  109.95 5983.86  109.77 6016.64  109.93 6033.04  109.84 6052.71  110.05
 6108.45  109.87 6134.68  110.11 6151.07   109.9 6226.48  109.86 6265.83   110.1
 6278.94  110.02  6347.8  110.32 6396.98  110.45 6462.55   110.3 6492.06  110.32
  6518.3  110.53 6544.53  110.47 6560.93  110.62  6646.2  110.13 6685.56   110.1
 6741.31  109.85 6777.39   109.9 6800.35  109.67 6826.58  109.63 6833.14  109.89
  6872.5  109.78 6892.18  109.92 6957.77  109.89 6967.61  110.02 7052.88  109.95
 7085.67  110.08 7141.43  109.89 7154.55  110.12 7187.34  109.84 7203.74  109.97
 7213.58  109.25 7229.98  110.12 7246.38  110.61 7252.94  112.14 7262.77   115.2
 7272.61  115.83 7298.85   115.4 7318.53  114.89 7351.32  114.53    7371  114.66
 7410.36  114.61 7446.43  114.43 7472.67  114.56 7485.79  114.42 7528.42  114.62
 7567.78   115.1 7590.74  114.94 7613.69  115.04 7626.81  114.86 7679.29  114.62
 7731.76  114.74 7744.88  114.53 7771.12  114.59 7839.99   114.4 7872.79  114.14
 7944.94  114.02 8007.25  113.77 8115.48  113.77 8154.83  113.55 8204.03   113.6
 8236.82  113.28 8338.48   113.1 8364.71  112.75 8377.83  112.93 8390.95  113.71
 8400.79  113.91 8407.34  112.83  8413.9  110.91 8417.18  110.77 8427.02  113.04
 8453.25  112.25 8495.89  112.21 8518.84   112.5 8531.96  112.29 8574.59  112.33
 8610.66  112.15  8636.9  112.25  8699.2  112.19 8718.88  112.67 8745.11  112.59
 8768.07  113.08 8784.46  113.16 8804.14  112.94 8843.49  113.23 8866.45  113.04
 8997.62  113.46 9010.74  113.36 9050.09  113.78 9076.32  113.75 9115.67     114
 9138.63  114.01 9161.58  114.29 9237.01  114.53 9256.68  114.74 9273.08   114.6
 9299.31  114.89 9332.11  114.81 9427.21  115.29 9473.12  115.16 9545.26  115.51
 9568.22  115.42 9617.41  115.59 9646.92  115.44 9732.18  115.83 9764.97  115.77
 9781.37  115.97 9820.72  115.78 9843.68  115.98 9892.87  115.97 9938.78  116.26
 9987.97  116.3110004.36  116.7610007.64  116.4110017.48  111.8910024.04  108.34
10027.32  107.7510037.16  107.7710043.71  110.3410053.55  117.5710069.95  126.35
10076.51  127.2310089.62  126.4510096.18  125.68 10125.7   125.510194.56  125.65
10250.31  125.5210266.71  125.63 10299.5   125.510309.34  125.8410319.17  127.11
10335.57  126.2910345.41  126.7610358.53  124.9610427.39  125.0410447.07  124.88
10509.37  124.8210525.77  125.06   10552  124.8510594.64  124.7710617.59  125.02
10666.78  124.8610719.25  124.8610729.09  124.7310778.28  124.8710820.91  124.79
10876.66  124.8610886.49  124.6910922.57  124.7110958.64  124.58 10965.2  124.91
10978.31  124.6911053.74  124.5111102.93  124.3211145.56  124.2611158.67  124.37
11191.47  124.2511214.42  124.3311237.38  124.1711276.73  124.1211319.36  124.26
11368.55  124.1211388.23  123.9611417.74  124.2211440.69  124.2411489.88  124.07
11522.68   124.311565.31  124.0611611.22  124.2611663.69  124.1211680.08  125.35
11703.04  125.9811712.88  125.6911722.71  126.6311798.14  126.3311817.81  126.56
11830.93  126.0711840.77  126.51 11899.8  126.0711935.87  126.4311952.26  126.82
 11978.5  126.4712017.85  126.9812034.25  127.0112040.81  127.62 12057.2  127.73
12076.88  128.2212096.55  127.2312103.11  127.3412116.23  128.5812126.07  127.03
12135.91  122.3312142.46  121.44 12152.3  121.32 12168.7   122.612178.54  124.48
12185.09  125.1412208.05  124.4612224.45  124.66   12231  125.1712250.68  125.64

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5269.43     .07 5320.33    .025 5574.02     .07 5603.53    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5269.43 5603.53          1037.5    1525    1100             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5269.43  116.47       T
 5688.7712250.68  115.98       T
Left Levee      Station=    6.56      Elevation=  136.08
Right Levee     Station=12116.23      Elevation=  128.58
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1308.69 4329.51  119.64 5688.77 7272.61  115.4110358.53   12000  124.96

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            133.71    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.066      0.039      0.066
  W.S. Elev (ft)            133.66    Reach Len. (ft)          1037.50    1525.00    1100.00
  Crit W.S. (ft)            121.45    Flow Area (sq ft)       78023.02   12559.69   96975.87
  E.G. Slope (ft/ft)      0.000066    Area (sq ft)            78436.05   12559.69  102969.30
  Q Total (cfs)           235000.00    Flow (cfs)              86134.26   43024.76   105841.00
  Top Width (ft)          12242.89    Top Width (ft)           5261.64     334.10    6647.15
  Vel Total (ft/s)            1.25    Avg. Vel. (ft/s)            1.10       3.43       1.09
  Max Chl Dpth (ft)          44.36    Hydr. Depth (ft)           14.83      37.59      14.59
  Conv. Total (cfs)       28889300.0    Conv. (cfs)             10588760.0   5289172.0   13011370.0
  Length Wtd. (ft)          1168.09    Wetted Per. (ft)         5271.89     347.81    6665.79
  Min Ch El (ft)              89.30    Shear (lb/sq ft)            0.06       0.15       0.06
  Alpha                       1.99    Stream Power (lb/ft s)      0.07       0.51       0.07
  Frctn Loss (ft)             0.06    Cum Volume (acre-ft)    325926.30   93962.05   329162.40
  C & E Loss (ft)             0.00    Cum SA (acres)           30679.13    3567.58   32497.18


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 183.00*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  135.95    4.92  135.95   12.39  126.25   16.94  125.46   21.75  122.36
   24.16  122.12   49.71  121.69   91.48  119.26  101.97  118.88  135.57  117.08
  151.59  117.43  176.63  117.03  202.76  117.39  221.41  117.31  228.88  118.08
  243.81  118.81  251.28  120.12  258.74  120.45  269.94  119.75  281.14   119.7
  296.07  119.08  314.73  119.14  359.53  118.85  432.91  118.68  519.47  118.82
  579.59  118.33  650.68  118.44  695.47  118.32  733.47  118.44  798.39  118.52
  841.05  118.32  870.92  118.49  889.58  118.41  919.44  118.59  945.57  118.41
  961.89  118.69  985.94  118.27  1016.5  118.35 1061.28   118.3 1076.21  118.82
 1091.14  119.01 1106.08  118.72 1132.21  119.45 1180.73  119.57 1195.66  119.21
  1210.6  119.48 1244.19  119.26 1285.25  119.46 1296.45  119.35 1330.05  119.51
 1378.57   119.1 1394.69   118.8 1406.71  119.04 1421.14  117.96 1434.57  118.08
 1456.96  117.88 1486.83  118.71 1494.29  118.27 1505.29  114.46 1512.96  113.14
 1524.15  113.71 1539.09  113.42 1568.95  113.18 1599.07  113.59 1608.69  113.21
 1639.95  113.45 1656.78  113.13 1692.84  112.88 1714.49  113.24 1721.69  112.76
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 1767.38  113.01  1832.3  113.12 1865.97  113.06 1962.14  113.17 2027.07  113.13
 2106.41   113.2 2178.55  113.21  2209.8  113.05 2238.66  112.46  2265.1  112.09
    2318  111.95 2565.67  112.01 2628.18  112.28 2669.06  112.57  2695.5   112.9
 2813.32  113.01 2928.74  112.51 3034.54  112.58 3118.06  112.55 3135.52  112.91
 3185.25   113.5 3218.84  113.34 3252.44  113.52 3263.64  113.26 3286.04  113.58
 3297.23  113.14 3364.41  113.52 3379.35  113.81 3390.54  113.48 3427.87  113.32
 3439.07  113.97 3457.73  113.06 3472.67  113.23 3483.86  112.96 3502.53  113.18
 3513.73  112.98 3521.19  113.25 3543.59  113.33 3551.06  113.07 3584.65  113.02
 3599.58  113.26 3618.25  112.96 3640.64  112.92 3655.58  113.25 3666.77  113.03
 3700.57  113.04 3733.97  113.42 3752.63  113.24 3793.69  113.84 3808.62  113.28
 3834.75  113.15 3875.81  113.33 3887.01  113.06 3921.77  113.16 3939.27  112.97
  3954.2  113.11 3969.13  112.93  4010.2  113.07 4069.92  112.93 4110.98  112.98
 4186.26  113.55 4234.16  114.55 4245.35  114.43 4260.29  113.38 4271.48  113.33
 4290.15  113.91 4312.55  113.29 4327.48  113.31 4338.68  112.82 4361.07  112.87
 4383.47  112.57 4402.13  112.85 4428.26   112.6 4439.46  112.83 4454.39  112.73
 4473.06  113.64 4495.45  112.61 4525.32  112.67 4551.45  112.49 4562.65  112.81
 4570.11  112.52 4596.24   113.3 4622.37  112.71 4652.23  112.68 4689.56  112.93
 4704.49  112.59 4719.43  112.69 4745.54  112.57 4764.21  112.29 4786.61  112.72
 4816.47  114.04 4823.93  114.62 4838.87  116.45 4850.06  116.69 4861.26  118.15
 4872.46  117.12 4883.66   116.8 4891.12  115.72 4902.31  114.68 4913.51  115.01
 4924.71  118.42 4948.47  117.66 4995.63  117.21 5018.03  116.67 5077.74  116.76
 5111.34      117 5122.54  116.89  5174.8  117.24 5200.93      117 5227.06  117.18
 5260.64  116.99 5283.04  116.65  5312.9  117.54  5335.3  116.63 5350.23  116.66
 5376.36  116.17 5391.29  114.11 5409.95   114.3 5417.41  115.95 5421.14  116.17
 5458.43  116.19 5477.04  116.44 5513.51  116.28 5551.98  116.46 5578.43  116.73
 5597.67   117.2 5614.75  116.36 5625.93  116.93 5644.53  116.99 5670.58  118.02
 5681.75  118.96 5696.63  118.52 5711.53  118.43 5718.97   117.6 5730.14  115.67
  5741.3   114.9 5752.47  114.62 5759.91  114.98 5785.97  114.61 5800.86  114.78
 5812.02  116.73 5821.28  116.36 5830.63  114.74 5838.07  114.45 5845.32  115.07
 5856.69      115 5869.37  115.33  5875.3  116.12  5883.8  116.15 5893.91  114.83
 5907.84  114.04 5923.68  114.38 5929.48  114.87 5946.31  115.43 5963.14  116.58
 5979.51   116.2  5994.4  116.89 6002.11  114.52 6005.97  112.73  6013.7  106.71
 6017.56  104.56 6037.41  100.89 6054.45    98.7 6060.35   97.45 6073.32   93.62
 6092.32   91.01 6101.64   89.44  6112.9   88.43 6133.49   87.34 6158.18   89.46
 6195.22   94.49 6212.49   94.43  6226.6   94.71 6242.59   95.75 6296.32   98.35
  6305.6   99.07 6309.07  105.96 6312.51  106.71 6324.48  112.56 6328.72  114.27
 6336.82  116.19 6346.72  116.84 6359.93  116.26 6376.43  114.97 6386.34  116.75
 6396.24  116.93 6406.14  115.74 6422.65  116.92 6432.56   116.1 6442.45  116.18
 6458.97  115.49 6468.86  113.72 6475.47  113.08 6485.38  113.83 6498.58   114.2
 6511.79  112.46 6518.39  111.97 6528.29  111.91 6561.31  112.23 6597.62  112.29
 6637.24   112.2 6657.04  112.41 6719.77  112.26  6789.1  112.49 6845.22  112.34
 6871.63  112.52 6888.14  112.36 6964.07  112.34 7003.69  112.54 7016.89  112.47
 7135.74   112.8 7201.76  112.68 7231.48   112.7  7257.9   112.9 7284.31  112.67
 7300.82  112.77 7386.68   112.3 7426.31  112.19 7482.45  111.88 7518.78  111.83
  7568.3  111.44 7574.91   111.6 7622.63  111.33 7634.36  111.46  7700.4  111.27
 7767.29   111.3 7786.57   111.2 7829.18  111.31  7857.3  111.17 7898.54  111.47
 7931.55  111.15 7948.07  111.16 7957.97  110.56 7974.49  111.24    7991  111.58
  8007.5  115.11 8017.41  115.64  8079.1  114.94 8096.66  114.66 8133.75   114.6
 8178.74  114.39 8218.85   114.5 8232.06  114.38 8268.75  114.55 8304.12  115.11
 8333.04  115.15 8339.47  115.41 8384.47  114.86  8410.2  115.09 8464.84  115.29
 8479.73  115.46 8583.78  115.32 8621.73  115.11 8694.38  115.02 8757.12  114.81
 8866.09  114.89 8905.71  114.69 8955.25  114.76 8988.27  114.52 9090.63   114.4
 9117.04  114.14 9130.25  114.27 9153.37  115.05 9169.87  112.69 9179.78  114.38
 9206.19  113.76 9249.13  113.77 9272.24  113.99 9285.45  113.83 9328.37   113.9
 9374.54  113.52 9380.97  113.95  9409.9  114.03 9453.84  113.99 9473.66  114.36
 9500.07  114.31 9523.18   114.7 9539.69  114.78  9559.5  114.61 9599.12  114.85
 9622.24  114.71 9663.85  114.77 9754.32  115.07 9767.53     115 9807.15  115.32
 9833.56  115.32  9896.3  115.52 9919.41  115.75 9995.36  115.9710015.16  116.14
10031.68 116.0410058.09 116.2710091.11  116.210186.87   116.6 10233.1  116.51
10305.73  116.810328.85 116.7510378.38 116.88 10408.1  116.7610493.94 117.06
10526.96 117.0310543.47 117.1810583.09 117.0610606.21 117.2310655.74 117.24
10724.62  117.68 10751.5   117.6   10768  117.81 10771.3 117.5410787.82 111.48
10791.12 111.0410801.03 111.0510807.62 112.9810817.53   118.410834.04 124.99
10840.65 125.6510860.45 124.4810890.18 124.3110956.08 124.3911015.65 124.32
11032.16 124.3911065.18 124.2711075.08 124.5211084.98 125.47 11101.5 124.85
 11111.4 125.2111124.61 123.8811193.95 123.9311213.76 123.8111276.49 123.75
11293.01 123.9311319.42 123.7811362.35 123.7211385.46  123.911415.75  123.8
11487.82 123.7811497.73 123.6811547.26 123.7811590.18  123.711646.32 123.75
11656.21 123.6211692.54 123.6411728.86 123.5411735.47 123.7811795.06 123.35
11874.15 123.0411917.07 122.9911930.27 123.0812009.52 122.8912092.07 122.97
12161.41 122.7612191.13 122.9512263.77 122.8512296.53 123.0412328.68 122.89
12385.94 123.0112438.77 122.9512455.28  123.9 12478.4 124.37 12488.3 124.15
 12498.2 124.8512574.15  124.712593.96 124.8812607.17 124.5212617.07 124.85
12676.51  124.512712.83  124.812729.33 125.0912755.75  124.912791.57 125.38
12801.21 124.1812811.89 124.0512818.49 124.5112833.36 124.8512846.22 126.75
12855.86 127.4712874.62 126.9312884.79 126.1812894.44 128.0112905.54 126.92
12917.84 121.8812925.63 120.9112937.33 120.8612956.83 122.0212976.32 124.11
12989.93 124.4112998.81 123.7213021.01 123.7913030.92    12513054.32  125.3

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082  5883.8    .066 5979.51    .015 6309.07    .066 6336.82    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        5994.4 6336.82           1037.5    1525    1100             .1       .3
Left Levee      Station=    4.92      Elevation=135.9525
Right Levee     Station=12894.44      Elevation= 128.015
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    1505 3185.25   113.5 6458.97 8011.99  115.4911124.61   14000  123.88

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 182.80*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  135.83    3.28  135.83   11.65  129.33   16.76   128.8   22.16  122.68
   24.85  122.23   49.11   121.9   73.38  120.91  100.34  118.44   132.7  117.85
  154.26  118.03  167.74  119.15  178.53  119.19  197.41  118.76  225.12  119.16
  246.04  119.14  271.15  120.17  279.52  121.05  287.89  121.29  300.45  120.83
  313.01  120.78  329.75  120.34  350.68  120.41  400.91  120.24   483.2  120.11
   553.3  120.18  580.26  120.31  601.83  120.19  647.66   119.5   690.8  119.62
  768.99  119.51  820.21  119.67  841.79  119.59  893.01  119.74  955.02  119.56
 1043.99  119.85 1065.56  119.74 1076.34  120.18 1103.31   119.5 1137.58  119.56
 1187.79  119.48 1221.28  119.98 1238.02   119.8 1267.32  120.27 1321.73  120.36
 1338.48   120.1 1355.22  120.31 1392.89  120.12 1438.93  120.27 1489.16  120.24
 1513.12  120.05 1561.65  119.08 1575.13  119.53 1591.31  117.29 1631.48  116.82
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 1661.41  117.04 1672.19  117.52 1685.67  114.18 1699.15  113.78 1715.33  114.25
 1744.98  113.61 1753.07  113.87 1774.65  113.69 1790.82  114.22 1801.61  113.47
 1825.87  113.73 1836.66  114.13 1855.53   113.6 1895.97  113.37 1912.15  113.58
 1920.24  114.25 1928.32  113.34 1936.41  113.78 1979.56  114.24 2052.35  114.46
 2065.83  114.34 2138.63  114.49 2184.46   114.4 2197.94  114.55 2270.74  114.49
 2359.71  114.61 2381.28  114.56  2440.6  114.65 2475.64  114.32    2508  113.14
 2537.66   112.4 2591.59  112.25 2596.97  112.12  2715.6  112.15 2745.26  112.33
 2756.05   112.2 2820.76  112.18 2874.68  112.25 2890.86  112.46 2944.78  112.78
 2990.62  113.36 3020.27  114.02  3071.5  114.18 3098.46  114.08 3152.38  114.24
 3195.53  114.02 3203.61  113.77 3252.15  113.35  3281.8  113.24  3351.9  113.26
 3400.43  113.38 3457.05  113.31 3502.88  113.39 3513.67  113.62 3569.43  113.98
  3607.1  113.82 3644.77  113.97 3657.33   113.8 3682.44  114.01    3695  113.71
 3770.33     114 3787.07   114.2 3812.94   113.9 3841.48  113.87 3854.04  114.32
 3874.97  113.72 3904.27  113.68 3971.24  113.91 3979.61  113.73 4017.28  113.73
 4034.03  113.89 4054.95  113.68 4080.07  113.68 4096.81   113.9 4109.37  113.75
 4147.26  113.74 4184.71  114.05 4205.64  113.92 4251.68  114.31 4268.42  113.97
 4297.72  113.94 4343.77  114.07 4356.32  113.88  4395.3  114.04 4448.41  113.82
 4494.45  113.98 4561.42  113.87 4627.17  113.97  4682.8  114.37 4691.88  114.33
 4729.62  114.86 4758.14  114.97 4774.88  114.23 4787.44  114.14 4808.37   114.6
 4842.86  113.93 4862.78  113.22 4887.89  113.15 4913.01   112.9 4933.94  113.07
 4963.24  112.91 4992.54  112.98 5013.46  113.56 5038.58   112.9 5122.29  112.83
 5151.59  113.32 5180.89  112.91 5255.37  112.99 5272.98   112.8 5289.72  112.89
 5339.94  112.55 5365.05  112.85 5398.54  113.75 5423.65  115.33 5436.21   115.5
 5448.76  116.47 5461.32   115.8 5473.88  115.58 5494.79  114.12 5507.35  114.41
 5524.09   117.1 5535.77   116.9 5546.55  116.18 5551.94  116.71 5570.82  116.26
 5599.44  116.25 5624.55  115.86 5741.74  116.05 5800.34  116.34 5829.64  116.15
 5858.94   116.3 5921.71  115.94 5955.19  116.55 5980.31  115.96 5997.05  115.98
 6026.35  115.65 6043.09   114.3 6064.01  114.41 6076.57  115.63 6104.65  115.64
 6128.92  115.83 6180.14  115.76 6223.28  115.94 6252.94  116.19  6274.5  116.95
 6282.59   116.1 6293.66  115.68 6306.19     116 6327.06  116.04 6356.27   116.7
 6368.79  117.36 6385.48  116.99 6402.18  116.94 6423.05  115.13 6448.09  114.45
 6456.43  114.68 6485.66  114.41 6502.35  114.53 6514.87  115.86 6525.25  116.09
 6536.03  114.73 6541.42  114.76 6552.21  116.17  6557.6  116.38 6573.78  115.56
 6579.17  115.76 6587.26  117.13 6598.04   117.1 6614.22  113.67 6622.31  112.89
 6635.79  113.31 6646.58  114.24 6665.44  114.34 6684.32  116.52 6702.67  116.83
 6708.59  117.38 6719.37  117.32 6727.15  113.01  6737.3  108.28 6746.05  103.44
 6768.94   98.65 6788.57   96.74 6810.32   93.14  6824.3   92.09  6832.2   91.16
 6840.11   89.35 6855.93   87.11 6879.66   85.39 6902.78   89.13 6925.91   94.46
 6937.47   97.99  6942.1   98.46 6966.87   98.41 6981.84   99.08 7032.17  100.69
 7040.86  101.47 7044.11  106.48 7047.34   107.4 7054.94   111.6 7062.52  116.45
 7070.11  118.28 7076.58  118.41 7083.05  117.66 7093.38  117.46 7109.99  116.59
 7119.97  117.76 7129.93  117.87 7139.91  117.08 7156.53  117.86  7166.5  117.32
 7176.47  117.38 7193.09  116.87 7209.71   115.3 7219.69  115.83 7232.98  116.06
 7246.28  114.88 7262.89  114.49 7296.14   114.7 7372.59  114.72 7392.53  114.86
 7455.69  114.76 7525.49  114.92 7581.99   114.8 7608.59  114.92  7625.2  114.82
 7701.65  114.83 7741.55  114.97  7795.1  114.97  7874.5  115.14 7966.63  115.07
 7995.77  115.26 8015.18  115.16 8021.65  114.88 8040.72  114.92 8099.34  114.57
 8167.06  114.28 8223.58  113.91 8260.16  113.76 8310.03  113.26 8348.55  113.14
 8364.73  112.82  8371.2     113 8403.57   112.9 8416.51  112.71    8478  112.56
 8510.37  112.63 8529.79  112.44 8568.63  112.56    8601  112.36 8626.89  112.78
 8642.52  112.83 8692.39  112.34 8702.37  111.87 8723.99  112.49 8735.62  112.55
 8752.24  115.03 8766.07  115.51 8772.54  115.29 8801.66  115.28 8814.61  115.01
 8824.32  115.16 8869.64  114.44 8879.34  114.55 8924.65  114.28 8947.31  114.45
 8978.33  114.33 9015.28   114.5 9050.88  115.24    9080  115.33 9086.48  115.87
  9105.9   115.3 9131.79  114.92 9157.69  115.48 9212.71  115.88    9241  116.27
 9293.62  116.19 9332.46  116.23 9351.88  116.09 9400.42     116 9432.79  116.04
 9497.51  115.86 9562.25  115.89 9616.71  116.01 9652.87  115.84 9706.48  115.93
 9739.72  115.76 9842.78  115.71 9882.66  115.61 9905.95  116.18 9922.57  114.61
 9932.54  115.72 9959.14  115.2810002.41  115.3410025.63  115.4810057.44  115.37
10096.27  115.4910118.93  115.2310128.64  114.8510135.11  115.6910164.24  115.82
10208.48  115.7810228.43  116.0410255.02  116.0310294.91  116.41   10339  116.27
10354.76  116.4710419.92  116.3710432.87  116.5210465.23  116.51 10497.6  116.67
10524.32  116.6310564.21  116.8510653.97  117.0410677.24  117.2110790.27  117.48
10816.87  117.6410860.09   117.610946.53  117.9110993.07  117.8611066.21  118.09
11139.35  118.1611169.27  118.0911305.58  118.3911345.47  118.3511368.74  118.47
11418.61  118.5111468.55  118.7711487.96  119.0911534.97  118.6811551.59  114.62
11564.89  114.3311571.53  115.6211581.51  119.2411598.14  123.6211604.79  124.07
11624.73  123.2911653.03  123.1211753.36  123.1811830.85  123.0511840.83   123.2
11850.79  123.8311867.42   123.411877.39  123.67 11890.7  122.8111960.51  122.83
11980.46  122.7312043.62  122.6812060.24  122.8112130.06  122.6712153.33  122.79
12183.83  122.6912256.39  122.7112415.97  122.6312499.08  122.4912505.73  122.65
12536.61  122.37 12552.8  122.4312565.74  122.1212601.34   121.912672.55  121.71
12701.87  121.7812781.67  121.6112834.38  121.69 12934.6  121.5612964.52  121.69
13037.65  121.6213070.64  121.7913103.01  121.6713213.86  121.7913230.47  122.44
13253.75  122.7613263.73  122.6113273.69  123.0713350.16  123.08 13370.1  123.21
 13383.4  122.9713393.38  123.1913453.22  122.9313506.41  123.3713523.76  123.24
13549.65  123.7313556.13  123.4913569.07  123.8313578.78  121.3713589.53   121.1
13607.91   121.613611.15  121.9813624.09  125.49 13633.8  126.7713653.22  126.65
13662.93  124.6913672.64  127.4513685.51  126.7213695.81  122.3913708.79  120.38
13722.36   120.413744.96  121.4413758.53  122.4913783.33  124.0313793.62  122.87
13811.63   122.613819.35  122.94 13824.5  124.59 13834.8   124.913857.96  124.96

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082  6557.6    .066 6635.79    .015  6942.1    .066 7040.86    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6719.37 7070.11          1037.5    1525    1100             .1       .3
Left Levee      Station=    3.28      Elevation= 135.825
Right Levee     Station=13672.64      Elevation=  127.45
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
    1600 5423.65  115.33

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 182.60*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   135.7    1.64   135.7   10.92  132.42   16.58  132.13   19.57  128.43
   22.56  122.99   25.55  122.34   52.43     122   79.33  121.08   97.26  118.66
   109.2  117.63  130.12  117.49  145.06  117.81  157.01  118.78  168.96  119.04
   183.9  120.86  195.85  121.01  201.83  120.58  216.77  120.48  255.61  121.01
  270.66  120.98  298.49  121.52  317.05  122.14  363.43  121.59  402.01  121.71
  533.48  121.54   575.3  121.67  611.16  121.62  641.04  121.79  664.94  121.64
  715.74  120.68  763.54  120.82  817.32  120.69  841.22  120.85  850.19  120.68
  906.96   120.9  930.86  120.76  987.63  120.95 1002.57   120.8 1050.38  120.87
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 1056.35  120.77  1092.2  121.03 1142.99  120.98 1154.95  121.16 1178.85  121.02
  1190.8  121.68 1199.76  121.57 1220.68  120.73 1258.66  120.76  1314.3  120.67
 1351.41  120.96 1369.97  120.89 1402.44  121.09 1447.75  121.19 1481.29  120.99
 1499.85  121.15 1555.32  120.96 1585.19  121.08 1648.28  120.98 1674.83  120.79
 1707.69  119.82 1728.61  119.36 1743.54  120.02  1755.5  117.36 1761.47  116.63
 1785.38  116.01 1797.33     116 1827.21  115.31 1839.16  115.54 1851.11  116.66
 1857.09   115.9 1866.04  113.91 1875.01   114.5 1880.99  114.28 1898.91  114.86
 1931.78  113.99 1940.74  114.46 1964.65  114.05 1970.62  114.66 1982.58  114.85
 1994.53  113.74 2006.47  114.18 2021.42  114.17 2033.37   114.8  2051.3  114.51
 2054.29  114.07 2069.22  114.12  2099.1  113.85 2117.03  114.22    2126  115.25
 2134.95  113.92 2143.92  114.62 2191.73  115.47 2272.39  115.79 2314.23  115.63
 2335.14  115.82 2368.01  115.84  2418.8   115.7 2433.74  115.93 2514.42  115.84
 2613.01  116.03 2636.92  115.94 2702.65  116.08 2741.49  115.59 2771.37  114.28
 2777.35  113.82 2810.21  112.72 2869.97  112.49 2875.94   112.3 2929.73  112.36
 2962.59  112.27 3007.41  112.33 3040.28  112.61 3052.23  112.41 3085.09  112.49
 3123.94  112.37  3183.7  112.49 3201.62   112.8 3261.38  113.28 3312.17  114.15
 3345.03  115.15 3401.81  115.38 3431.69  115.23 3491.44  115.46 3539.25  115.14
 3548.21  114.77    3602  114.14 3634.86  113.98 3712.55     114 3766.33  114.18
 3829.07  114.07 3879.86  114.09 3891.81  114.32 3963.52  114.46 3978.46  114.29
  4037.1  114.43 4078.85  114.44 4092.76  114.28 4176.24  114.47 4194.79   114.6
 4223.47   114.4  4255.1  114.42 4269.01  114.66  4292.2  114.39 4310.76  114.48
 4361.78  114.33 4375.84  114.52 4408.17  114.39 4468.47  114.52 4491.66   114.4
 4538.05  114.56 4593.96  114.44 4632.79  114.67 4658.65  114.59 4709.67  114.78
 4728.23  114.66 4811.72  114.81 4853.89  114.66 4868.83  114.91 4927.68  114.71
 4978.71  114.89 5066.03  114.81 5083.96  114.93 5125.79  114.84 5187.43  115.28
 5197.49  115.12 5239.32  115.44 5270.92   115.5 5305.05  114.96    5320  115.31
 5340.91  115.07 5364.81  114.52 5386.89  113.63 5442.55  113.23 5530.68  113.23
 5553.87  113.47  5581.7   113.2  5612.8   113.1  5665.2  113.24 5674.47  113.13
 5706.94  113.34 5739.41   113.1 5768.17  113.19 5841.46     113 5860.02  113.09
 5915.67  112.81  5943.5  112.97  5980.6  113.45 6008.44   114.2 6022.35   114.3
 6036.27   114.8  6064.1  114.36 6087.28  113.57 6101.19   113.8 6119.75  115.24
 6132.68  115.56 6144.63  114.69 6150.61   115.6 6171.52  115.19 6183.48  115.38
 6231.07  115.06 6270.12  115.07 6279.08  115.23 6326.89  115.14  6422.5  115.43
 6458.35   115.3 6490.82  115.42 6560.38  115.23 6597.49  115.56 6625.32  115.28
 6676.34  115.14  6694.9  114.48 6718.08  114.53 6731.99   115.1 6763.11  115.12
    6790  115.32 6831.83  115.35 6846.77  115.24 6879.63  115.48 6894.57  115.41
 6927.44  115.66 6951.34  116.69 6960.31  115.49 6972.26  115.01 7029.03  115.13
 7055.83  115.77 7076.83  115.44 7092.84  115.46 7115.96   114.6  7143.7  114.27
 7152.95  114.39 7185.34  114.21 7203.84  114.29 7229.21  115.81 7241.17  114.75
 7247.13  115.05 7259.09  117.27 7265.06  117.55 7282.99  116.04 7288.97  116.18
 7297.93  118.07 7309.88  118.23 7327.81  113.07 7336.77  111.74 7351.71  112.38
 7363.67   113.6 7384.58  113.25 7405.49  116.45 7414.46  116.63 7432.39  118.12
 7444.33  117.74 7453.14  111.28 7459.02  108.02 7464.64  106.72 7474.55  102.33
 7500.46   96.41 7522.68   94.77 7536.28   93.33 7547.31   92.66 7563.14   92.28
 7572.09   91.32 7581.05   88.91 7598.96   85.79 7625.82   83.43 7647.38    88.8
 7668.94   96.22 7679.73  101.48 7684.04  102.23 7707.13  102.12 7768.03  103.04
 7776.13  103.86 7779.16  106.99 7782.17  108.08 7789.25  112.69 7796.33  118.63
  7803.4  120.37 7809.92  120.09 7816.43  118.78 7843.55   118.2  7853.6  118.78
 7873.67  118.41  7890.4  118.81 7927.22  118.26 7943.95  117.52 7967.37  117.93
 7987.46  117.12 8107.93  117.24 8161.84  117.23 8261.87  117.36 8318.77  117.27
 8412.75  117.27 8468.15  117.41 8533.32  117.35  8621.3   117.5 8706.02  117.45
 8735.35  117.64  8754.9   117.5 8761.42  117.08 8820.07  116.94 8865.69  116.66
 9001.55   115.7 9051.75  115.07 9090.53  114.81 9106.82  114.31 9113.34  114.55
 9145.93   114.4 9158.96  114.12 9220.87  113.85 9253.46  113.96 9273.01  113.68
 9282.78   113.9 9299.08  113.61 9312.12   113.8 9344.71  113.54 9370.77  114.23
 9406.62  114.02 9452.24  113.17 9468.53   113.6 9480.24  113.52 9496.97  114.94
 9510.89  115.38 9517.41   115.1 9546.73  115.39 9559.76   115.1 9569.55  115.37
 9615.17  114.34 9624.94  114.51 9670.55  114.18 9693.37  114.44  9724.6  114.29
  9761.8  114.46 9797.65  115.38 9804.16  115.23 9826.97   115.5 9833.48  116.34
 9853.04  115.43  9879.1  114.97 9905.18  115.87 9960.58  116.47 9986.64  117.16
10042.03 117.0210081.14 117.1310100.69 116.9910149.57 116.9610182.15 117.05
10247.32  116.88 10312.5  116.96 10335.3 117.1210384.18 117.1210403.73 116.97
 10429.8  117.110527.55 116.9710540.59 117.05 10635.1 116.9610658.53 117.32
10675.26 116.5310685.31 117.0610712.08 116.7910779.03 116.9610811.05  116.9
10850.14  117.110872.75 116.7710882.73 116.1810889.25 117.4310918.58 117.62
10957.68 117.5711009.98 117.7511061.95 118.0411094.53 117.8511107.58 118.08
   11176 117.9611189.03 118.1711221.61 118.11 11254.2 118.2911312.86 118.34
11368.25 118.5511397.58 118.5211449.71 118.7211575.64 119.0211619.16 118.98
11681.07 119.1711753.05 119.2111826.68 119.3811930.45 119.4212067.68 119.61
 12150.3 119.6812231.76 120.0312251.31 120.4912274.12 120.3112298.63 119.81
12315.37 117.7612328.76 117.6212335.45 118.2612345.49 120.0712362.23 122.26
12368.92  122.48   12389 122.0912417.49 121.9312485.93 121.8912518.51 121.97
12596.53  121.82 12616.6 122.1912643.39 122.1212656.78 121.7312727.06 121.72
 12779.2 121.6212827.48 121.68 12951.9 121.5712984.48 121.6613195.66 121.48
13294.05 121.4413323.38 121.3313336.42 120.8813372.25  120.613443.95 120.43
13486.31  120.513553.81 120.3313606.88 120.4513662.27 120.31 13737.9 120.42
13779.58 120.3513844.75 120.5313877.34 120.4413896.89 120.5513945.77  120.5
13988.94 120.6214005.67 120.99 14053.3 121.2814146.25 121.5314229.94 121.37
14283.48 121.6414300.95 121.5714327.02 122.2514333.54 121.8614346.57 122.28
14356.34 118.5614367.17 118.1414385.68 118.5614388.93 119.1214401.96 124.23
14411.74  126.08 14431.3 126.3514441.07 123.1914450.84 126.8914465.48 126.53
 14477.2 121.7314491.83 119.8514509.39 119.9914515.24 120.47 14533.1 120.87
 14553.3 121.6214565.01  122.414570.86 123.4914576.72 123.6414588.43 122.01
14608.92  121.61 14617.7  122.114623.55 124.4714635.27 124.7414661.61 124.63

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082 7444.33    .066 7536.28    .015 7843.55    .066 7927.22    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7444.33  7803.4          1037.5    1525    1100             .1       .3
Left Levee      Station=    1.64       Elevation=135.6975
Right Levee     Station=14450.84       Elevation= 126.885
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0  157.01  118.78    1850 7229.21  115.81

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 182.4

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  135.57    16.4  135.47   19.68  130.55   22.96   123.3   26.24  122.45
   55.75  122.11   75.43  121.27   85.27  121.25  104.95  118.05  118.06  116.81
  141.02  116.98  157.42  117.78  170.54  119.43  183.65  120.05  200.05  122.58
  213.17  122.83  219.73  122.28  236.13   122.2  278.76  122.82  314.84  122.81
  350.91  123.01   400.1  122.84  439.46  123.03  583.76  122.97  629.67  123.13
```

```
  669.03  123.05  701.82  123.27  728.06   123.1  783.81  121.85  790.37  122.02
  826.44  121.85  836.28  122.02  895.31  121.83  921.55  122.07  931.39  121.86
   993.7  122.13 1019.94  121.93 1082.25  122.17 1098.65  121.97 1151.12  122.12
 1157.68  121.98 1197.03  122.32 1252.78  122.19  1265.9  122.47 1292.14  122.31
 1305.25  123.18 1315.09  123.05 1338.05  121.96 1374.12  121.99  1426.6  121.83
 1515.14     122 1551.22  121.86 1587.29     122 1623.37  121.88 1652.88  122.02
 1705.36  121.79 1738.15   121.9  1793.9   121.8 1836.54  121.53 1872.61  120.18
 1895.57  119.64 1911.96  120.51 1925.08  116.96 1931.64  115.96 1957.88  115.07
    1971  115.07 2003.79  113.76 2016.91  114.04 2030.03  115.79 2036.59  115.33
 2046.42  113.63 2056.26  115.15 2062.82  114.78  2082.5  115.47 2118.57  114.36
 2128.41  115.05 2141.53  114.49 2154.65   114.4 2161.21  115.22 2174.33  115.48
 2187.45     114 2200.56   114.6 2216.96  114.61 2230.08  115.47 2249.76  115.12
 2253.04  114.54 2269.43  114.64 2302.23  114.34 2321.91  114.87 2331.75  116.26
 2341.58   114.5 2351.42  115.47  2403.9   116.7 2492.44  117.13 2508.84   116.9
 2538.36  116.91 2561.31  117.16 2597.39  117.19 2653.14  117.01 2669.54  117.32
 2695.78  117.13  2708.9  117.32 2758.09  117.19 2866.31  117.45 2892.55  117.33
  2964.7  117.52 2987.66     117 3007.33  116.86 3040.13  115.11 3046.69   114.5
 3082.76  113.03 3148.36  112.72 3154.91  112.47 3213.95  112.55 3250.02  112.43
 3299.21  112.52 3335.29  112.89 3348.41  112.62 3384.48  112.72 3427.12  112.57
 3492.71  112.72 3512.39  113.14 3577.98  113.78 3633.73  114.94 3656.69  115.96
  3669.8  116.27 3732.12  116.58 3764.91  116.38 3791.15  116.61 3823.94  116.52
  3830.5  116.69 3882.98  116.26 3892.81  115.77 3922.33   115.3 3932.17  115.41
 3951.85  114.93 3987.92  114.71 4073.19  114.74 4132.22  114.98 4201.09  114.84
 4237.17  114.95 4256.84  114.79 4269.96  115.02 4309.32  114.88 4348.67  114.95
 4365.07  114.74 4437.22   114.9 4522.48  114.83 4624.15  115.04 4633.99   114.9
 4745.49  115.13 4784.84     115 4801.24  115.14 4834.04  115.04 4883.23  115.17
 4942.26   115.1  4968.5  115.23 5040.65  115.14 5083.28   115.3 5158.71   115.2
 5221.02  115.53 5286.61  115.55 5325.96  115.42 5342.36  115.79 5375.16   115.8
 5394.83  115.55 5450.59   115.8 5558.81  115.75 5578.49   115.9  5624.4   115.7
 5693.27  116.21 5703.11  115.91 5749.02  116.02 5765.42  115.86 5788.38  116.09
 5821.17  115.75 5837.57  116.07 5860.53  115.79 5886.76   115.1 5903.16  114.11
 5949.07  113.65 5988.43  113.49 6054.02  113.56 6090.09  113.37 6122.89   113.5
 6158.96  113.32 6198.32  113.49 6306.54  113.28  6329.5  113.43 6388.53  113.13
    6441  113.33 6493.47  113.06 6575.46  113.17  6585.3  113.07 6650.89  113.17
 6677.12  112.98  6696.8  113.22 6709.92  113.06  6729.6  114.21 6736.16  113.18
 6742.71  113.21 6749.27   114.5 6772.23  114.11 6785.35   114.4  6841.1  114.25
 6880.45  114.26 6890.29  114.46 6942.76  114.27 7014.91  114.49 7024.75   114.3
 7047.71  114.54 7087.06  114.45 7093.62   114.6 7162.49  114.47 7293.67  114.64
 7339.59  114.62 7359.26  114.75 7382.22  114.56 7421.57  114.59 7451.09   114.8
 7460.93  114.66    7497  114.87  7513.4  114.72 7549.47  115.01 7565.87  114.88
 7601.95  115.12 7628.18  116.44 7638.02  114.88 7651.14  114.34  7674.1  114.06
 7693.77  114.16 7713.45  113.91 7739.69  114.21 7765.92  113.91 7815.12  114.09
 7861.03   114.1 7893.82  113.97 7923.34  114.15 7933.18  115.54  7946.3  114.77
 7952.85  115.35 7965.97  118.37 7972.53  118.73 7992.21  116.52 7998.77  116.61
 8008.61  119.02 8018.45  119.75 8021.72  119.35  8041.4  112.48 8051.24  110.59
 8067.64  111.45 8080.76  112.97 8093.87  112.24 8103.71  112.16 8126.67  116.39
 8136.51  116.76 8156.19  118.87 8166.02  118.88  8169.3  118.16 8179.14  109.55
  8185.7  105.62 8191.98  105.17 8201.98  101.47 8231.98   94.17 8271.98   91.97
 8301.98   92.47 8311.98   91.47 8321.98   88.47 8341.98   84.47 8371.98   81.47
 8391.98   88.47 8411.98   97.97 8421.98  104.97 8425.98     106 8503.88  105.38
 8510.44  105.83    8517  108.76 8523.57  113.78 8530.13  120.81 8536.69  122.46
 8543.25  121.78 8549.81  119.89 8615.42  119.72 8641.67   119.8 8664.63  119.62
 8690.88  119.84 8743.37   119.6 8858.19  119.79 8897.55  119.69 8979.57  119.85
 9015.65  119.74 9150.16  119.73 9205.93  119.87 9271.54  119.74 9360.12  119.85
 9445.41  119.83 9474.94  120.01 9494.62  119.83 9501.18  119.28 9560.23  119.12
 9579.92  118.85 9606.16  118.83  9734.1  117.72 9776.75  117.28 9799.71  116.74
 9832.52  116.48 9848.92   115.8 9855.48  116.11 9888.29   115.9 9901.41  115.52
  9953.9  115.29 9963.74  115.13 9996.55  115.2910016.23  114.9210026.07  115.22
10042.48  114.81 10055.6  115.0510088.41  114.7310114.65  115.6710150.74  115.37
10196.67  114.3810213.07  114.7110226.19  114.4710232.75  115.0410245.88  114.77
10255.72  115.2510262.28  114.9110281.96  115.08 10291.8  115.4910304.92  115.19
10314.77  115.59 10360.7  114.2310370.54  114.4710416.46  114.0710439.43  114.43
10468.95  114.2410508.32  114.4110544.41  115.5110550.97  115.2910573.93  115.68
10580.49   116.810600.18  115.5610626.42  115.0210652.67  116.2610708.44  117.06
10734.68  118.0210790.45  117.8610829.82  118.04 10849.5  117.8910875.74  118.05
10898.71  117.9110931.51  118.0510997.12  117.9111062.74  118.02 11085.7  118.24
11134.91  118.2711154.59   118.111180.84  118.2711279.25  118.2211292.37  118.33
11387.51   118.311417.03  118.4911462.96   118.311508.89  118.4711564.66  118.43
11604.02  118.7111626.99   118.311636.83  117.5111643.39  119.1711672.92  119.41
11712.28  119.3611764.77  119.4711817.26  119.7111850.06  119.4311863.19   119.7
11899.27  119.7411932.08  119.56 11945.2  119.82   11978  119.7112010.81  119.92
12069.86  119.8912125.63  120.1112155.15  120.0212207.64  120.1812325.74   120.4
12378.23  120.3512440.56   120.512565.22  120.6112614.43  120.7412742.37  120.74
 12821.1   120.812896.55  120.9712912.96  120.9112994.97  121.2813014.65  121.89
13037.62  121.6513054.02  121.0213067.14   120.913152.44   120.913181.96  120.74
13250.86  120.6413283.66  120.7713398.48  120.5113431.29   120.713546.11  120.54
13680.61  120.5813719.98  120.4513752.78  120.5913946.34   120.414015.23  120.44
14064.44  120.3614077.56   120.114093.97  120.2414107.09  119.6514143.17  119.31
14215.35  119.14   14258  119.2214313.76  119.0214379.38  119.2114435.15  119.02
14490.92  119.1914553.25  119.0814618.86  119.2814651.67  119.2114671.35  119.37
14720.56  119.2514786.17  119.5614828.82   119.514904.27  119.8314946.92  119.88
14986.29  119.74 15051.9  119.9315078.14  119.8915104.39  120.7715110.95  120.22
15124.07  120.7315133.91  115.7515147.04  115.0715163.44  115.5115166.72  116.25
15179.84  122.9715189.68  125.3815209.37  126.0615219.21   121.715229.05  126.32
15245.45  126.3415258.58  121.0715274.98  119.3215294.66  119.5115301.22  120.05
15343.87  120.5615356.99  121.5315363.55  123.0215370.12  123.2515383.24  121.16
 15406.2  120.6315416.04  121.25 15422.6  124.3615435.73  124.5715465.25  124.29

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082 8018.45    .066 8179.14    .015 8523.57    .066 8536.69    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8169.3 8536.69          1987.52 1916.67 1916.38            .1       .3
Left Levee      Station=       0      Elevation=  135.57
Right Levee     Station=15229.05      Elevation=  126.32
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   72.11  171.27  119.54 1938.03 7959.44  116.59

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            133.48    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                0.082      0.021     0.061
  W.S. Elev (ft)            133.39    Reach Len. (ft)         1987.52    1916.67    1916.38
  Crit W.S. (ft)            122.57    Flow Area (sq ft)       126314.40   13093.07   98472.59
  E.G. Slope (ft/ft)      0.000038    Area (sq ft)            126314.40   13093.07   98472.59
  Q Total (cfs)           235000.00     Flow (cfs)             88054.55   60467.89   86477.58
  Top Width (ft)          15447.46    Top Width (ft)           8151.51     367.39    6928.56
  Vel Total (ft/s)            0.99    Avg. Vel. (ft/s)           0.70       4.62       0.88
  Max Chl Dpth (ft)          51.92    Hydr. Depth (ft)          15.50      35.64      14.21
  Conv. Total (cfs)       38182020.0    Conv. (cfs)            14306810.0   9824622.0   14050590.0
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Length Wtd. (ft)	1944.26	Wetted Per. (ft)	8162.60	385.64	6946.16	
Min Ch El (ft)	81.47	Shear (lb/sq ft)	0.04	0.08	0.03	
Alpha	6.10	Stream Power (lb/ft s)	0.03	0.37	0.03	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	315251.50	92183.70	318797.70	
C & E Loss (ft)	0.02	Cum SA (acres)	30039.77	3518.46	31811.54	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 182.05*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	129.06	4.37	128.7	10.93	129.54	29.51	135.05	37.16	135.47
47.78	134.88	50.93	133.29	56.44	122.41	59.19	120.85	83.96	120.43
108.75	119.55	125.27	117.16	136.27	116.37	169.32	116.66	180.33	117.65
191.34	117.97	205.11	119.54	216.12	119.62	221.63	119.2	249.49	118.94
276.04	119.38	318.5	119.16	373.05	119.07	414.05	119.17	527.24	119.18
573.29	119.24	610.45	119.46	668.85	119.07	695.18	118.36	730.97	118.37
739.23	118.51	788.79	118.4	859.95	118.6	893.42	118.46	945.73	118.65
959.5	118.51	1003.55	118.58	1009.05	118.48	1042.09	118.75	1088.89	118.67
1099.91	118.86	1121.93	118.76	1132.94	119.34	1160.48	118.53	1234.82	118.48
1309.15	118.69	1369.72	118.62	1385.46	118.5	1424.78	118.67	1468.84	118.48
1496.37	118.59	1543.17	118.55	1578.97	118.34	1609.25	117.41	1628.52	117.08
1642.28	117.66	1653.3	115.28	1658.81	114.6	1680.84	113.99	1691.85	113.99
1719.38	113.14	1730.39	113.33	1741.41	114.5	1755.17	113.07	1763.43	114.09
1768.93	113.85	1785.46	114.32	1815.74	113.58	1824	114.03	1846.03	113.59
1851.53	114.13	1862.55	114.3	1873.56	113.31	1884.57	113.73	1898.34	113.76
1909.35	114.34	1925.87	114.07	1928.63	113.67	1969.92	113.57	1986.44	113.95
1994.71	114.89	2002.96	113.71	2011.22	114.33	2055.28	115.12	2129.61	115.44
2143.38	115.29	2187.43	115.44	2202.94	115.33	2240.1	115.68	2298.48	116.69
2335.65	117	2351.56	117.44	2378.11	117.55	2404.65	117.03	2465.51	117.01
2494.89	117.2	2505.51	116.74	2526.08	116.91	2542.66	116.71	2561.87	116.12
2594.91	114.59	2616.97	113.97	2625.19	113.48	2659.44	112.53	2675.37	112.67
2685.76	112.47	2765.61	112.51	2806.91	112.43	2837.2	112.66	2848.21	112.49
2903.63	112.51	2969.35	112.62	2985.87	112.92	3040.94	113.35	3087.74	114.13
3118.02	115.03	3170.34	115.29	3197.87	115.19	3252.93	115.36	3296.99	115.1
3305.24	114.77	3354.81	114.25	3407.92	114.08	3456.68	114.12	3506.23	114.3
3564.05	114.19	3621.87	114.36	3654.91	114.23	3687.95	114.31	3701.71	114.18
3762.29	114.3	3811.33	114.28	3919.22	114.48	3933.43	114.38	4013.05	114.58
4054.12	114.47	4067.89	114.58	4186.28	114.62	4208.3	114.73	4268.88	114.74
4294.4	115.05	4331.55	115.11	4347.46	114.97	4405.86	115.09	4448.33	115.33
4508.4	115.18	4522.17	115.46	4549.7	115.43	4566.22	115.23	4623.5	115.49
4703.88	115.39	4720.4	115.5	4750.89	115.41	4803.98	115.65	4816.76	115.86
4851.75	115.57	4877.33	115.55	4896.61	115.76	4924.14	115.53	4937.9	115.74
4979.2	115.06	4992.97	114.39	5048.17	114.02	5106.55	114.11	5149.9	114.05
5177.44	114.14	5207.72	114.02	5240.76	114.15	5297.65	114.18	5331.61	114.07
5382.58	114.12	5403.82	114.02	5435.67	114.37	5467.51	114.15	5515.29	114.27
5547.13	114.06	5620.7	114.09	5670.26	113.91	5686.78	114.61	5697.79	113.94
5703.29	114.8	5722.57	114.54	5733.58	114.73	5775.39	114.64	5813.42	114.68
5821.68	114.81	5865.73	114.67	5953.84	114.89	5992.38	114.9	6050.2	114.79
6131.04	114.96	6200.06	114.87	6215.39	115.06	6300.74	115.07	6331.03	115.23
6388.84	115.2	6419.13	115.35	6441.15	116.26	6449.41	115.26	6460.43	114.95
6496.22	114.84	6512.74	114.64	6534.77	114.81	6556.79	114.61	6636.64	114.8
6664.16	114.71	6688.95	114.85	6697.21	115.8	6708.22	115.32	6713.72	115.67
6724.73	117.62	6730.24	117.87	6746.76	116.41	6752.27	116.47	6760.53	118.09
6771.54	118.32	6788.06	113.76	6796.32	112.5	6810.09	113.08	6821.1	114.08
6840.37	113.52	6859.64	116.41	6867.91	116.68	6884.43	118.14	6895.43	117.71
6904.78	111.15	6911.02	107.78	6916.98	106.75	6928.41	102.71	6954.99	97.87
6961.75	97.6	6984.09	95.9	6992.99	94.98	7007.56	94.2	7021.5	93.85
7031	92.9	7040.5	90.71	7059.5	87.86	7088	85.59	7108.7	90.31
7129.39	97.2	7139.74	102.2	7143.88	103.02	7224.48	105.17	7231.27	105.72
7233.84	106.74	7244.86	113.38	7251.65	118.14	7258.43	119.32	7271.47	117.08
7298.29	116.82	7385.58	116.47	7411.66	116.63	7464.39	116.42	7583.98	116.5
7607.23	116.39	7698.56	116.46	7746.75	116.3	7819.84	116.31	7868.09	116.23
7923.51	116.27	8005.86	116.12	8022.46	116.37	8039.07	118.43	8085.58	118.47
8112.16	118.36	8132.09	118.53	8145.37	119.98	8152.02	119.77	8161.98	118.68
8210.4	117.88	8216.92	117.51	8321.25	117.03	8394.51	116.48	8448.39	116.16
8490.78	115.76	8513.59	115.36	8546.2	115.14	8562.5	114.64	8569.02	114.84
8601.62	114.66	8614.66	114.38	8676.6	114.02	8709.21	114.07	8728.77	113.79
8738.54	113.98	8754.85	113.73	8767.89	113.85	8800.5	113.61	8826.57	114.17
8862.44	113.91	8908.08	113.22	8924.38	113.4	8937.42	113.21	8943.94	113.57
8956.99	113.35	8989.13	113.44	9002.42	115.29	9025.45	115.56	9071.09	114.57
9080.87	114.72	9126.5	114.47	9149.33	114.71	9178.67	114.56	9217.79	114.65
9253.66	115.39	9260.18	115.24	9282.99	115.47	9289.51	116.23	9309.08	115.44
9335.16	115.07	9361.24	115.88	9416.67	116.37	9442.74	116.96	9498.17	116.84
9556.85	116.81	9582.93	116.95	9605.75	116.8	9638.35	116.9	9700.01	116.77
9791.58	116.94	9849.5	116.84	9866.11	117.03	9879.39	115.74	9925.9	115.15
9945.83	115.29	9983.92	115.1110015.59		115.2510038.84		115.1310072.07		115.42
10078.71	115.1510120.85		115.2510168.39		115.1210212.13		115.2810268.05		115.21
10294.62	115.8410306.67		115.6310339.28		114.67 10351.1		118.1210357.74		118.62
10427.5	118.3110466.42		118.3110518.59		118.4510551.18		118.2410564.23		118.4
10600.08	118.3810632.69		118.2210645.73		118.3810678.33		118.2710710.93		118.38
10769.61	118.2610825.04		118.3710854.37		118.2510899.21		118.33 11023.9		118.36
11076.07	118.3111181.57		118.34	11248	118.2911287.86		118.33 11384.2		118.31
11437.94	118.211607.47		118.1711630.02		118.2711688.97		118.3211708.52		118.71
11731.35	118.5611749.61		118.0611874.79		117.811943.26		117.7411975.86		117.82
12005.39	117.7212089.97		117.6312122.57		117.7412204.71		117.6312236.68		117.53
12390.74	117.5112463.81		117.8312483.74		117.7212497.03		117.2512520.29		118.19
12533.58	119.2512553.51		117.9412573.44		117.7112633.24		117.6712659.81		117.37
12696.35	117.512751.78		117.2712781.13		117.1712794.17		116.6712830.02		116.34
12879.05	116.1312942.16		116.1412999.55		116.0313064.76		116.1513120.18		116.02
13154.77	116.0813237.55		116.0913302.75		116.4213330.82		116.4813350.75		117.66
13367.37	116.913374.01		116.2413390.62		116.2713397.26		117.1513413.87		117.8
13427.16	117.9713443.77		117.0713450.41		117.7413473.66		117.8513480.31		117.51
13490.28	118.113510.21		118.5713543.43		120.0113550.07		119.99 13570		118.99
13616.51	119.17 13629.8		119.37 13676.3		119.6413712.84		119.7413732.78		119.94
13759.17	119.9713785.26		120.6713791.78		120.3213804.82		120.6813814.59		117.45
13827.64	117.0113843.94		117.2313860.24		121.2513870.02		122.513889.58		124.01
13899.36	121.6513909.14		125.4813925.44		125.8713934.42		122.9313941.59		123.29
13954.15	120.5113973.87		119.3813982.83		119.9713998.97		119.8114009.72		120.19
14016.9	120.9814022.27		120.5314036.62		120.31 14067.1		120.4514101.16		120.79
14113.72	121.4614125.82		123.1314136.97		123.314145.98		122.5514156.75		122.19
14160.33	120.6414165.71		122.0414171.09		122.2814178.26		120.33 14192.6		119.46

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14206.95  121.0214214.89  121.0314226.02  123.0214248.18  123.1614298.38  122.88

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082 6895.43    .066 6961.75    .015  7059.5    .066 7258.43    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6895.43 7258.43          1987.52 1916.67 1916.38             .1       .3
Left Levee      Station=   37.16      Elevation=135.4667
Right Levee     Station=13914.51      Elevation=125.8533
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    1600 6713.72  115.67 7271.47   10633  117.08

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 181.70*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.54    8.75  121.84    15.3  122.18   21.86   123.5   39.35  128.84
   59.02  134.53   65.57  135.32   74.32  135.36   82.91  134.26   85.46   131.1
   89.91  121.52   92.14  119.26  112.18  118.75  132.22  117.86  147.31  116.12
  164.49  116.18  181.21  115.53  199.02   115.9  210.16  116.51  246.06  115.43
  267.53  115.93   284.7   115.8  301.88  115.39     346  115.31  470.71   115.4
  507.97  115.37  538.02  115.77  563.78  115.33  585.25  115.58  598.14  115.03
   619.6  114.82  642.18  114.99  682.27  114.98  739.82  115.12   766.9  114.98
  795.63  115.14  864.33     115  887.15  115.18  951.73   115.2  960.63   115.5
   982.9   115.1 1053.25  115.15 1103.15  115.37 1143.42  115.33 1164.88  115.06
 1173.47  115.24 1216.41  115.32 1229.28  115.17 1280.81  115.32  1321.4  115.14
 1345.21  114.66 1361.48  114.53 1372.61  114.81 1385.97  113.25 1434.97  112.51
 1452.78  113.22 1463.91  112.51 1470.59  113.03 1488.41  113.17  1512.9  112.79
 1519.59  113.01  1537.4  112.77 1550.77  113.11 1559.68  112.63 1588.62   113.2
 1604.21  112.81 1637.62  112.81 1650.98  113.04 1657.66  113.53 1664.34  112.91
 1671.02   113.2 1706.65  113.53  1748.8  113.78 1777.91  113.69 1804.61  113.85
 1826.09  113.49 1856.14  114.25 1877.61  115.16  1886.2  115.27 1903.36  116.24
 1933.43  116.75  1946.3  117.68 1967.78  117.83 1989.24  116.71 2023.59  116.55
 2062.23  116.97 2070.82  116.03 2100.87  116.34 2113.76   115.4 2143.13  114.67
 2160.98  114.52 2182.45  112.87 2195.32  112.23 2208.21  112.58 2242.56  112.41
  2281.2  112.58 2289.79  112.36  2339.1  112.44 2435.77  112.46 2470.12   112.8
  2503.9  112.93 2541.75  113.31 2566.25  113.79 2608.56     114 2667.61  113.92
 2689.09  114.06 2717.68  113.77 2800.72  113.44 2880.25  113.63 2920.93  113.53
 2981.05  113.69  3000.5  113.58 3087.35   113.7 3127.02   113.7  3148.5  113.87
 3182.84  113.79 3195.73  113.95 3225.78  113.84 3290.18  114.05 3315.94  113.92
 3376.06  114.14 3393.22  114.04 3500.56  114.37 3517.74  114.85 3526.32  114.67
  3547.8  114.95 3560.67  114.72 3582.14  114.85  3607.9  114.75 3642.25  115.12
 3668.01  114.88 3706.65  115.14 3753.88  114.87 3783.93  115.18 3818.28     115
 3895.57  115.19 3929.91  115.21 3947.09  115.57 3968.56  115.16 4004.84  115.42
 4038.24   115.4 4071.64  115.01 4082.78  114.66 4127.42  114.47 4174.64  114.68
 4183.23  114.54 4213.29  114.76 4256.47  114.71 4329.21  115.01 4376.45   114.8
 4397.91  115.01 4415.09   114.9 4440.85  115.45  4466.6   115.1 4483.62   115.5
 4505.25  115.44    4531  114.97 4565.35  115.07  4630.6  114.77 4643.96  115.01
 4652.86  114.68 4657.32  115.11 4715.63  115.01 4753.07  115.16  4788.7  115.07
 4844.38  115.12 4859.97  115.23 4937.91  115.11  5003.3  115.32 5059.12  115.12
 5084.88  115.54 5149.28  115.49 5236.32  115.58 5254.13  116.09 5260.81  115.64
 5312.03  115.38 5347.66  115.31 5406.89  115.49 5454.55  115.55 5461.23  116.06
 5474.59  115.98 5487.95     117 5501.32   116.3 5512.45  117.16 5521.35  117.29
 5534.72  115.03  5541.4  114.42 5561.44  115.18 5577.03  114.89 5592.62  116.43
 5612.66  117.42 5621.57  117.25 5625.04  115.88 5636.33  109.94 5641.98  108.34
 5652.81  104.43 5663.22  102.95 5677.99  101.58  5684.4  101.43 5705.57   99.32
  5727.8   96.18 5750.01   94.33 5759.02   92.94 5777.02   91.25 5804.03   89.71
 5828.24   92.55 5846.81   96.44  5857.5   99.43 5861.78  100.04 5945.09  104.96
 5951.59   105.5 5954.76  106.55 5961.12   111.3 5973.16  115.47 5980.18  116.17
 5993.13  114.28 6003.28  114.21 6009.88  113.68 6019.79  113.83 6075.91  113.44
 6106.52  113.32 6125.42  113.45 6184.85  113.23 6191.45  113.46 6207.95  113.18
 6267.37  113.25 6277.27  113.11 6303.69  113.23 6326.79  113.07  6363.1  113.17
  6376.3  113.04 6448.93  113.02 6465.44  112.87 6551.27   112.8 6722.92  112.49
 6739.42  112.97 6755.93  117.06 6782.33  116.95 6802.15   117.1 6828.55  116.89
 6848.36  117.22 6851.66  117.61 6861.56  120.12 6868.16  119.71 6878.07  117.52
 6891.27  117.21 6897.87  116.61 6932.66  115.74 6947.39  115.73 7010.42   115.3
 7036.33  115.23 7109.14  114.77 7162.68   114.6 7227.48  113.99 7251.09   113.9
 7276.07  113.48 7282.55  113.57 7327.91  113.24 7389.46   112.9 7421.86  112.85
 7512.58  112.48  7538.5  112.67 7619.49  112.07 7648.65  111.95 7655.12   112.1
 7684.29  111.72 7700.04  111.84 7709.94  113.68 7713.24   115.1 7719.84  115.71
 7781.48   114.9 7836.55  114.86 7908.01  114.96 7924.51  114.87 7950.92   115.2
 7992.06  115.27 7998.54  115.67 8017.98  115.33 8043.89  115.11 8069.82  115.49
 8106.06  115.52 8150.81  115.89 8188.59  115.91  8264.2  115.73 8294.23  115.85
 8317.34  115.66 8345.19  115.74 8406.47  115.62 8436.17  115.76 8497.46  115.65
 8522.01  115.49 8555.01  115.49 8561.62  115.98 8571.52  115.92 8584.72  113.25
 8614.43  112.31 8630.93  112.04 8650.75  112.35 8700.26   111.9 8720.06  112.17
 8743.17  111.95 8776.19  112.53 8782.79     112  8815.8  111.96 8865.31  112.08
 8871.91  111.93 8951.14  112.15 8970.95  111.99 8997.35  113.06 9023.77  111.82
 9040.27  111.54 9046.87   113.4 9053.48  117.03 9060.08  117.97 9079.88  117.81
 9093.08  117.45 9129.39  117.22 9168.08  117.15 9219.91  117.19 9265.27  117.11
  9333.3  116.88  9446.3  116.76 9466.11  116.63 9524.44  116.64  9553.6  116.47
 9598.15   116.5 9687.28  116.28 9756.61  116.31 9852.33  116.13 9878.75  116.15
 9944.76  115.97 9984.37  115.9910017.39  115.89 10080.1  115.8810139.53  115.65
10185.74  115.6410291.38  115.4210324.38  115.52 10350.8  115.3610382.96  115.36
 10402.4  115.5410425.08  115.4710443.22  115.1110548.86  114.8810668.06  114.86
10697.41  114.7310740.33  114.8310813.85  114.7810859.17  114.6510895.47  114.67
10915.28  114.5311053.92  114.4711067.12   114.811080.34  114.5211096.84  114.69
11139.75  114.8611152.96  115.0811172.76  114.8911185.96  113.9711199.18  114.84
11209.08  115.8611215.68  117.4311222.28  117.9911242.09  115.4111261.89  114.96
 11294.9  114.8811321.32  114.9511347.72  114.3311384.03  114.5711452.08  114.04
11468.28   114.111486.37  113.5911519.38  113.3511535.88  113.39 11565.6  113.06
11598.61   113.111605.21  113.3311628.31  113.0611658.02  113.1311720.74  113.01
11743.85  113.0911865.99  112.97 11895.7  113.0111945.22  113.2312014.54  113.73
12021.14   114.212027.74  115.6112034.34  115.9912040.95  115.0912050.85  114.45
12057.46  113.1512073.96  113.2712080.56  115.0412097.07   116.312110.27  116.57
12126.77  114.7112133.38  116.0112156.48  116.1412163.09  115.48   12173  116.67
 12192.8  117.63 12202.7   118.712225.81  120.3912232.41  120.3212252.21  118.22
12275.32  118.4512298.44  118.4812311.64  118.8712338.04  119.2512351.25   119.2
12357.85  119.5212394.16  119.6112413.97  119.95 12440.2  120.0412466.12  120.57
12485.56  120.6312495.28  119.1412508.25  118.9512527.68  119.1112532.81  119.84
12542.71  119.2712550.35  119.62 12569.8  121.9612579.52  121.5912589.23  124.65
12605.43  125.3912610.51   124.8 12618.1  121.6412625.68  123.9612635.81  123.05
12645.92  120.3612673.74  119.3412686.38  120.5812709.15  120.1612724.32  120.83
12734.44  122.0712742.03     12112762.26  120.4512777.44  120.7612805.26  120.52
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 12817.9  120.8312853.31  120.6312871.02  121.4412883.66  123.08 12903.9  123.34
12916.54   122.712931.72  122.9812936.78  120.13 12939.3  120.1912944.36  123.02
12951.95  123.5512962.06  119.7612967.12   119.112982.29  118.2112997.47  120.11
13002.53  121.0913013.73  120.8113029.43  121.6813060.86  121.7413131.52  121.46

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082 5621.57    .066 5677.99    .015 5861.78    .066 5980.18    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5621.57 5980.18          1987.52 1916.67 1916.38             .1       .3
Left Levee      Station=   74.32      Elevation=135.3633
Right Levee     Station=12599.96      Elevation=125.3867
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 3393.22  114.04 5980.18    9060  115.86

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 181.35

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     490
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  116.03   13.12  114.97   22.95  115.48   32.79  117.47   88.53  134.01
   98.36  135.19  111.48  135.26  118.04  133.65   124.6  117.68  147.55  116.79
  167.22  115.28  180.34  115.81  193.45  114.37  226.24  113.02  242.63  111.93
  259.03  112.49  272.14   112.3  285.26  111.63  344.28  111.47   432.8  111.65
  442.64   111.5  465.59  112.09  485.26  111.42  501.66   112.1   511.5  111.48
  527.89  111.25  544.28  111.48   619.7  111.65  629.53  111.43  662.32  111.66
  714.78  111.48  724.62  111.61  813.15  111.67  859.05   111.8  868.89  111.96
  911.51  112.11  927.91  112.02   944.3  111.62  950.86  111.91  983.65  112.04
  993.48  111.85 1032.83  112.07 1082.01  111.88  1098.4     112 1124.63  111.81
 1200.05  112.04 1242.67  111.92 1265.62  112.09  1285.3  111.88 1321.36  112.17
 1341.04  111.94 1370.54  111.95 1390.22  112.17 1406.61  112.03 1432.84  112.27
 1449.24  111.65 1472.19  112.83 1488.58  114.21 1495.14  114.25 1508.25  115.79
 1518.09  115.86 1531.21  116.51 1541.04  117.93 1557.44  118.12 1573.83   116.4
 1600.06  116.11 1629.57  116.75 1636.13  115.32 1659.08  115.98 1668.92  114.65
 1682.03  114.55 1704.98  115.06 1721.38  112.84 1731.21  111.92 1741.05   112.5
 1767.28  112.35 1796.79  112.66 1803.35  112.32 1839.41  112.21 1882.04  112.31
 1891.88  112.49 1914.83  112.35 1941.06  112.55 1983.68  112.47 2023.03  112.57
 2065.65  112.82 2091.88  112.61 2108.28  112.83 2131.23  112.77 2177.13  112.95
 2193.53   112.8 2268.94  112.99 2285.33  112.87 2331.24  113.05 2347.63  112.92
 2370.58  113.05 2442.71  113.13 2459.11  113.39 2485.34  113.21 2495.18  113.44
 2518.13  113.31 2567.31  113.52 2586.98  113.36 2632.89  113.65    2646  113.48
 2727.97  113.97 2741.09  114.65 2747.64  114.35 2764.04   114.8 2773.87  114.46
 2790.27  114.65 2809.94   114.4 2836.17  114.91 2855.84  114.55 2885.35  114.82
 2921.42  114.47 2944.37  114.87  2970.6  114.62 3023.06  114.74 3029.62  114.92
 3055.85  114.77 3068.97   115.4 3085.36  114.74 3118.15  115.15 3173.89  114.93
 3193.56  115.09 3206.68  114.92 3242.74  115.25  3249.3  115.03 3272.25  115.45
 3318.16  115.39 3360.78  115.83 3396.85   115.5 3413.24  115.89 3426.36  115.77
 3446.03  116.53  3465.7  116.06 3478.82  116.72 3495.21  116.61 3514.88  115.88
 3541.11  116.05 3587.02  115.76 3596.85  115.42 3655.87  115.38 3662.43  115.53
  3744.4  115.44  3760.8  115.59 3823.09  115.42 3875.55  115.69 3918.18  115.36
 3937.85  116.01 3987.03  115.87 4006.71  116.02 4016.54  115.84 4062.45  115.81
  4085.4  116.32 4121.46  116.03 4147.69  115.99 4183.76  116.19 4216.55   116.2
 4232.94  116.42  4239.5  116.11 4291.96  116.36 4311.63  116.22  4347.7   116.8
 4350.98  116.43 4373.93   107.1 4377.21  106.16 4387.05  105.35 4387.05  105.22
 4407.05  105.25 4427.05  102.73 4443.05   99.19 4447.05   98.33 4448.05   98.15
 4454.05   97.26 4458.05   96.83 4463.05   96.43 4470.05   95.65 4478.05   95.18
 4483.05   94.83 4485.05   94.82 4491.05   94.76 4495.05   94.73 4498.05   94.64
 4505.05   94.47 4512.05   94.14 4520.05   93.83 4521.05   93.86 4529.05   94.03
 4533.05   94.13 4545.05   93.96 4546.05   93.93 4561.05   93.93 4568.05   93.86
 4572.05   93.83 4582.05   93.92 4584.05   93.93 4589.05    93.8 4596.05   93.63
 4609.05   93.63 4613.05   93.65 4622.05   93.73 4627.05   93.82 4635.05   93.93
 4635.55   93.93 4644.05   94.05 4649.05   94.13 4652.05   94.09 4659.05   93.97
 4662.05   93.93 4668.05   94.09  4672.4  105.35 4675.68  106.35 4682.24  111.86
 4685.52  112.52 4701.92  113.03 4711.76   111.5 4724.88  111.38 4731.44   110.6
 4741.28  110.83 4764.24  110.72 4797.05  110.27 4836.41  110.15 4846.25  110.29
 4872.49  110.04  4905.3  110.05 4911.86  110.39 4928.26  109.95  4987.3     110
 4997.14  109.78 5023.39  109.96 5046.35  109.75 5082.43  109.88 5095.55  109.68
 5167.72  109.66 5184.12  109.43 5233.32  109.33 5256.29  109.47 5269.41  109.33
 5410.46   108.9 5439.98  108.85  5453.1   109.1 5456.38  109.56 5472.78  115.69
 5499.02  115.51 5518.71  115.72 5544.95  115.41 5564.63  115.91 5567.91   116.5
 5577.75  120.27 5584.31  119.65 5594.15  116.36 5607.27  115.86 5613.83  114.93
 5640.08  113.97 5663.04  113.97 5705.68  113.61 5810.65  113.18 5823.77  113.06
 5876.25  113.04 5932.02  112.62 5964.82  112.58 5981.22  112.34 6014.03  112.24
 6161.64  111.49 6178.04   111.6 6204.28  111.32 6214.12  111.44 6266.61  111.04
 6332.21  110.91 6378.14  110.54 6394.54  110.12 6410.94  110.23 6420.78  112.85
 6424.06  114.91 6430.62  115.89 6437.18  115.59 6469.98  115.29 6502.79  115.21
 6565.11  115.28 6584.79  115.16  6617.6  115.28    6634  115.11 6660.24  115.23
 6696.32  115.03 6725.84  115.21 6791.45  115.08 6814.41  114.89 6824.25  115.06
 6860.34  114.82 6896.42  114.91 6955.46  114.58 7001.39  114.77 7024.35  114.53
 7037.47  114.62 7112.92  114.47 7142.44  114.66 7185.08  114.53 7227.73  114.11
 7260.53  114.14 7267.09   114.9 7276.93  114.81 7290.05  110.76 7309.73  109.98
 7319.57  109.33 7335.97  108.94 7355.66   109.4  7365.5  109.36 7404.86  108.69
 7424.54   109.1  7447.5  108.76 7480.31  109.64 7486.87  108.85 7519.67  108.73
 7568.87  108.96 7575.43  108.74 7654.16  109.01 7673.84  108.77 7700.08  110.28
 7726.33   108.5 7742.73   108.5 7749.29  110.68 7755.85  115.94 7762.41  117.32
 7782.09  117.01 7795.21  116.48 7831.29  116.14 7860.82  116.01  7946.1  115.89
 8037.95  115.53  8146.2  115.19 8165.88     115 8241.33  114.87 8251.17   114.7
 8297.09  114.67 8375.82  114.37 8385.66  114.26 8454.55  114.28 8549.67  113.94
 8575.92  113.95 8641.52  113.66 8680.88  113.64 8713.69  113.46 8776.01  113.45
 8789.13  113.28 8835.06  113.11 8880.98  113.07 8913.78  112.88 8943.31  112.94
 8949.87  112.75 8985.95  112.65 9018.75  112.78    9045  112.47 9090.92  112.36
 9130.28  112.38 9136.84  112.17 9186.05  112.14 9215.57     112 9231.97  112.13
 9241.81   111.9 9287.74  111.97  9359.9  111.91 9389.42  111.75 9432.07  111.95
 9517.35  111.79 9550.16  111.65 9586.24  111.71 9605.92  111.52 9743.69  111.42
 9756.81  111.92 9769.94  111.52 9786.34  111.81 9828.98     112  9842.1  112.34
 9861.78  112.06  9874.9  110.69 9888.03     112 9897.87  113.53 9904.43  115.89
 9910.99  116.74 9924.11   113.9 9930.67  112.87 9950.35  112.21 9983.15   112.1
 10009.4  112.22 10025.8  111.8610035.64  111.2910071.72  111.63 10091.4  111.33
10140.61     11110157.01  111.0310173.41  110.5810206.21  110.3810222.61  110.45
10252.14  109.9910284.94  110.07 10291.5  110.4110314.46  109.9810343.98  110.13
10406.31  109.9510429.27  110.04 10524.4     11010550.64  109.8610580.16  109.95
10629.37  110.2710698.25  110.9910704.81  111.6910711.37  113.7710717.93  114.32
 10724.5  112.9510734.34  112.01 10740.9  110.07 10757.3  110.2610763.86  112.92
10780.26   114.810793.38  115.1810809.78  112.3410816.34  114.28 10839.3  114.43
10845.87  113.4510855.71  115.2410875.39   116.710885.23  118.2810908.19  120.76
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10914.75  120.6410934.43  117.4510957.39  117.7510980.36  117.7910993.48  118.37
11019.72  118.9911032.84  118.93 11039.4   119.411052.52  119.2711075.48  119.48
11095.17  119.9611118.13  120.0711144.37  120.4611170.61   120.611177.17  120.89
11200.13   120.911213.26   120.3 11223.1  117.1611229.66  116.5711259.18  121.42
11269.02  123.7911285.42  124.9211291.98  124.4611301.78  120.3511311.57  124.47
11314.84  124.8211324.64  123.95 11337.7  120.2111350.76   120.111373.62   119.3
11389.94  121.1911419.33  120.5211438.92  121.4711445.45  122.8211451.99  123.16
11461.78  121.4711481.37  121.03 11487.9  120.59 11507.5  121.0211543.42  120.59
11559.74  121.0211579.33  120.6711589.13  120.8911605.46  120.4811628.32  121.41
11644.64  123.3211670.77  123.3911687.09  122.8511706.69  123.7811713.22  119.62
11716.48  119.7211723.01  123.9911732.81  124.8311739.34  121.5511745.87  119.19
 11752.4  118.2211771.99  116.9611791.58  119.7611798.12  121.1611807.91  120.65
 11847.1  120.1611873.22  120.3311883.02   120.111909.14  120.1911964.65  120.05

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  111.48    .066 1082.01    .066 4387.05    .025  4672.4    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4347.7 4701.92          1561.05  1691.8 1675.24             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  4347.7   116.8       T
 4701.9211964.65  113.03       T
Left Levee      Station=  111.48      Elevation=  135.26
Right Levee     Station=11285.42      Elevation=  124.92

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            133.20    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.066      0.035      0.066
  W.S. Elev (ft)            133.17    Reach Len. (ft)          1561.05    1691.80    1675.24
  Crit W.S. (ft)            118.93    Flow Area (sq ft)       69150.59   12068.72   133858.60
  E.G. Slope (ft/ft)      0.000042    Area (sq ft)            81822.09   12068.72   141895.80
  Q Total (cfs)           235000.00    Flow (cfs)              64919.68   34117.03   135963.30
  Top Width (ft)          11846.41    Top Width (ft)           4229.46     354.22    7262.73
  Vel Total (ft/s)            1.09    Avg. Vel. (ft/s)            0.94       2.83       1.02
  Max Chl Dpth (ft)          39.54    Hydr. Depth (ft)           16.35      34.07      18.43
  Conv. Total (cfs)       36236380.0    Conv. (cfs)             10010440.0   5260755.0   20965180.0
  Length Wtd. (ft)          1647.44    Wetted Per. (ft)         4241.31     367.17    7295.34
  Min Ch El (ft)              93.63    Shear (lb/sq ft)            0.04       0.09       0.05
  Alpha                        1.68    Stream Power (lb/ft s)      0.04       0.24       0.05
  Frctn Loss (ft)              0.07    Cum Volume (acre-ft)    300592.60   90559.00   303336.90
  C & E Loss (ft)              0.00    Cum SA (acres)           29192.33    3470.83   30875.04


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 181.01*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  116.43    12.1  115.95   21.17  116.59   30.24  118.27   39.44  120.66
   74.95  131.89   81.66  133.65   92.49135.0159  102.08135.0478  108.74  133.97
  114.75  123.32   122.9  122.91  135.76  121.22  153.76  118.34  165.78  117.39
  177.78  115.81  199.33  114.93   222.8  112.38  237.82  112.19  261.83  111.52
  291.87  111.74  315.86  111.47  328.07  111.71  352.22   111.5  405.91  111.42
  426.92  112.01  444.93  111.54  459.94  111.87  468.95  111.47  483.95  111.35
   541.3  111.56  577.01  111.46  607.02  111.68  655.05  111.53   682.1  111.67
  745.11  111.68  787.13  111.79  835.16  112.03  865.18  111.69  871.18  111.89
   901.2  112.02   910.2   111.9  963.71  112.11  990.74112.1036 1006.25   112.1
 1030.27  111.86 1099.31  112.11 1159.34  112.16 1176.94  111.99 1210.37   112.2
 1228.39  112.03 1273.41  112.27 1288.42  112.14 1312.43  112.28 1327.44  111.91
 1348.45  112.68 1363.46  113.61 1369.47  113.65 1381.47  114.71 1402.49  115.19
 1411.49  116.18  1426.5  116.37 1441.51  115.17 1465.52  114.96 1492.53  115.37
 1498.54  114.43 1519.55  114.91 1528.56  114.04 1540.56  113.99 1561.57  114.34
 1576.59  112.88 1585.59   112.3 1594.59  112.72 1615.44  112.54 1631.53  112.74
 1699.92  112.48 1732.68  112.71 1753.69  112.63 1776.36  112.77 1792.45  112.63
 1816.58  112.77 1868.89  112.79 1891.76  113.02 1915.78  112.87 1945.32  113.11
  1977.5  113.09 1993.59   113.4 2001.65  113.04 2037.85  113.33 2090.15  113.39
 2106.24     114  2134.4  113.86 2146.48  114.18 2198.77  114.22 2218.89  113.76
    2239  114.06 2251.07  113.54 2263.14  113.57 2279.23  114.55 2303.37   114.3
 2319.46   113.6 2369.04  113.55 2411.07  113.77 2423.07  113.66 2464.29  113.95
 2510.12  115.04 2516.12  114.64 2531.13  114.63 2540.13  114.36 2548.77  114.58
 2573.16  114.66 2597.17  115.08 2615.18  114.82 2629.23  115.09 2669.46  114.85
  2677.5  114.64 2701.65  115.25 2717.74  114.73 2741.88  114.63 2774.27  114.82
 2798.28  114.79  2810.3   115.3  2825.3  114.77 2870.62  114.86 2894.75  115.05
 2914.86     115 2922.91  115.55 2943.02  115.53 2947.05  115.23 2959.11  113.34
 2975.39  112.84 3023.49  112.81 3047.62  112.91 3077.45  113.24 3110.47  113.14
 3125.47  113.35 3137.48   113.2 3155.49  113.61  3173.5  113.24 3185.51  113.57
 3200.51  113.52 3218.52  112.95 3256.83   113.1 3284.57  112.84 3293.57   112.6
  3347.6  112.83 3361.42  112.97 3397.63  112.82 3425.79  112.88 3441.88   113.1
 3482.11  113.04 3500.69   112.9 3526.37  112.98 3566.59  112.87 3587.74   112.6
 3605.75  113.03 3650.77  112.92 3719.82  112.98 3740.83   113.4 3763.72  113.39
 3779.82  113.56 3816.02  113.39  3860.9  113.87  3875.9  114.23 3881.91  114.11
  3916.6  114.81 3936.71   115.8 3964.87  115.64 3972.92  116.42 3980.96  116.68
 3984.31  116.19 3990.44   114.1 4006.23  107.26 4011.05  105.94 4021.09  105.11
  4029.6  104.89 4041.48  103.58 4050.78  101.82 4061.87  100.91 4083.28    97.2
 4105.72   94.83 4113.5294.29431 4118.97   93.92 4137.44   93.38  4156.7   92.07
 4164.69   92.68 4185.29   92.36 4204.64   93.84 4236.61   95.23  4244.6   96.08
 4260.58   98.92 4270.97  101.79 4328.03  105.15 4332.74107.1704 4342.21   112.3
 4345.97  112.77 4364.72  113.37 4374.32  112.38 4387.12  112.33 4393.52  111.83
 4425.52  112.21 4468.32  112.17  4551.2   111.8 4569.54  112.11 4585.54  111.81
 4652.73  111.29 4678.34   111.4 4700.74  111.25 4735.94  111.28 4748.74  111.13
 4819.15  111.05 4835.15  110.87 4868.88   110.8 4905.56  110.86 4993.19  110.48
 5084.76  110.27 5100.76  110.77 5116.76  114.84 5142.36  114.69 5161.57   114.8
 5187.17  114.59 5206.37  114.93 5209.57  115.31 5219.17  117.79 5225.57  117.39
 5235.17  115.22 5247.97  114.87 5254.37  114.25 5279.97  113.59 5314.33   113.4
 5417.92  113.06 5459.18  112.88 5510.38  112.84 5564.79  112.56 5596.78  112.55
 5612.78  112.38 5690.71  112.09 5701.07     112  5788.8  111.67  5804.8  111.73
 5891.21  111.33  5955.2  111.22 6000.01  110.95 6016.01  110.68 6032.01  110.75
 6041.61   112.5 6044.81  113.87 6051.21  114.52 6057.61  114.31 6089.61  114.07
 6121.62  113.97 6182.42  114.02 6201.62   113.9 6249.62  113.85 6275.22  113.96
 6310.42   113.8 6339.22  113.84 6425.63  113.68 6435.23  113.81 6512.53   113.7
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 6526.35  114.09 6540.17  115.04 6547.07   115.2 6560.88  114.74 6588.51  115.38
 6608.04  115.47 6629.94  115.28  6640.3  115.64 6650.66  115.53 6664.47  115.81
 6671.38  115.42 6681.73  115.48 6695.55  114.86 6716.27  114.59 6726.63  114.65
 6764.61  114.28 6774.97  113.87 6788.78  114.04  6809.5  113.93 6826.77  114.12
 6860.85  113.91 6867.25  114.36 6876.85  114.31 6889.65  111.63 6908.85  111.12
 6918.45  110.62 6934.45  110.38 6953.66  110.66 7001.66   110.1 7020.86  110.36
 7043.26  110.05 7075.27  110.64 7081.67  110.08 7120.28  109.94 7161.67  110.15
 7189.34  109.91 7196.24  110.03 7237.68  110.12 7264.07  109.87 7289.67  110.92
 7315.28   109.7 7331.28  109.63 7337.68  111.14 7344.08  114.65 7350.48  115.56
 7369.68  115.34 7393.06  114.78 7448.32  114.59 7517.38  114.44 7524.28  114.27
 7538.09  114.56 7558.81   114.3 7641.69  113.94 7690.03   113.8  7744.1  113.56
 7765.99  113.57 7879.95  113.22 7948.91  113.07 8004.26  112.89 8049.15   112.9
 8087.13  112.78 8135.47  112.79  8156.2   112.7 8228.71  112.78 8259.78  112.48
 8294.31   112.4 8342.66  112.45 8370.29  113.81 8380.64  112.74 8394.45  112.36
 8401.36  111.73 8415.17  111.74 8425.53  112.32 8442.79  112.43 8456.61  113.11
 8473.73  113.48 8508.94  113.05 8576.14  113.45 8646.55  113.35 8684.95  113.43
 8691.35   113.3 8784.15  113.33 8793.75  113.17 8838.56  113.24 8937.76  113.12
 8979.37  113.29 9094.57  113.15 9129.77  113.18 9178.29  113.05 9195.57   113.1
 9283.38  113.09 9296.18  113.42 9308.99  113.19 9324.99   113.4 9366.59  113.54
 9379.38  113.76 9398.58  113.55 9411.38  112.66 9424.19  113.56 9433.79  114.59
 9440.19  116.18 9446.59  116.75 9465.79  114.19 9484.99  113.75  9542.6   113.8
  9568.2  113.19  9603.4  113.42  9622.6  113.22 9670.61  113.03  9686.6  113.06
  9702.6  112.77  9750.6  112.66 9779.41  112.39 9811.41  112.41 9817.81  112.64
 9840.21  112.36 9869.01   112.5 9913.81  112.39 9952.22  112.5210070.62  112.46
10138.27  112.6910214.63  113.2710221.03  113.7610227.43  115.1610233.83  115.54
10240.24  114.6210249.84  113.9910256.24  112.6910272.24   112.810278.64  114.57
10294.64  115.8610307.44  116.1410323.43  114.2810329.83  115.5510352.23  115.66
10358.64  115.0210368.24  116.2110387.44  117.1910397.04  118.2410419.44  119.89
10425.84  119.8110445.04  117.7210467.44  117.9510489.85  117.9810502.65  118.36
10528.25  118.7910541.05  118.7710547.45  119.0810582.65  119.1310601.86   119.5
10624.25  119.5810649.33   119.910675.45  119.9610704.25  120.5910717.06  120.25
10726.66  117.6110732.21  116.9510746.03  119.8210756.38  120.9210771.46  123.65
10787.46  124.5610792.86  124.1510800.92  120.6110808.98     12310819.73  123.56
10830.48  121.3810845.07  121.0310860.03  119.9610873.46  120.6410897.64  120.23
10913.76  121.1810919.14  122.2610924.52  122.5510932.57  121.4710948.69  121.28
10954.06  120.9510970.19   120.9 10977.6  120.6110999.75  120.5311013.18  120.89
11029.44  120.6711050.79  120.9311058.25  121.4811083.03  122.6511104.53  122.42
11117.96  121.9811134.09  122.5811139.46  119.8411142.14  119.9311147.52  122.81
11155.58  123.4511166.33  119.8211187.82  118.1711203.94  119.9311209.32  120.82
11217.38  120.3511249.62   119.611271.11  119.7111279.18  119.5611346.34  119.85

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  102.08    .066 3980.96    .066 4113.52    .025 4364.72    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      3980.96 4364.72          1561.05  1691.8 1675.24             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3980.96  116.68       T
 4364.7211346.34  113.37       T
Left Levee      Station=99.50333      Elevation=135.0533
Right Levee     Station=10787.46      Elevation=  124.56

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 180.66*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  116.82   11.08  116.92   19.39   117.7    27.7  119.07   36.12  120.96
   44.31  123.54   68.64  131.76   83.97134.8208   92.67134.8288   99.44  134.29
  104.89  128.96   112.3  128.48  140.31   121.4  156.11  117.59  181.67  116.45
  207.24  112.18  221.85  111.63   240.1  111.41  265.66  111.94  287.44  111.47
  298.53  111.93  320.44  111.45     346  111.18  356.96  111.41  378.87  111.43
  393.47  112.09  404.59  111.66   426.4  111.46  448.25  111.52  459.21   111.3
  492.07  111.53  524.48  111.48  551.73  111.71  595.32  111.57  619.88  111.72
  638.13  111.67  700.22  111.72  747.68  111.93  786.05  111.77  818.75  111.99
  846.28  111.95  875.49  112.22  899.47112.2081  915.65   112.2  933.92  111.92
  998.58  112.18 1036.16  112.26 1069.03  112.09 1079.99  112.25 1115.74  112.11
 1153.01  112.36 1205.65  112.17 1243.79  113.06 1254.68  113.64 1273.76  113.88
 1281.93  114.43 1295.56  114.61 1309.18  113.94 1330.98   113.8  1355.5  113.98
 1360.95  113.53 1380.02  113.83  1388.2  113.43 1418.16  113.62 1439.96  112.67
 1452.45  112.96 1467.06  112.71 1481.67  112.99 1492.62  112.81 1507.22  112.96
 1543.74  112.72 1576.61  112.93 1613.12  112.99 1627.73  112.75 1649.64  113.06
 1697.12   112.9 1719.02  113.24 1755.54  113.17 1766.49  113.44  1795.7  113.31
 1810.31  113.85 1817.62  113.22 1839.53  113.41 1850.48  113.77 1897.95   113.9
 1912.55  115.08 1923.51  115.16 1938.11  114.68 1949.08   115.4 1981.94  115.15
 1996.55  115.36  2014.8   114.4 2033.06  114.96 2044.01   113.7 2054.97  113.83
 2069.57   115.8 2091.49  115.28  2106.1  113.82 2151.09  113.73 2179.12  113.88
  2219.3  113.86 2237.56  114.15 2255.81  115.11 2277.72  115.49 2292.33  114.47
 2306.93  114.26  2339.8  115.05 2358.17  115.26 2372.67  115.05 2387.27  115.49
 2401.88  115.14 2423.78  115.18 2431.09  114.77 2453.01  115.68 2467.61  114.82
 2489.52  114.58 2529.68  114.65 2551.62  115.21 2565.24   114.8 2595.42  114.53
 2628.28  115.13 2646.54     115 2653.84  116.02 2661.14  116.33  2672.1  116.07
 2675.75  115.44 2683.05  112.27 2694.02  110.94 2719.57  110.23 2745.13  110.21
 2759.74  110.51 2767.04  110.32 2810.86  110.93 2848.61  110.64 2876.59  110.67
 2887.55  110.29 2905.82  110.43 2927.71  109.97 2956.93  110.24 2990.28  109.78
 3015.35  110.12 3051.87  110.41 3084.74  110.16  3110.3  110.31 3124.91  110.64
 3135.86  110.46 3161.42   110.6 3179.67  110.36 3201.59  110.39  3230.8  110.07
 3238.11  110.21 3256.36  109.84 3273.65  110.04 3314.52  109.97 3377.19  110.15
 3417.03  110.66 3431.65  111.11 3464.51  110.69 3486.42  110.96 3518.86  112.04
 3548.49   112.9 3555.81  113.33 3574.06   115.3 3581.36  115.44 3599.62  114.77
 3606.92  116.19 3614.23  116.57 3623.88  114.21 3630.32  111.51 3639.98  106.83
 3646.42  105.49  3663.8  104.48 3675.91  101.91 3685.39   99.54 3695.21   99.21
 3705.02   98.17 3714.83   96.61 3734.46   94.61 3756.9892.93158 3773.72   92.22
 3783.54   91.52 3793.35   90.32 3802.35   91.37 3811.34   90.81 3829.33   90.85
 3847.32    92.2 3856.32   92.14 3874.31   92.56  3883.3    92.5  3892.3   93.57
 3901.29   95.45 3910.29   97.99 3919.29   102.2 3921.98  102.93 3986.22  105.18
 3989.17  106.38 3993.08109.5014 3995.07  111.09 4002.19  112.75 4027.53   113.7
 4036.89  113.25  4055.6  113.07 4074.66  113.25 4084.77  113.66  4101.6  113.94
 4128.53   114.1 4155.46  113.94 4165.56  114.11 4175.66  113.77 4209.33  113.56
 4227.21  113.84 4242.81  113.66 4259.83  113.71 4286.76     113 4308.33  112.79
  4333.3  112.85 4389.45  112.68  4414.7  112.53 4428.17  112.63 4488.77  112.29
 4519.07  112.24 4542.63  112.34 4640.27  111.86 4684.03  111.89 4714.33  111.65
 4742.02  111.82 4760.74     114 4829.38  113.76 4851.22  114.12 4860.58   115.3
 4866.82  115.13 4876.18  114.08  4894.9  113.57 4919.87   113.2    4950  113.12
 4953.37  112.94 4982.27  112.95 5054.36  112.83 5074.56  112.72 5165.46  112.62
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 5175.56   112.5 5228.75  112.51 5276.55  112.26 5320.33  112.17 5330.43  112.06
 5415.96  111.84 5431.56  111.86  5515.8  111.62  5578.2  111.53 5653.08  111.28
 5665.56  112.84 5678.04  113.03 5737.78  112.74 5795.01  112.77 5818.44  112.65
 5865.25  112.59 5899.38  112.69 5949.88  112.46 6000.39  112.38 6046.21  112.55
 6098.01  112.57 6104.75  112.25 6121.58  112.54 6135.04   113.4 6148.52  115.37
 6155.25  115.72 6161.98   114.9 6168.72  114.88 6195.65  116.08 6214.69  116.18
 6236.05  116.03 6246.15  116.67 6256.24  116.45 6269.71  117.05 6276.44  116.27
 6286.54  116.41 6300.01   115.2 6320.22   114.7 6330.32  114.77 6353.88  114.12
 6367.35  113.95 6377.45  113.16 6390.91  113.56 6411.11  113.56 6427.94  114.11
 6461.18  113.68 6476.78  113.81 6489.26   112.5 6505.38  112.33 6518.85  111.88
 6551.66  111.91 6582.81   111.5 6617.18  111.63 6646.77  111.29 6663.61  111.66
 6683.81  111.21 6704.01  111.29 6828.57  111.25 6842.03  110.92  6854.3  110.97
 6879.26  111.57 6912.74  110.65 6919.83  110.77 6926.07   111.6 6932.31  113.35
 6938.55   113.8 6957.27  113.67 6980.07  113.19  6986.8  113.36 7033.94  113.17
 7044.04  112.86 7057.51  113.12 7074.34  112.95 7101.27  112.97    7108  112.63
 7121.47  113.27 7141.67  112.82 7185.43  112.67 7222.47  112.43 7306.63  112.12
 7343.66  112.18 7404.27  111.84 7424.47  112.01 7454.76   111.8 7491.79  111.83
 7575.97  111.51 7619.73  111.61 7656.76   111.5 7703.89  111.63  7724.1  111.51
  7764.5  111.83 7794.79  111.92 7804.89  111.56 7825.09   111.4 7899.16  111.35
  7905.9   111.5 7922.73  113.55 7932.83  114.41 7942.93  112.32 7956.39  111.59
 7963.13  110.36 7976.59  110.39 7986.69  111.56 8003.52  111.79 8016.99  113.24
 8033.82  114.09 8043.92  114.15 8050.65  113.61 8068.01  113.35 8094.43  113.84
 8161.75  114.29 8185.32  114.29 8239.61  114.47 8276.22  114.39 8299.79  114.59
 8346.92  114.43 8389.38  114.51 8468.12  114.44 8508.52  114.49 8526.67  114.63
 8599.42  114.58 8629.72  114.66 8692.02  114.66 8720.61  114.59 8737.45  114.71
 8767.75  114.63 8777.85  114.76 8823.07  114.75 8835.54  114.92 8916.67  115.17
 8935.39  115.04 8947.87  114.63 8969.72  115.65  8982.2  116.77 9000.91  115.52
 9019.63   115.3  9075.8  115.39 9100.76  115.09 9135.07  115.21 9153.79  115.12
  9216.2  115.09    9263  114.87 9323.25  114.73 9344.12  114.87 9365.96  114.74
 9394.04  114.87 9437.72  114.79 9488.23  115.01 9508.43   114.9 9531.99  115.02
 9562.29  114.99 9639.73   115.2 9656.56  115.17 9683.49   115.4  9723.9   115.5
 9737.25  115.82 9749.73  116.75 9765.33  115.96 9771.57  115.31 9787.17  115.35
 9793.41  116.23 9809.01  116.91 9821.49  117.09 9837.09  116.21 9843.33  116.83
 9865.17  116.88 9871.42  116.59 9880.78  117.19  9899.5  117.67 9930.69  119.03
 9936.93  118.99 9955.65     118 9999.34  118.16 10055.5  118.7710089.81  118.78
10111.07  119.07   10138  119.1310154.83  119.3510164.93  119.25 10188.5  119.45
10201.96  119.8610212.07  120.4710220.86   120.210230.22  118.0510235.64  117.24
   10239  117.81 10249.1  120.88 10259.2  121.34 10273.9  123.52 10289.5   124.2
10294.02  123.7610300.06  120.8710303.06  120.7410316.62  123.3510323.25  122.54
10334.71  122.1210346.45  120.6210366.36  119.7510384.45  120.4210392.82  121.71
10425.13  121.2810438.69  120.3110466.61  120.7610479.38  120.6710492.94  121.11
10501.98   122.110511.04  122.4310529.12  121.5610548.83  121.1110561.49  121.39
 10565.7  120.0710572.02  121.6210578.35  122.0610586.78  120.4510603.65  119.38
10620.52  120.4810642.13   119.310652.14  119.0410678.31  119.0210728.04  119.65

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   83.97    .066 3630.32    .025 4027.53    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3614.23 4027.53          1561.05  1691.8 1675.24             .1       .3
Left Levee      Station=87.52667      Elevation=134.8467
Right Levee     Station=10289.51      Elevation=   124.2
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 2661.14  116.33 4259.8310728.04  113.71

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 180.32

INPUT
Description: RGV-03, New Cross-Section, Begin Wall, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  117.22    6.56  117.47   22.96  119.47    32.8  121.26   42.64  124.52
   62.33  131.64   75.45  134.64   98.41  134.59  101.69  134.06  124.65  125.34
  141.05  118.81  157.45  118.43  164.01  117.98  177.14  114.92  186.98  112.21
   200.1  111.25   216.5   111.3  239.46  112.14  259.14  111.47  268.98  112.15
  288.67   111.4  311.63  110.97  321.47  111.29  341.15  111.24  354.27  112.19
  373.95  111.39  403.48  111.59  413.32   111.2  442.84   111.5  462.52   111.4
  492.04  111.73  521.57  111.73  541.25  111.57  557.65  111.77  574.05  111.69
  629.82  111.71  672.46  111.87  718.38  111.83  741.35  112.01  761.03  111.93
  787.27  112.33  823.35   112.3  839.76  111.96   931.6  112.42  961.13   112.2
  970.97  112.38 1000.49  112.18 1036.57  112.48 1069.38  112.24 1079.22  112.44
 1108.74  112.37 1134.98  112.63 1141.54  112.51  1164.5  112.86 1174.35  112.71
 1216.99  112.59 1269.47  112.97 1279.31  112.84 1305.56   113.2 1318.68  112.88
  1331.8  113.23 1341.64   112.9 1354.76   113.3 1387.56  112.95 1417.09  113.16
 1449.89  113.22 1463.01  112.86 1482.69  113.36 1525.34  113.01 1545.02  113.45
 1577.82  113.35 1587.66  113.76  1613.9  113.52 1627.02   114.3 1633.59  113.39
 1653.27  113.69 1663.11  114.22 1695.91  114.21 1705.75   114.4 1718.87  116.16
 1728.71  116.25 1741.83  115.49 1751.68  116.63 1774.64  116.45  1781.2   116.2
 1794.32   116.5 1810.72  115.05 1827.12  115.85 1836.96  113.86  1846.8  114.09
 1859.92  117.05 1879.61  116.26 1892.73  114.05 1918.97  113.85 1958.33  114.04
 1994.42  113.98 2010.82  114.35 2027.22  115.72 2037.06  116.08  2046.9  115.96
 2060.02   114.4 2073.14  114.16  2079.7  114.61 2089.55  114.63 2102.67  115.34
 2115.79  115.47 2132.19  115.28 2145.31  115.89 2158.43  115.31 2178.11   115.5
 2184.67   114.9 2204.36  116.12 2217.48  114.91 2237.16  114.53 2250.28   114.7
 2273.24  114.55 2292.92  115.11 2332.29  114.22 2342.13   114.4 2361.81   115.2
 2378.21     115 2384.77  116.49 2391.33  116.99 2401.17  116.61 2404.45  115.64
 2411.01  110.85 2414.29  109.73 2420.86   108.8 2443.82  107.63 2466.78  107.61
  2479.9  108.07 2486.46  107.74  2512.7   108.1 2525.82  108.57 2548.79  108.29
 2575.03  107.77 2584.87   107.9 2594.71  107.21 2607.83  107.39 2630.79  106.99
 2657.04  107.39 2683.28  106.94 2699.68  107.03 2709.52  107.48 2742.32  107.86
 2771.85   107.5 2794.81  107.75 2807.93  108.17 2817.77  107.91 2840.73  108.16
 2857.13  107.83 2876.82   107.8 2903.06   107.3 2909.62  107.54 2926.02  107.08
 2988.35     107 2994.91  107.22 3040.83  107.33 3070.35  107.93 3083.48  108.65
    3113  107.98 3132.68  108.35 3188.44  111.23 3195.01  111.85 3211.41   114.8
 3217.97  115.04 3234.37   113.9 3240.93  115.95 3247.49  116.45 3257.33  114.32
 3263.89  111.53 3273.73   106.4 3280.29  105.21    3298  104.06    3320   97.26
    3330   97.36    3340   96.76    3350   95.46    3360   95.06    3370   93.76
    3390   92.16    3410   91.06    3420   90.16    3430   88.56    3440   90.06
    3450   89.16    3470   89.16    3490   90.56    3500   90.16    3520   90.16
    3530   89.76    3540   91.06    3550   93.56    3560   97.06    3570  103.06
    3573  104.06 3644.41  105.21 3647.69   106.9 3650.97  110.71 3654.25  113.03
 3670.65  113.36 3690.33  114.04 3736.25  114.48  3746.1  115.12  3762.5  115.66
 3788.74  116.03 3814.98  115.84 3824.82  116.03 3834.66  115.56 3867.47  115.32
 3874.03  115.64 3893.71   115.5 3916.67  115.58 3926.51  114.99 3942.91  114.51
 3962.59   114.3 4001.96  114.29 4067.56  113.96 4080.69  114.11 4139.73  113.73
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4169.25	113.68	4192.21	113.81	4202.05	113.65	4234.85	113.58	4287.34	113.24
4329.98	113.35	4359.5	113.03	4392.3	113.21	4461.19	112.89	4487.43	113.02
4500.55	112.81	4516.95	112.94	4589.12	112.73	4592.4	112.47	4612.08	112.63
4690.8	112.59	4710.48	112.47	4736.73	112.54	4762.97	112.42	4799.05	112.49
4808.89	112.35	4848.25	112.5	4890.89	112.42	4907.29	112.28	4949.94	112.26
4959.78	112.12	5002.42	112.11	5081.15	111.94	5179.55	111.88	5238.59	111.77
5284.52	111.81	5356.68	111.5	5412.44	111.52	5461.65	111.25	5514.13	111.45
5550.21	111.29	5563.33	111.09	5612.54	111.02	5625.66	111.16	5697.82	111.48
5707.66	111.42	5714.22	110.94	5730.62	111.37	5743.74	112.7	5756.87	115.7
5763.43	116.24	5769.99	115.03	5776.55	115.02	5792.95	116.32	5802.79	116.78
5819.19	116.89	5842.15	116.77	5851.99	117.71	5861.83	117.37	5874.95	118.28
5881.51	117.12	5891.35	117.35	5904.47	115.54	5924.16	114.82	5934	114.89
5956.96	113.86	5970.08	113.63	5979.92	112.46	5993.04	113.09	6012.72	113.19
6029.12	114.1	6042.24	113.98	6068.48	113.26	6104.57	113.45	6117.69	113.18
6134.09	113.26	6170.17	113.05	6180.01	112.76	6196.41	112.93	6225.93	112.86
6242.33	112.45	6258.74	112.76	6278.42	112.4	6298.1	112.57	6307.94	112.29
6317.78	112.51	6363.7	112.52	6373.54	112.11	6380.1	112.4	6419.46	112.39
6432.58	111.92	6458.83	112.26	6494.91	112.08	6501.47	111.72	6514.59	112.07
6557.23	111.97	6567.07	111.59	6573.63	111.88	6619.56	111.75	6629.4	111.29
6642.52	111.7	6658.92	111.45	6685.16	111.5	6691.72	111	6704.84	111.98
6724.52	111.35	6767.16	111.21	6803.25	110.91	6849.17	110.8	6885.25	110.6
6921.33	110.79	6941.01	110.55	6980.38	110.41	7000.06	110.67	7029.58	110.38
7065.66	110.5	7095.18	110.47	7147.67	110.13	7190.31	110.32	7226.39	110.23
7272.31	110.47	7292	110.32	7331.36	110.89	7360.88	111.05	7370.72	110.52
7390.4	110.32	7400.24	110.45	7423.2	110.3	7462.57	110.3	7469.13	110.54
7485.53	113.7	7495.37	115.01	7505.21	111.89	7518.33	110.83	7524.89	108.99
7538.01	109.04	7547.85	110.8	7564.25	111.15	7577.37	113.37	7583.93	113.57
7593.77	114.69	7603.61	114.77	7610.17	113.96	7626.57	113.65	7639.7	113.82
7652.82	114.42	7682.34	114.65	7718.42	115.21	7741.38	115.23	7816.83	115.64
7829.95	115.51	7852.91	115.83	7898.83	115.7	7948.03	115.79	8016.92	115.73
8026.76	115.89	8056.28	115.8	8066.12	115.95	8102.2	116.03	8144.85	115.97
8174.37	116.15	8220.29	116.12	8243.25	116.3	8262.93	116.14	8279.34	116.32
8308.86	116.22	8318.7	116.41	8377.74	116.42	8390.87	116.56	8443.35	116.63
8469.59	116.52	8531.92	116.86	8545.04	116.81	8590.96	116.96	8699.21	117.02
8761.54	117.16	8810.74	117.08	8830.42	117.22	8850.1	117.08	8892.75	117.12
8902.59	117.26	8961.63	117.19	8981.31	117.43	9010.84	117.5	9030.52	117.34
9053.48	117.52	9083	117.48	9102.68	117.64	9158.45	117.76	9174.85	117.65
9201.09	117.87	9240.46	117.79	9263.42	117.97	9309.34	117.88	9351.99	118.16
9368.39	117.96	9381.51	118.16	9450.39	118.16	9479.92	118.36	9542.24	118.34
9548.8	118.46	9601.29	118.43	9617.69	118.62	9643.93	118.6	9660.33	118.8
9670.17	118.62	9693.13	118.73	9706.25	119.34	9716.1	120.34	9722.66	120.51
9739.06	117.54	9742.34	118.21	9752.18	121.95	9762.02	121.76	9771.86	123.25
9791.54	123.84	9794.82	123.51	9801.38	119.96	9804.66	120.09	9811.22	123.45
9814.5	123.8	9824.34	123.21	9840.75	119.48	9847.31	119.2	9860.43	120.05
9866.99	121.24	9883.39	121.77	9889.95	121.54	9899.79	120.01	9919.47	120.63
9929.31	120.67	9939.15	121.36	9945.71	122.73	9952.28	122.93	9958.84	121.41
9965.4	120.67	9985.08	120.07	9998.2	120.49	10011.32	121.35	10017.88	120.65
10031	120.2	10047.4	118.77	10053.96	118.48	10073.65	118.47	10109.73	119.45

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	75.45	.066	3247.49	.025	3690.33	.066

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3247.49	3690.33	557.41	674.61	.1	.3

Left Levee Station= 75.55 Elevation= 134.64
Right Levee Station= 9791.55 Elevation= 123.84
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	2391.33	116.99	3814.98	10109.73	115.84

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	132.98	Element			
Vel Head (ft)	0.09	Wt. n-Val.	0.066	0.025	0.066
W.S. Elev (ft)	132.89	Reach Len. (ft)	557.41	674.61	694.11
Crit W.S. (ft)	120.12	Flow Area (sq ft)	56923.34	15140.55	105066.30
E.G. Slope (ft/ft)	0.000050	Area (sq ft)	56923.34	15140.55	105066.30
Q Total (cfs)	235000.00	Flow (cfs)	62128.41	65762.66	107108.90
Top Width (ft)	10004.96	Top Width (ft)	3142.72	442.84	6419.40
Vel Total (ft/s)	1.33	Avg. Vel. (ft/s)	1.09	4.34	1.02
Max Chl Dpth (ft)	44.33	Hydr. Depth (ft)	18.11	34.19	16.37
Conv. Total (cfs)	33392910.0	Conv. (cfs)	8828292.0	9344710.0	15219910.0
Length Wtd. (ft)	660.32	Wetted Per. (ft)	3148.39	452.47	6437.51
Min Ch El (ft)	88.56	Shear (lb/sq ft)	0.06	0.10	0.05
Alpha	3.45	Stream Power (lb/ft s)	0.06	0.45	0.05
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	293090.80	89003.72	288768.10
C & E Loss (ft)	0.01	Cum SA (acres)	28795.58	3424.40	30085.75

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 180.3

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	114.96	16.12	115.3	22.57	116.44	45.13	118.72	48.35	119.31
87.04	132.3	96.71	135.32	103.16	136.17	112.83	135.64	128.95	130.68
145.12	126.35	161.52	120.3	174.65	118.61	184.49	118.02	194.33	116.74
214.01	111.05	220.57	110.27	381.32	110.27	387.88	110.4	397.72	111.42
420.68	111.4	440.37	111.16	460.05	111.6	505.98	111.85	555.19	111.66
568.31	111.81	617.52	111.63	679.85	111.88	719.21	111.79	722.49	111.91
817.63	111.99	843.87	111.92	886.52	112.14	906.2	112.03	935.73	112.26
978.37	112.28	1050.55	112.44	1093.19	112.37	1152.24	112.59	1175.21	112.75
1201.45	112.64	1224.41	112.76	1267.06	112.65	1273.62	112.84	1312.99	112.74
1352.36	112.95	1375.32	112.87	1391.72	113.1	1414.69	112.93	1421.25	113.23
1450.77	113.02	1463.89	114.1	1477.02	114.11	1503.26	113.6	1536.07	113.59
1618.08	113.08	1644.32	113.31	1660.73	113.1	1709.93	113.19	1742.74	113.12
1759.14	113.56	1768.98	113.36	1795.23	114.12	1808.35	113.86	1818.19	114.23
1828.03	115.22	1851	114.13	1864.12	114.26	1873.96	114.86	1883.8	114.46
1890.36	115.68	1896.92	116.21	1916.61	115.62	1923.17	114.3	1939.57	115.62
1952.69	115.81	1969.1	116.52	1978.94	116.09	1988.78	116.42	1998.62	117.17

2011.74	117.08	2021.59	116.65	2031.43	116.86	2057.67	114.53	2074.07	114.34
2100.32	114.63	2129.84	115.21	2133.12	114.58	2156.09	114.74	2179.05	114.16
2202.01	114.48	2238.1	114.56	2244.66	114.76	2264.34	116.44	2270.91	116.62
2293.87	115.25	2316.83	115.69	2323.39	115.45	2339.8	115.5	2349.64	115.1
2375.88	115.09	2389	114.75	2402.13	115.17	2428.37	115.35	2448.05	115.1
2464.46	114.42	2471.02	114.63	2480.86	114.32	2497.26	115.45	2507.1	116.8
2513.66	116.13	2523.51	116.93	2536.63	117.32	2539.91	116.83	2549.75	110.62
2559.59	106.24	2585.84	106.14	2621.92	106.77	2641.6	106.47	2654.73	106.72
2671.13	106.14	2677.69	106.63	2687.53	108.09	2703.93	109.37	2723.62	109.76
2733.46	109.14	2749.86	109.54	2756.42	109.29	2772.82	109.51	2792.51	108.99
2822.03	109.18	2828.59	108.82	2848.28	108.6	2867.96	109.03	2884.36	108.05
2890.92	106.97	2900.76	106.24	2910.61	106.16	2940.13	106.62	2953.25	105.9
2966.37	105.98	2982.78	106.63	2995.9	106.73	3018.86	107.82	3035.27	108.27
3045.11	109.76	3064.79	111.88	3071.35	111.68	3074.63	110.21	3077.91	107.06
3081.19	105.21	3087.19	103.18	3107.19	97.18	3117.19	97.28	3127.19	96.68
3137.19	95.38	3147.19	94.98	3157.19	93.68	3177.19	92.08	3197.19	90.98
3207.19	90.08	3217.19	88.48	3227.19	89.98	3237.19	89.08	3257.19	89.08
3267.19	89.98	3277.19	90.48	3287.19	90.08	3307.19	90.08	3317.19	89.68
3327.19	90.98	3337.19	93.48	3347.19	96.98	3357.19	102.98	3360.19	103.98
3409.22	105.21	3412.5	105.55	3422.34	114.89	3428.9	117.51	3435.46	117.22
3442.02	115.89	3448.58	115.55	3468.26	116	3478.1	115.61	3514.18	115.82
3527.31	116.84	3569.95	117.39	3583.07	116.82	3592.91	115.96	3609.31	116.43
3619.15	115.94	3635.55	116.17	3645.39	116.77	3651.95	115.72	3661.79	116.26
3668.35	115.54	3691.31	115.11	3714.27	115.27	3724.11	115.07	3766.75	114.9
3773.31	115.16	3786.43	115.03	3832.35	115.08	3858.59	114.71	3874.99	114.66
3881.55	114.96	3911.07	115	3947.15	114.77	3973.39	114.72	4006.19	114.83
4035.71	114.58	4058.67	114.54	4088.2	114.73	4134.12	114.45	4163.64	114.53
4176.76	114.42	4225.96	114.37	4281.72	114.1	4321.08	114.23	4344.05	114.01
4350.61	114.16	4373.57	113.95	4403.09	114.09	4426.05	113.85	4465.41	113.93
4485.09	113.75	4494.93	113.9	4511.34	113.73	4560.54	113.82	4593.34	113.55
4698.31	113.52	4724.55	113.39	4757.35	113.48	4763.91	113.3	4783.59	113.43
4888.56	113.39	4931.2	113.19	4950.88	113.25	4990.25	113.12	5013.21	113.16
5068.97	113	5082.09	113.06	5118.17	112.89	5187.06	112.8	5314.99	112.77
5351.07	112.86	5370.75	112.77	5475.72	112.84	5505.24	113.28	5531.48	113.46
5547.88	113.18	5561	114.49	5583.97	114.77	5597.09	114.37	5603.65	114.66
5669.25	114.8	5715.17	114.49	5757.82	114.52	5787.34	114.27	5820.14	114.26
5856.22	113.83	5872.62	113.89	5898.86	113.46	5915.27	113.73	5931.67	113.56
5944.79	113.67	5961.19	113.3	5967.75	113.54	6000.55	113.23	6007.11	113.37
6020.23	112.94	6043.19	113.2	6069.44	113.02	6082.56	112.71	6092.4	112.95
6112.08	112.66	6135.04	112.74	6148.16	112.36	6167.84	112.66	6200.64	112.5
6207.2	112.2	6220.33	112.42	6249.85	112.12	6266.25	112.1	6272.81	111.69
6292.49	112.13	6315.45	111.81	6328.57	111.86	6335.13	111.55	6364.66	111.77
6374.5	111.59	6394.18	111.64	6397.46	111.3	6407.3	111.63	6456.5	111.53
6463.06	111.15	6476.18	111.36	6528.67	111.15	6551.63	110.92	6558.19	110.32
6561.47	110.73	6571.31	110.7	6581.15	111.36	6597.55	111.72	6607.39	111.16
6620.51	111.43	6640.19	113.29	6653.31	113.58	6659.87	111.68	6666.43	111.43
6689.4	109.18	6702.52	108.11	6718.92	108.05	6732.04	108.79	6738.6	109.84
6745.16	112.09	6751.72	112.72	6761.56	112.88	6768.12	113.81	6781.24	117.62
6791.08	119.39	6807.48	119.32	6814.04	118.8	6827.16	115.88	6837.01	114.5
6850.13	113.33	6859.97	112.96	6876.37	113.71	6882.93	114.45	6896.05	114.52
6912.45	114	6932.13	114.58	6948.53	115.44	6968.21	118.03	6981.33	118.41
6987.89	118.93	7004.3	118.8	7027.26	119.6	7033.82	119.38	7066.62	119.63
7079.74	119.88	7112.54	119.56	7151.91	120.01	7158.47	119.77	7174.87	119.8
7191.27	120.19	7207.67	119.92	7217.51	120.24	7227.35	119.88	7237.19	120.15
7247.03	119.92	7269.99	119.87	7302.8	120.37	7332.32	120.43	7338.88	120.24
7361.84	120.3	7384.8	121.08	7401.2	120.81	7411.04	121.45	7427.44	121.78
7437.28	122.29	7450.4	121.89	7460.25	121.14	7466.81	121.46	7479.93	120.89
7499.61	119.43	7512.73	119.22	7542.25	117.88	7598.01	117.47	7634.1	117.7
7680.02	117.53	7696.42	117.72	7745.62	117.61	7798.11	117.87	7837.47	117.76
7880.11	117.77	7896.51	117.96	7906.35	117.81	7945.72	117.95	7968.68	117.86
8086.77	118.01	8122.85	118	8155.65	118.18	8178.61	118.06	8244.22	118.26
8290.14	118.27	8303.26	118.12	8322.94	118.31	8339.34	118.24	8411.51	118.38
8463.99	118.21	8496.8	118.38	8506.64	118.3	8565.68	118.55	8588.64	118.39
8611.6	118.55	8641.13	118.56	8670.65	118.42	8693.61	118.57	8736.26	118.58
8746.1	118.38	8775.62	118.42	8782.18	118.65	8811.7	118.27	8828.1	118.51
8847.78	119.07	8860.91	119.65	8877.31	119.49	8880.59	119.06	8896.99	118.96
8903.55	118.3	8919.95	117.57	8942.91	117.38	8975.72	117.79	8982.28	117.68
9024.92	118.03	9061	117.98	9067.56	118.1	9106.93	118.11	9152.85	118.28
9241.42	118.27	9300.46	118.45	9343.11	118.44	9379.19	118.59	9438.23	118.52
9461.2	118.69	9526.8	118.62	9556.32	118.8	9618.65	118.89	9625.21	118.78
9658.01	118.97	9700.66	118.93	9743.3	119.09	9766.26	119.27	9792.5	119.24
9805.62	119.54	9825.31	120.61	9828.59	120.31	9838.43	117.45	9841.71	116.97
9854.83	120.13	9864.67	120.69	9874.51	123.17	9884.35	123.94	9894.19	123.92
9897.47	123.46	9904.03	120.31	9907.31	119.67	9913.87	122.8	9920.43	124.01
9933.55	122.95	9949.96	118.99	9956.52	118.55	9972.92	121.85	9986.04	122.22
9992.6	121.9	110005.72	119.4	10012.28	119.85	10025.4	119.44	10028.69	119.74

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.157	3064.79	.066	3087.19	.015	3360.19	.066	3422.34	.074

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3064.79	3422.34	1062.5	1652.05	1250	.1	.3

Left Levee Station= 103.16 Elevation= 136.17
Right Levee Station= 9920.43 Elevation= 124.01
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	2536.63	117.32	3428.91	10028.69	117.51

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	132.93	Element			
Vel Head (ft)	0.17	Wt. n-Val.	0.157	0.031	0.074
W.S. Elev (ft)	132.76	Reach Len. (ft)	1062.50	1652.05	1250.00
Crit W.S. (ft)	122.23	Flow Area (sq ft)	49947.86	13136.63	96729.72
E.G. Slope (ft/ft)	0.000120	Area (sq ft)	49947.86	13136.63	96729.72
Q Total (cfs)	235000.00	Flow (cfs)	34145.29	73796.41	127058.30
Top Width (ft)	9906.49	Top Width (ft)	2942.59	357.55	6606.35
Vel Total (ft/s)	1.47	Avg. Vel. (ft/s)	0.68	5.62	1.31
Max Chl Dpth (ft)	44.28	Hydr. Depth (ft)	16.97	36.74	14.64
Conv. Total (cfs)	21461390.0	Conv. (cfs)	3118322.0	6739463.0	11603610.0
Length Wtd. (ft)	1337.30	Wetted Per. (ft)	2948.18	368.08	6624.54
Min Ch El (ft)	88.48	Shear (lb/sq ft)	0.13	0.27	0.11
Alpha	5.05	Stream Power (lb/ft s)	0.09	1.50	0.14
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	292407.00	88784.76	287160.30
C & E Loss (ft)	0.02	Cum SA (acres)	28756.64	3418.20	29981.97

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 180.08*

INPUT
Description: RGV-03,
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	117.21	8.53	117.38	16.88	116.32	23.63	117.07	47.25	118.78
59.69	121.5	68.22	124.93	79.59	128.42	99.49	134.99	108.01	136.08
120.76	134.27	141.66	127.34	160.58	124.53	184.98	119.47	208.1	118.09
221.41	116.31	234.72	113.32	254.22	108.29	262.87	107.38	420.18	107.4
431.77	107.31	474.89	107.43	483.54	107.55	496.52	108.33	501.32	108.32
512.91	109.83	552.77	110.05	567.42	110.39	573.13	110.84	588.34	111.35
595.94	112.38	616.85	112.23	652.98	112.31	706.21	112.15	721.42	112.29
757.54	112.22	831.69	112.28	873.51	112.53	890.62	112.34	913.43	112.43
957.16	112.43	979.98	112.84	987.58	112.47	1095.95	112.46	1126.36	112.66
1181.5	112.61	1210.01	112.84	1257.54	112.78	1265.15	113.06	1280.36	112.72
1314.58	111.11	1357.57	111.16	1413.81	111.11	1491.7	111.27	1521.99	111.39
1556.6	111.31	1586.88	111.4	1643.14	111.32	1651.79	111.46	1703.72	111.38
1755.64	111.54	1785.93	111.48	1807.56	111.65	1837.85	111.53	1846.51	111.75
1885.44	111.6	1902.75	112.4	1938.17	112.35	1947.68	112.58	1993.3	112.7
2016.12	112.58	2073.16	112.81	2103.58	112.68	2130.19	113.44	2156.81	113.46
2162.51	113.18	2177.72	113.35	2183.42	112.7	2187.22	113.22	2198.63	113.23
2244.26	112.54	2270.54	112.42	2292.17	112.73	2305.15	112.53	2339.77	113.21
2357.07	113.07	2370.05	113.3	2383.03	114.1	2413.33	113.24	2430.63	113.33
2443.61	113.8	2456.59	113.48	2465.24	114.42	2473.89	114.84	2499.86	114.4
2508.51	113.4	2530.14	114.39	2547.45	114.55	2569.09	115.14	2582.07	114.78
2608.03	115.55	2625.33	115.56	2638.33	115.25	2651.3	115.42	2685.91	113.73
2707.54	113.54	2744.27	113.95	2755.67	114.3	2767.08	114.31	2781.1	114.78
2785.43	114.3	2803.2	114.63	2831.72	114.47	2843.13	114.22	2864.04	114.67
2869.74	114.29	2888.76	114.73	2903.96	114.43	2913.47	113.52	2923.89	113.73
2936.28	114.78	2949.59	115.58	2964.8	116.04	2972.4	115.41	2985.72	113.51
2997.45	113.1	3027.73	113.37	3036.38	113.18	3058.03	113.22	3080.77	113
3109.29	113.46	3128.3	112.81	3135.9	113	3145.41	115.62	3151.11	116.15
3162.52	115.83	3170.12	114.89	3191.03	113.62	3222.45	112.78	3244.08	112.61
3265.71	113.36	3278.69	114.4	3287.34	113.92	3300.33	114.53	3317.64	114.99
3321.96	114.69	3334.94	110.12	3347.92	106.86	3382.54	106.82	3413.47	107.29
3430.13	107.81	3455.29	107.67	3468.6	108.3	3487.61	108.2	3495.04	107.76
3506.62	107.69	3516.13	108.48	3538.3	109.36	3557.95	109.85	3577.25	108.99
3598.88	109.04	3607.53	108.75	3629.16	108.97	3651.11	108.39	3670.13	108.59
3700.54	108.65	3710.05	108.16	3728.69	108.02	3754.65	108.65	3776.28	107.99
3784.93	107.3	3797.91	106.84	3827.92	108.12	3845.03	107.84	3852.63	107.21
3867.85	106.85	3873.55	107.26	3888.76	106.67	3906.09	107.77	3923.39	107.53
3942	107.88	3949.61	108.58	3957.21	108.52	3970.52	108.92	3989.54	110.88
3999.04	111.53	4014.25	112.04	4022.47	111.44	4026.58	109.81	4032.64	105.42
4034.8	104.62	4059.43	99.08	4067.37	97.45	4092.43	96.72	4104.96	95.67
4117.49	95.33	4142.9	93.41	4172.79	91.9	4192.66	90.02	4205.19	88.06
4215.67	89.39	4226.15	89	4235.95	89.31	4253.53	91.81	4268.07	92.49
4278.55	92.22	4299.52	92.25	4310	91.97	4320.48	92.96	4330.96	94.85
4341.44	97.49	4351.92	102	4355.07	102.75	4366.03	102.94	4383.61	104.77
4406.46	106.24	4409.89	106.65	4420.21	114.14	4426.01	116.1	4431.81	115.87
4437.62	114.87	4443.42	114.61	4460.83	114.93	4469.53	114.63	4501.45	114.75
4513.06	115.54	4533.44	115.87	4550.78	115.96	4571.09	114.86	4585.59	115.22
4594.3	114.85	4608.8	115.02	4617.51	115.47	4623.31	114.69	4632.01	115.08
4637.82	114.51	4658.13	114.15	4678.44	114.29	4687.14	114.15	4730.66	114.2
4742.27	114.07	4782.88	114.03	4820.6	113.64	4826.4	113.84	4867.72	113.74
4883.9	114.29	4900.05	114.28	4921.6	113.89	4943.14	112.63	4959.31	112.52
4970.08	113.03	4986.25	114.73	4997.02	115.55	5009.2	115.57	5023.95	115.25
5075.93	114.83	5153.24	114.79	5174.79	114.64	5215.19	114.74	5261.62	114.58
5287.74	114.73	5308.04	114.59	5336.41	114.7	5352.57	114.91	5383.49	114.71
5465.7	114.59	5508.79	114.82	5572.08	114.71	5601.1	114.79	5606.9	114.67
5638.08	114.88	5697.35	115	5754.88	114.75	5794.31	114.81	5826.62	115.16
5837.39	114.99	5858.95	114.25	5880.5	115.03	5912.81	114.47	5977.45	114.41
5998.99	114.8	6009.77	114.3	6020.54	114.84	6036.69	114.46	6094.36	114.33
6236.54	114.37	6285.86	114.82	6300.37	114.63	6311.97	115.62	6332.29	115.83
6343.9	115.52	6349.7	115.73	6407.73	115.81	6448.34	115.57	6486.07	115.59
6512.18	115.4	6541.2	115.4	6573.11	115.06	6587.62	115.1	6610.83	114.76
6625.34	114.96	6651.46	114.9	6665.96	114.62	6671.77	114.8	6718.19	114.36
6738.5	114.56	6761.72	114.43	6773.32	114.19	6782.03	114.36	6799.43	114.12
6819.74	114.16	6831.35	113.88	6848.76	114.1	6935.81	113.7	6941.61	113.4
6959.02	113.73	6996.73	113.27	7022.85	113.43	7104.09	113.22	7109.9	112.93
7121.5	113.09	7167.93	112.93	7188.24	112.75	7194.04	112.29	7214.35	113.06
7228.86	113.33	7237.56	112.91	7249.17	113.12	7266.58	114.51	7278.18	114.73
7283.98	113.31	7289.79	113.12	7321.71	110.64	7336.22	110.58	7347.82	111.13
7353.63	111.91	7359.43	113.6	7373.94	114.18	7379.74	114.88	7391.34	117.73
7400.05	119.05	7414.55	118.99	7420.36	118.6	7431.96	116.41	7440.67	115.38
7452.28	114.5	7460.98	114.22	7475.49	114.79	7481.29	115.34	7492.9	115.39
7507.41	115.01	7524.81	115.44	7539.32	116.09	7556.73	118.03	7574.14	118.71
7588.65	118.6	7608.96	119.19	7614.76	119.03	7655.38	119.43	7684.4	119.18
7719.22	119.5	7739.53	119.36	7754.04	119.66	7768.54	119.47	7777.25	119.7
7785.95	119.43	7794.66	119.63	7823.67	119.4	7852.69	119.76	7904.92	119.7
7925.23	120.29	7939.73	120.11	7948.44	120.61	7971.65	121.32	7983.25	121.06
7991.97	120.53	7997.77	120.79	8009.37	120.34	8026.78	119.17	8038.39	119.05
8064.5	118.03	8113.82	117.67	8145.75	117.8	8186.36	117.68	8200.87	117.84
8244.39	117.75	8290.82	117.97	8325.64	117.88	8386.57	117.89	8421.39	118.01
8441.7	117.95	8578.07	118.04	8607.09	118.15	8627.39	118.04	8681.47	118.19
8726.05	118.18	8737.65	118.07	8769.57	118.17	8833.41	118.25	8879.83	118.11
8917.56	118.17	8969.78	118.37	8990.09	118.24	9036.52	118.35	9062.63	118.24
9082.94	118.35	9120.67	118.34	9129.37	118.18	9155.48	118.17	9161.29	118.35
9187.4	118.07	9201.91	118.25	9230.93	119.11	9245.43	118.99	9248.34	118.67
9262.84	118.58	9268.64	118.08	9283.15	117.52	9303.46	117.35	9332.48	117.66
9338.29	117.59	9376	117.85	9407.92	117.8	9489.17	118.01	9543.3	118
9657.46	118.12	9689.38	118.22	9741.6	118.18	9761.92	118.31	9819.94	118.22
9846.06	118.37	9936.01	118.45	9973.73	118.4110031.76		118.6810054.97		118.66
10066.58	118.8810083.99		119.6910086.89		119.47 10098.5		116.9610110.11		119.32
10118.81	119.7310127.51		121.5710136.22		122.1410147.82		121.9610153.63		119.76
10156.53	119.3610162.33		121.8710168.13		122.9410186.61		121.2610209.72		118.38
10218.96	117.8810224.22		118.1810242.06		120.0310252.26		120.5310262.77		120.67
10271.54	121.410288.26		119.6810299.58		119.5710311.85		118.710320.61		119.12

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.157	4014.25	.066	4059.43	.015	4351.92	.066	4420.21	.074

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4014.25 4420.21 1062.5 1652.05 1250 .1 .3
Left Levee Station= 108.01 Elevation=136.0775
Right Levee Station=10170.59 Elevation=122.9425
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	2339.77	113.21	4420.21	7539.32	116.09

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 179.85*

INPUT
Description: RGV-03,
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	119.46	8.91	119.63	17.82	117.29	49.37	118.84	62.37	120.77
71.28	124.9	77.22	126.94	83.16	128.24	103.96	135.18	112.86	135.99
117.51	135.41	131.44	132.07	154.65	123.92	156.97	123.5	178.14	122.15
189.94	120.35	208.45	118.64	215.91	118.69	237.16	117.84	253.68	115.21
260.77	112.65	270.22	111.32	294.42	105.54	299	104.68	313.4	104.52
500.52	104.54	514.91	104.35	579.2	104.7	601.28	105.22	615.67	108.25
665.18	108.94	683.37	109.36	690.45	110.17	699.9	110.22	709.34	111.06
718.78	113.1	723.51	113.25	744.75	112.71	836.83	112.68	850.99	112.85
855.72	112.61	874.6	112.76	919.46	112.73	938.34	113.01	947.79	112.85
973.76	112.92	1011.54	112.79	1042.23	113.1	1054.03	112.97	1063.47	113.19
1084.72	112.84	1113.05	113.07	1127.26	112.94	1167.35	112.93	1183.88	113.19
1195.69	113.74	1205.13	112.98	1219.29	113.12	1268.88	112.95	1301.92	113.03
1309.01	113.17	1339.7	112.96	1428.16	113.17	1445.94	113.1	1471.91	113.22
1481.35	113.43	1530.93	113.4	1540.38	113.28	1549.82	113.83	1568.71	113.13
1589.96	111.35	1599.4	110.95	1611.2	109.84	1664.59	109.88	1734.43	109.85
1868.77	110.04	1911.75	109.98	1949.36	110.04	2019.21	109.99	2029.96	110.08
2094.44	110.03	2158.93	110.13	2196.53	110.1	2223.4	110.21	2261.02	110.12
2271.76	110.28	2320.11	110.17	2341.6	110.71	2371.42	110.67	2385.59	110.86
2397.4	111.47	2416.28	111.42	2425.73	111.72	2442.26	111.83	2470.58	111.61
2503.64	112.02	2517.8	112.01	2553.22	112.39	2567.38	112.17	2591	112.26
2624.05	113.63	2633.49	113.45	2657.1	113.76	2664.18	113.27	2683.07	113.59
2690.15	112.28	2694.87	113.3	2709.04	113.32	2732.65	112.57	2739.73	112.64
2749.17	112.17	2784.59	111.73	2825.19	111.89	2850.69	111.74	2867.23	112.17
2921.91	112.38	2938.03	112.98	2959.3	112.52	2975.65	112.35	2997.14	112.4
3013.26	112.75	3029.37	112.51	3050.86	113.46	3083.11	113.18	3093.86	112.5
3120.72	113.17	3142.21	113.29	3169.09	113.75	3185.95	113.46	3226.08	114.04
3255.06	113.85	3271.18	113.98	3292.18	113.38	3325.24	112.7	3365.38	112.99
3370.1	113.35	3386.62	113.23	3400.79	113.76	3414.95	113.61	3431.48	114.34
3437.74	114.02	3450.37	114.03	3459.81	114.58	3476.33	114.21	3495.22	114.5
3509.39	114.22	3518.83	114.86	3528.27	114.64	3535.36	114.99	3542.44	114.18
3566.05	114.96	3584.94	114.33	3596.74	112.5	3608.54	112.8	3625.07	114.56
3641.6	115.29	3653.4	115.2	3660.48	115.52	3669.93	114.45	3686.46	111.23
3701.03	110.96	3738.63	111.06	3749.38	110.9	3783.25	110.86	3797.41	111.18
3804.5	110.91	3825.75	111.29	3839.91	111.9	3863.52	110.75	3872.96	110.94
3877.68	112.19	3884.77	116.04	3891.85	117.07	3898.93	116.1	3906.02	116.37
3915.46	114.45	3927.26	113.19	3941.43	112.04	3957.96	111.48	3991.01	111.01
4012.25	110.9	4034.16	111.27	4050.28	112.01	4061.02	111.71	4098.65	112.67
4104.02	112.54	4120.13	109.62	4136.25	107.48	4179.25	107.5	4217.65	108.03
4248.34	109.15	4253.06	108.85	4269.59	108.85	4286.12	109.96	4309.73	110.07
4333.33	108.42	4345.14	108.94	4364.03	109.29	4387.63	109.46	4397.08	110.04
4421.03	108.83	4441.94	108.74	4458.64	108.2	4496.24	108.44	4512.76	107.71
4536.38	108.11	4552.9	107.95	4574.15	108.39	4585.95	107.56	4607.2	107.43
4628.45	107.78	4642.61	108.3	4654.41	107.86	4668.19	107.92	4687.47	107.37
4701.63	107.65	4708.71	108.68	4722.88	109.2	4732.33	109.89	4744.13	109.24
4753.57	109.12	4763.02	107.92	4772.47	107.63	4781.91	107.8	4788.99	108.59
4807.88	107.22	4829.13	108.92	4848.02	108.31	4862.18	108.56	4873.99	108.36
4883.44	109.49	4892.88	109.15	4909.41	109.66	4933.02	111.9	4944.83	112.41
4956.63	111.81	4963.72	112.19	4973.6	111.21	4978.54	109.41	4985.82	104.65
5018.01	99.08	5027.56	97.72	5057.67	96.76	5072.73	95.96	5093.62	95.48
5118.32	93.97	5130.67	93.79	5154.25	92.49	5167.73	91.34	5193.18	87.63
5204.14	88.8	5215.1	88.91	5225.35	89.53	5243.74	93.99	5258.96	94.5
5291.84	94.42	5302.8	94.26	5313.77	94.94	5324.73	96.22	5335.69	98
5346.65	101.02	5349.94	101.51	5361.41	101.64	5379.8	104.88	5407.29	107.76
5418.08	113.38	5423.12	114.68	5438.26	113.67	5453.39	113.86	5460.96	113.64
5488.71	113.69	5498.81	114.25	5516.53	114.59	5531.6	114.52	5549.26	113.76
5561.88	114	5569.44	113.76	5589.63	114.18	5594.67	113.65	5602.24	113.91
5607.28	113.49	5624.94	113.2	5675.92	113.33	5698.1	113.11	5750.94	112.87
5766.21	112.63	5807.19	112.59	5821.25	113.8	5835.29	113.83	5854.03	113
5863.4	111.45	5872.76	110.5	5886.82	110.43	5896.18	111.5	5910.24	114.9
5919.6	116.45	5924.29	116.61	5943.03	115.86	5957.07	115.72	5985.18	115.09
6003.91	115.24	6041.4	115.16	6055.44	115.32	6074.18	115.15	6092.91	115.34
6126.97	115.17	6172.38	115.38	6214.7	115.48	6228.75	115.99	6284.97	115.43
6303.7	115.65	6327.12	115.64	6364.59	116.1	6449.89	116.03	6477.01	116.33
6528.54	116.61	6578.56	116.32	6612.85	116.45	6640.94	117.15	6650.3	116.85
6664.36	115.5	6669.05	115.44	6687.78	117.04	6706.52	116.52	6715.88	116.02
6758.03	115.92	6772.08	116.01	6790.81	116.81	6800.18	115.82	6809.54	116.88
6823.59	116.13	6873.74	115.89	6997.35	115.91	7040.24	116.18	7052.85	116.07
7062.94	116.76	7146.2	116.82	7181.52	116.66	7214.32	116.67	7262.25	116.53
7322.8	116.07	7335.42	116.19	7375.78	116.06	7416.14	115.78	7433.8	115.92
7471.65	115.78	7514.54	115.39	7529.67	115.55	7605.36	115.31	7610.41	115.1
7625.54	115.33	7653.29	115.16	7658.34	114.99	7681.05	115.09	7751.68	114.91
7807.19	114.71	7824.85	114.57	7829.9	114.26	7860.17	114.94	7867.74	114.66
7877.83	114.8	7892.96	115.74	7903.05	115.89	7908.1	114.94	7913.14	114.82
7940.9	113.16	7953.51	113.11	7963.61	113.47	7973.7	115.11	7986.31	115.49
7991.36	115.95	8001.45	117.84	8009.01	118.71	8026.67	118.4	8036.76	116.94
8054.43	115.67	8062	115.49	8079.66	116.23	8102.36	116.01	8130.11	116.74
8145.25	118.03	8160.38	118.48	8173	118.39	8190.66	118.78	8195.71	118.67
8231.03	118.98	8256.25	118.8	8286.53	119	8304.19	118.92	8316.8	119.14
8336.99	119.17	8377.35	118.93	8402.58	119.15	8447.99	119.11	8465.65	119.5
8478.26	119.41	8506.01	120.35	8523.68	119.91	8538.82	119.79	8553.95	118.92
8565.85	118.84	8586.75	118.17	8629.63	117.86	8692.71	117.84	8725.09	118
8734.45	117.86	8762.56	118.08	8813.81	118	8897.06	118.07	8973.32	117.98
9058.52	118.12	9081.04	118.01	9123.19	118.14	9172.05	118.03	9255.31	118.12
9295.67	118	9373.88	118.18	9391.54	118.09	9431.91	118.15	9454.61	118.06
9505.08	118.1	9563.1	117.86	9575.71	117.99	9600.95	118.57	9628.7	118.2
9646.35	117.46	9664.01	117.32	9727.09	117.68	9778.88	117.65	9797.62	117.77
9872.55	117.72	9881.91	117.81	9928.75	117.7510044.97		117.8410078.62		117.93
10102.04	117.810135.79		117.9410246.81		117.910327.53		118.2310342.68		118.77
10355.29	116.9510365.38		118.510372.95		118.7610380.52		119.9810398.18		120.46
10405.74	119.0510410.79		120.9410415.83		121.8710422.62		121.72 10429.4		120.28
10469.49	117.7610488.19		117.0610511.21		118.2110517.58		118.2810524.36		119.01
10537.92	119.1910549.23		121.12 10585.4		119.3310601.23		117.8610612.54		118.5

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	2683.07	.12	5018.01	.025	5418.08	.066

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4963.72	5418.08	1062.5	1652.05	1250	.1	.3

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4963.72  112.19       T
 5418.0810612.54  113.38       T
Left Levee      Station=  112.86      Elevation= 135.985
Right Levee     Station=10420.75      Elevation= 121.875
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1589.96 3365.38  111.35

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 179.63*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   121.7     9.3  121.87   12.39  121.23   18.58  118.28    51.5  118.89
   65.05  120.05   68.15  121.08   74.35  124.88   80.54  127.02   86.74  128.07
   92.93  129.92  108.42  135.38  117.71  135.89  123.26  135.11   139.9  130.55
  167.63   120.5  170.41  120.06   195.7  119.77   209.8   118.3  231.91  117.81
  240.83  118.17  260.57  117.98  266.21  117.59  280.32  115.38  285.96   114.1
  294.42  110.54  305.71  109.32   340.1  101.66  512.07   101.7  546.47   101.6
  580.86  101.67  598.06   101.4  674.87  101.85  701.24  102.13  718.44  106.68
  777.58  107.83  799.31  108.34  807.78   109.5  819.06  109.53  830.35  110.78
  841.63  113.81  847.27  114.03  858.55  113.53  864.19  113.74  872.65  113.18
   920.6   113.1  982.66  113.18  999.58  113.45 1005.22  113.08 1027.94  113.24
 1044.72  113.08    1056  113.28 1081.38  113.24 1103.94  113.69 1115.23  113.46
 1146.26  113.54 1182.92  113.46 1191.39  113.31 1228.05  113.73 1242.15  113.52
 1253.44  113.84 1278.83  113.34 1295.75  113.36 1312.67   113.7 1318.31  113.41
 1360.63   113.5 1377.55  113.42 1397.29  113.81  1411.4  114.63 1422.68   113.5
  1439.6   113.7 1459.34  113.51 1490.38  113.62 1498.84  113.44 1538.32  113.56
 1546.78  113.78 1583.46  113.46 1690.64  113.75 1710.39  113.59 1741.41  113.72
 1752.69  114.01 1811.93  113.96 1823.21  113.79 1834.49  114.61 1857.06  113.54
 1882.44  110.85 1893.72  110.25 1902.19  108.93 1907.83  108.58 2055.05  108.58
 2215.55  108.68 2395.29  108.65 2485.17  108.67 2697.02   108.8 2754.78  108.74
 2780.46  109.01 2816.09  108.99 2833.02  109.37 2847.12  110.35 2869.68  110.33
 2880.97  110.78 2900.71  110.95 2934.56  110.65 2948.67  110.73 2974.05  111.31
 2990.97  111.33 3033.29  111.96 3050.21  111.67 3061.49  111.94 3078.42  111.85
 3106.62  113.41  3117.9  113.83 3129.18  113.53 3140.47  113.92  3157.4  114.07
 3165.86  113.35 3188.42  113.82 3196.88  111.85 3202.52  113.38 3219.45   113.4
 3247.65  112.26 3256.12  112.37  3267.4  111.67 3309.71  111.03 3343.56   111.1
 3388.69  110.85 3408.44  111.35  3416.9  111.23 3450.74  111.54 3470.49  111.41
 3501.52  111.88 3518.44  111.48 3566.39  111.48 3572.03   111.7 3602.16  111.53
 3627.83  112.09 3666.37  111.96  3679.2   111.6 3711.29  111.94 3736.97  112.03
 3780.76  112.41 3808.97   112.2 3837.17  112.49 3891.05  112.55 3916.15   112.2
 3938.72  112.25 3955.64  111.82 4003.59  112.23 4009.23  112.75 4028.98  112.52
  4045.9  113.23 4062.82  112.92  4074.1  113.19 4082.57  113.91 4105.13  113.73
 4116.41  114.54 4136.16  113.95 4158.73  114.53 4175.65  114.23 4186.93  115.19
 4198.21  114.81 4206.67   115.3 4215.13  114.06 4243.35  115.18 4251.81  115.09
 4265.91  114.23 4280.01  111.48 4294.11  111.92 4313.86  114.34  4333.6     115
 4347.71  114.57 4356.17  114.99 4367.45  113.48 4381.55     110  4387.2  108.96
 4404.61  108.81 4449.54  108.74 4466.18  108.61 4502.84  108.62 4519.76  109.22
 4528.22  108.81 4553.61  109.38 4570.54  110.34 4584.64  109.72 4598.74  108.68
 4610.02  108.88 4615.66  110.71 4624.13  116.46 4626.95  117.54 4632.59     118
 4641.05  116.53 4649.51  116.92 4655.15  115.98 4660.79  114.01  4674.9  112.14
 4691.82  110.47 4711.57  109.72 4731.31  109.76 4751.05   109.2 4765.15  109.37
 4776.44  109.08 4799.01  109.13 4821.87  109.61  4834.7   109.5 4861.06  109.75
 4886.07   110.4 4905.33  109.13 4924.58   108.1 4971.06  108.13 5021.84  108.77
  5058.5  110.38 5064.14  109.96 5083.88  110.04 5103.64  111.61 5109.28   111.5
 5131.84  111.93  5140.3   111.3 5160.04  109.15 5174.15  109.39 5179.79  109.17
 5196.71  109.45 5224.92  109.42  5236.2  110.23 5264.41  108.69 5289.79  108.38
 5303.89  107.67 5329.29  107.74 5354.67     108 5374.41  107.03 5385.69  107.07
 5402.62  107.64 5422.36  107.37 5433.65  107.48 5447.75  108.13 5461.85  106.96
 5487.24  106.84 5512.62  107.24 5529.55  107.95 5543.65  107.51 5580.32  108.11
 5583.14  107.76 5600.06  108.37 5608.52  109.93 5625.44  110.67 5636.73  111.65
 5650.84  110.62 5662.12   110.4  5673.4  108.62 5684.69  108.35 5695.97  108.75
 5704.43  109.93 5712.89  109.36    5727  107.78 5738.28  108.54 5746.74  109.77
 5752.38  110.06 5760.85  109.47 5774.96  109.11 5791.88  109.32 5805.99  108.85
 5817.27   110.4 5828.55  109.77  5848.3  110.41 5856.76  111.55 5868.04  111.99
 5876.51  112.91 5890.61   113.3 5904.72     112 5913.19  112.35 5918.92  111.99
 5927.52  110.32 5936.13  106.11 5938.99  103.89  5962.6  101.14 5976.59   99.08
 5987.74   97.99 6003.69   97.13 6022.91   96.8 6050.03      96 6064.89   95.98
 6079.76   95.51 6093.75   94.52 6108.17   94.59 6135.71   93.09 6151.45   91.66
 6181.18   87.21 6214.76   89.76 6233.96   96.17 6249.84   96.51 6295.61   96.54
 6307.06   96.91 6329.94   98.51 6344.82  100.28 6356.79  100.33 6375.98  104.99
 6404.68  108.86 6415.94  112.63 6420.23  113.27  6433.1  112.73 6475.98  112.62
 6499.62  113.32 6527.44  112.66 6561.74  112.88 6583.29  112.27 6619.15  112.32
 6635.09  112.52 6653.94  112.15 6698.85  111.93 6726.73  111.35 6746.65  111.43
  6758.6  113.32 6770.54  113.38 6786.46  112.12 6794.43  109.77 6802.38  108.36
 6814.33  108.33 6822.29  109.97 6834.24  115.06 6842.19  117.36 6846.18  117.57
  6862.1  116.48 6874.04  116.32 6897.93  115.37 6913.85  115.65  6945.7  115.58
 6957.64  115.86 6973.56  115.65 6989.49  115.93 7001.44  115.76 7037.73  115.83
    7093  116.27 7104.94  117.08 7152.71  116.25 7168.63  116.62 7188.54  116.68
 7220.38  117.39 7267.16  117.35 7303.99  117.48 7315.93  117.78 7359.72  118.21
 7403.51  117.88 7431.38  118.09 7455.26  119.15 7463.21  118.71 7475.16  116.71
 7479.14  116.63 7495.07  119.05 7510.99  118.28 7518.94  117.56 7554.77  117.47
 7566.71  117.61 7582.63  118.82  7590.6  117.33 7598.55  118.93 7610.49  117.81
 7638.36  117.51 7670.21  117.41 7702.05  117.49 7777.68  117.41 7805.34  117.52
 7813.92  117.89 7983.31  117.67 8034.77  117.37 8045.49  117.42  8114.1   117.2
 8161.28  117.19 8197.72  116.91 8210.59  116.99 8292.07  116.93 8319.94  116.71
 8367.12  116.74 8403.56  116.49 8430.48  116.57 8461.46   116.4 8465.75  116.23
 8491.48  116.54 8506.48  116.49 8527.92  117.04  8536.5  116.51 8560.09  115.69
 8579.39  115.81 8587.96  116.62 8602.97  117.01 8617.98  118.37 8632.99   118.2
 8641.57  117.47 8663.01  116.75 8678.02  117.13 8697.32  117.02  8720.9  117.38
 8733.76  118.03 8808.62  118.52 8828.11  118.42 8896.72  118.63 8931.03  118.46
 8991.07  118.51  9016.8  118.72 9040.38  119.38 9063.37  119.43  9079.3  118.69
 9091.23  118.71    9109  118.32 9145.45  118.06 9182.79  117.93 9226.58  118.16
 9234.53  117.97 9258.42  118.25  9282.3  118.12 9330.06  118.17    9347  118.05
 9372.73  118.13 9437.54  117.99 9488.52  118.13 9529.09  117.98 9564.92  118.08
 9580.84  117.95 9616.66  118.05 9711.51   117.9 9771.91     118 9889.48  117.86
 9907.24  117.67  9938.8  117.66 9970.96  118.03 9994.55  117.8210009.56  117.41
10034.61   117.310062.47  117.4910122.19  117.4310138.11  117.59 10201.8  117.45
10209.75  117.5810249.57  117.4310269.47  117.5310301.32  117.4410376.94  117.57
10396.85  117.3810416.74  117.51 10508.3  117.3710579.91  117.4910601.36  117.85
10612.08  116.9510633.52  118.3810648.53  118.9610654.96  118.7410663.54  120.79
10671.84  120.7310680.15  118.7210691.23  117.86 10738.3  117.1110752.15  115.94
10788.16  116.4410796.46  117.4810813.07  117.7110821.38  119.9410826.92  120.85
10843.54  120.6810857.38  120.1810871.23  119.0910890.61  117.0310904.46  117.89
```

```
Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2974.05     .12 5976.59    .025 6415.94    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5913.19 6415.94           1062.5 1652.05    1250             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5913.19  112.35       T
 6415.9410904.46  112.63       T
Left Levee      Station=  117.71      Elevation=135.8925
Right Levee     Station=10670.91      Elevation=120.8075
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1857.06 3106.62  113.54

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 179.4

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     459
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
        0  123.95    9.68  124.12    12.9  123.25   19.35  119.26   22.58  118.97
    54.83  118.95   67.73  119.33   70.96   120.4   77.41  124.85   83.86   127.1
    90.31  127.89   96.76  129.75  112.89  135.57  122.56   135.8  129.02  134.81
   148.37  129.02  180.62  117.08  183.85  116.62  213.26  117.39  229.66  116.24
   259.19  117.09  265.75  117.66  288.71   117.8  295.27  117.34  311.67  114.57
   318.23     113  328.07  108.44   341.2  107.32   381.2   98.64   401.2   98.77
    581.2   98.84   621.2   98.71   661.2    98.8   681.2   98.44   701.2   98.64
    781.2   99.06   801.2   99.03   821.2   105.1  915.26  107.32   925.1  108.83
   938.23  108.84  951.35  110.49  964.47  114.52  971.03  114.81  984.15  114.13
   990.71  114.41 1000.55  113.66 1016.95  113.52 1056.32  113.53 1062.88  113.82
  1079.28  113.62 1128.49  113.67 1148.17  114.04 1154.73  113.55 1180.97  113.72
  1200.66  113.52 1213.78  113.79  1243.3  113.75 1262.98  113.98 1269.54  114.36
  1282.67  114.06 1318.75  114.16 1331.87  113.99 1361.39  114.03 1371.24  113.82
  1413.88  114.36 1430.28  114.07  1443.4   114.5 1463.09  114.28 1472.93  113.84
  1492.61  113.87 1512.29  114.33 1518.85  113.95 1568.06  114.02 1587.74  113.92
   1594.3  114.32  1610.7  114.44 1627.11  115.53 1640.23  114.02 1659.91  114.28
  1682.87  114.03 1718.96  114.17  1728.8  113.92 1774.72   114.1 1784.56  114.39
  1827.21  113.96 1866.57  114.06 1879.69   114.4 1886.25  114.11 1951.86  114.32
  1974.83  114.08 2010.91  114.21 2024.03  114.59 2050.27  114.67  2063.4  114.47
  2092.92  114.52 2106.04  114.29 2119.16  115.38 2145.41  113.95 2168.37  111.36
  2174.93  110.36 2188.05  109.55 2197.89  107.79 2204.45  107.32 3260.75  107.32
  3280.44  107.88 3296.84  109.23 3323.08  109.24 3336.21  109.84 3346.05  109.65
  3359.17  110.07 3362.45  109.69 3375.57  110.04 3398.53  109.68 3414.94   109.8
  3444.46  110.61 3464.14  110.65 3490.39  111.17 3503.51  111.08 3513.35  111.54
  3533.03  111.16 3546.15  111.54 3565.84  111.43 3598.64  113.48 3611.76  114.03
  3624.88  113.61 3638.01  114.14 3657.69  114.37 3667.53  113.43 3693.77  114.05
  3703.61  111.43 3710.17  113.46 3729.86  113.48 3762.66  111.96  3772.5   112.1
  3785.62  111.16 3808.59  110.68 3828.27  110.66 3834.83  110.33  3874.2  110.35
  3926.68  109.96 3949.65  110.53 3959.49  110.33 3998.85  110.75 4021.82  110.49
   4057.9  110.84 4077.58  110.44 4087.42  110.58 4133.35  110.53 4139.91  110.76
  4166.15  110.51 4221.92  110.81 4277.69  110.66 4353.13  110.82 4382.66  111.13
   4392.5  110.82 4402.34   111.1 4415.46  110.77 4438.42  110.66 4448.26  110.94
  4510.59  111.11 4540.11  111.03 4566.36  111.43 4586.04  110.94 4641.81  111.47
  4648.37  112.16 4671.33   111.8 4691.01  112.69 4710.69  112.22 4723.81  112.55
  4733.66  113.48  4759.9  113.43 4773.02  114.49 4795.98  113.69 4822.23  114.56
  4841.91  114.23 4855.03  115.52 4868.15  114.98 4877.99  115.62 4887.83  113.94
  4907.52  114.88 4917.36  114.83 4920.64  115.41 4930.48  115.28 4946.88  114.13
  4963.28  110.46 4969.84  110.33 4979.68  111.04 5002.65  114.12 5015.77  114.19
  5025.61  114.71 5042.01  113.94 5051.85  114.46 5064.97  112.51 5081.37  108.01
  5087.94  106.68  5110.9  106.66 5179.79  106.33 5222.43  106.39 5242.11  107.26
  5251.95  106.72 5281.48  107.48  5294.6  108.64 5301.16  108.78 5317.56  108.02
  5333.96  106.61 5347.08  106.82 5353.64  109.23 5363.49  116.88 5366.77  118.32
  5373.33  118.92 5383.17  116.95 5393.01  117.46 5399.57  116.21 5406.13  113.57
  5422.53  111.08 5442.21  108.89 5465.18  107.97 5488.14  108.15  5511.1  107.39
   5527.5  107.69 5540.62  107.27 5566.87  107.07 5612.79  107.32 5639.04  107.32
   5678.4  108.58 5730.89  108.79 5766.97  108.79 5826.02  109.51 5868.66  111.62
  5875.22  111.07 5898.18  111.23 5921.15  113.26 5927.71   113.1 5953.95   113.8
  5963.79  113.01 5986.75  109.88 6003.16  109.84 6009.72  109.46  6029.4  109.62
  6035.96  109.34  6062.2  109.37 6075.32  110.42 6088.45   109.4 6108.13  108.53
  6121.25  108.51 6137.65  108.02 6154.05  107.09 6183.58  107.18  6213.1  107.55
  6236.06  106.35 6249.18  106.42 6268.87  107.16 6291.83  106.78 6304.95  106.92
  6321.35  107.87 6337.75  106.36 6367.28  106.25  6396.8   106.7 6416.48  107.61
  6432.88  107.16 6475.53  108.58 6478.81  108.15 6498.49  109.09 6508.33  111.18
  6528.01  112.13 6541.14  113.41 6557.54     112 6570.66  111.68 6583.78  109.33
  6596.91  109.07 6610.03   109.7 6619.87  111.26 6629.71   110.5 6646.12  108.34
  6659.24  109.28 6669.08  110.86 6675.64  111.21 6685.49   110.4 6701.89  109.91
  6721.57  110.07 6737.98  109.33  6751.1  111.31 6764.22   110.4 6787.19  111.15
  6797.03  112.61 6810.15  112.91    6820  113.93  6836.4  114.19  6852.8   112.2
  6862.65  112.51 6869.21  112.06 6879.05   110.1 6888.89  105.77 6892.17  103.12
  6919.17  101.03 6935.17   99.08 6966.17   97.08 7002.17   96.68 7019.17   96.28
  7036.17   96.48 7053.17   96.18 7069.17   95.08 7085.67   95.38 7117.17   93.68
  7135.17   91.98 7169.17   86.78 7186.17   87.98 7204.17   89.98 7220.17   96.98
  7224.17   98.35 7252.17   98.64 7332.17   99.06 7352.17   99.03 7372.17   105.1
  7413.81  111.88  7466.3  111.53 7482.71  112.05 7495.83  111.56 7541.76  111.59
   7551.6  111.24 7581.13  111.41 7594.25  111.72  7604.1  111.26 7633.62  110.89
  7646.75  110.99 7669.71  110.14 7686.11  110.28 7695.95  112.83 7705.78  112.93
  7718.89  111.23 7725.45  108.09    7732  106.23 7741.84  106.24 7748.39  108.44
  7758.23  115.23 7764.78  118.26 7768.06  118.53 7781.17   117.1    7791  116.92
  7810.67  115.66 7823.78  116.06 7850.01  115.99 7859.84   116.4 7872.95  116.16
  7886.06  116.52  7895.9  116.27 7918.84  116.37 7971.29  117.05 7981.12  118.16
  8020.46  117.07 8033.57  117.59 8049.96  117.73 8076.18  118.67 8125.35  118.67
  8145.02  118.84 8154.85  119.23 8190.91  119.82  8207.3  119.49 8226.96  119.44
  8249.91  119.73 8269.57  121.15 8276.12  120.57 8285.96  117.92 8289.24  117.82
  8302.35  121.06 8315.46  120.05 8322.01  119.11 8351.51  119.02 8361.34  119.21
  8374.45  120.83 8381.01  118.84 8387.56  120.98 8397.39  119.48 8420.34  119.09
  8446.56  118.93 8472.78  119.06 8521.94  118.97 8535.05  118.78 8567.82  119.05
  8603.88  118.85 8705.48   118.8 8780.86  118.57 8843.13  118.67 8872.63  118.41
   8964.4  118.54 8990.62  118.38 9016.84  118.46 9049.62  118.27 9072.56  118.34
  9115.17  118.14 9174.16  118.23 9236.43     118 9331.48  118.04 9351.15  117.94
  9383.92  118.08 9419.97  117.98 9449.47  118.12 9498.63  117.93 9544.52  117.91
  9557.63  118.04 9593.68  118.83 9606.79  118.38 9616.62  118.57 9692.01  118.03
  9728.06  118.33 9734.61  118.08 9754.28  118.42 9773.94  118.21 9813.27   118.3
  9826.38  118.13 9859.16  118.21 9901.77     118 9944.37  118.17 9977.15  117.95
 10006.65  118.0310019.76  117.8510049.25  117.9710137.75  117.7710177.08  117.83
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 10275.4  117.6210288.51  117.4210350.79  117.5110393.39  117.2110416.33  117.37
 10465.5   117.210478.61   117.4   10495  117.2210531.05  117.17 10537.6  117.35
10570.38   117.110586.77  117.2310612.99  117.0810675.26   117.210691.65  116.96
10708.03  117.1110783.42  116.8510868.63  116.9410894.85  116.7210911.24  119.72
10921.07  119.74 10930.9  117.1610944.01  116.15 10960.4  116.4310999.73  116.57
11016.12  114.8211039.06  114.5111058.73  114.6111068.56  115.9611088.22  116.23
11098.06  119.2611104.61  120.5711124.28  120.8311140.66   120.411147.22   119.4
11157.05  118.8511179.99  116.1911189.83  117.2511196.38  117.27

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3693.77     .12 6919.17    .025 7372.17    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6862.65 7413.81          1754.79  1830.6 1749.92             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6862.65  112.51       T
 7413.8111196.38  111.88       T
Left Levee      Station=  122.56      Elevation=   135.8
Right Levee     Station=10921.07      Elevation=  119.74
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 2145.41 3611.76  114.03

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            132.49    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.085      0.043     0.066
  W.S. Elev (ft)            132.45    Reach Len. (ft)          1754.79    1830.60   1749.92
  Crit W.S. (ft)            117.33    Flow Area (sq ft)       127804.50   18998.19   56803.94
  E.G. Slope (ft/ft)      0.000059    Area (sq ft)            143093.70   18998.19   57106.20
  Q Total (cfs)           235000.00     Flow (cfs)             122188.70   53176.26   59635.02
  Top Width (ft)          11059.48    Top Width (ft)           6725.75     551.16    3782.57
  Vel Total (ft/s)            1.15    Avg. Vel. (ft/s)            0.96       2.80       1.05
  Max Chl Dpth (ft)          45.67    Hydr. Depth (ft)           19.00      34.47      15.02
  Conv. Total (cfs)       30548250.0    Conv. (cfs)             15883620.0   6912519.0   7752109.0
  Length Wtd. (ft)          1768.43    Wetted Per. (ft)         6743.34     557.35    3806.22
  Min Ch El (ft)              86.78    Shear (lb/sq ft)            0.07       0.13       0.06
  Alpha                        1.90    Stream Power (lb/ft s)      0.07       0.35       0.06
  Frctn Loss (ft)              0.10    Cum Volume (acre-ft)    282706.90   86340.48   277996.80
  C & E Loss (ft)              0.00    Cum SA (acres)           28284.96    3349.27   29385.73


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 179.10*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  126.73    6.45  126.85    12.9  123.61   36.55   123.4   45.15  123.65
   51.61  127.33   64.51   130.6   75.26  134.48   81.71  134.63   88.52  133.26
  108.94  127.07  123.28  121.73  138.14  117.97  146.36  116.76  177.39  117.21
  194.69   116.4  225.85  117.18  230.21  117.47  256.99  117.59  263.91   117.3
  281.21  115.62  288.13  114.61  298.51  111.42  312.36  110.66  354.56  104.85
  378.72  105.08  408.42   104.9  417.33  105.12  441.09  104.82  470.79  104.82
  497.52  105.11  521.29  104.92  568.81  105.12  595.54  104.45  625.24  105.01
  634.15  104.82   669.8  105.05  687.61  104.76  705.43  105.49  732.17  104.51
  747.02  102.59  761.86  102.45  797.64  102.51  818.74  106.58  833.15  106.81
  850.97  108.25  880.68  109.19  917.97  109.18  928.35  110.18   942.2  110.22
  956.04  111.35  969.88  113.93  997.57  113.89 1007.95  113.36 1023.24  113.28
 1049.97   113.6 1130.16  113.62 1163.68  113.93  1170.6  113.58 1183.63  113.72
 1219.05  113.26 1251.95  113.16  1284.8  113.39 1357.47  113.66 1388.62  113.94
 1412.33  113.92 1443.99   114.4 1461.29  114.27 1475.13  114.59 1495.91  114.59
 1506.29  114.33 1547.81  114.69 1554.73   114.4 1605.39  114.34 1627.41  114.48
 1634.33  114.81 1651.63  114.82 1668.94  115.43 1682.78  114.22 1703.54   114.4
 1750.93  114.43 1798.45  114.31 1840.04  114.89 1866.76  114.71 1905.38  114.73
  1935.4   115.1 1942.32  114.89 1976.66  114.89 1988.54  114.39 1994.48  113.29
 2015.27  112.49    2042  112.44  2062.8  113.78  2071.7  114.91 2087.67  115.33
 2129.21  115.01 2148.92  115.19 2174.19  114.82 2188.03  115.03 2215.72  112.96
 2246.86  110.14 2260.71  109.52 2278.01  107.95 2315.25  108.01 2368.71  108.61
  2419.2   108.2 2442.97  107.83 2505.34  107.76 2543.95  108.04 2567.71   108.4
 2588.51  109.15 2621.17  108.77 2633.05  108.97 2683.54  108.03 2799.38  108.05
 2843.93  108.34 2864.72  108.28 2894.42  108.53 2953.83  108.22 2998.37  108.41
 3019.17  108.28 3069.66  108.37 3129.06  108.66 3209.25  108.71 3253.81  109.02
 3339.94  108.77 3357.76  108.91 3372.61  108.69 3413.13  109.11 3430.43  110.05
 3440.93  109.93 3471.96  110.53 3499.65  110.38 3513.49  110.68 3555.02   110.6
 3586.16  111.24 3606.92  111.22 3648.46  111.58 3675.56  112.16 3714.21  112.27
 3743.87  113.69 3762.66  114.28  3776.5  113.65 3790.35  114.31 3811.11  114.78
 3830.01  114.25 3849.17  114.71 3859.55   112.7 3866.47  113.96 3874.56  114.53
 3892.38  114.77 3901.29  113.68 3921.85  112.62 3933.97   113.2 3963.66  112.04
 3972.58  111.88 3991.06   112.2  4020.1  111.86 4037.92  112.16 4091.38  111.62
  4109.2  112.51 4119.12  112.57 4141.88  111.95 4201.28  112.18 4254.08     112
 4269.59  112.37 4284.44  112.07 4317.11  112.08 4328.99  112.67 4343.85  112.01
 4355.73  112.31 4373.54  112.22 4400.28  112.46 4409.19   112.2 4429.97  112.36
 4453.74  111.98 4504.23  112.62 4519.08  112.58 4539.87  112.96 4548.78   112.5
 4563.64  112.51 4578.48  113.28 4610.52  112.42 4634.75  112.26 4670.56  113.17
 4712.14  112.73  4765.6  112.95 4786.39  111.01 4804.21  110.42 4830.95  110.37
 4849.31  110.61 4856.23  111.07 4880.46  110.91 4901.22  111.69 4921.98  111.57
 4946.21  112.43 4973.89  112.36 4987.73  113.06 5011.96  112.52 5039.65  113.09
 5060.41  113.01 5074.25  113.85 5088.09  113.49 5098.47  114.05 5108.85  113.06
 5129.63  114.28 5148.75   114.8 5171.15  114.36 5188.45  111.61 5205.75  111.97
 5214.09  112.61 5229.98  114.54 5246.77  114.01 5254.21  114.45 5271.51  114.06
 5281.89  114.17 5295.73  112.82 5306.17   111.4 5312.11  109.96 5319.96   109.3
 5329.93  109.45 5356.66  108.99 5389.33  109.11 5398.24  108.88 5424.97  108.96
 5442.79  109.37 5461.84  109.21  5482.6  109.84 5492.98  109.65 5524.14   110.3
 5537.98  111.14  5562.2   110.9  5579.5  109.85 5593.34  110.01 5600.26   111.6
 5610.65   116.7 5614.11  117.67 5621.03  118.07 5631.41  116.77 5641.79  117.11
 5648.72  116.44 5655.64  114.85 5672.94  113.14 5701.19  111.28 5717.93  110.84
  5730.9  110.88 5775.44  109.86 5783.68  110.06 5805.15  109.81 5831.88  110.38
 5855.64  110.23 5864.55  110.83 5876.43  110.42  5900.2  110.25 5909.11  110.84
 5920.98  110.58 5950.69  111.01 5962.57  111.48 5995.24   111.8 6010.09  111.72
    6019  111.04 6069.49  111.91 6087.31  112.52 6128.89  112.76 6143.58   113.3
 6150.51  112.96 6174.73  113.19 6198.96  114.76 6209.09  114.55 6233.56  115.18
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 6250.67  114.14 6268.16  112.36  6292.4  112.11 6313.16  112.41 6347.76  111.95
  6361.6  112.91 6396.21  111.62 6405.11   111.9 6411.05  111.46 6427.36   111.4
 6444.66  110.81 6475.81  110.59 6506.95  110.86 6517.98  110.51 6531.18  109.37
 6545.02   109.2 6565.79  109.85 6583.33  109.55 6621.15  110.51 6638.45  109.16
 6669.46  109.35 6700.75   109.3 6721.51  109.79 6738.81  109.66 6758.56  110.27
 6787.27  110.18 6808.03   110.9 6818.41  112.39 6839.17  112.95 6853.02  113.75
 6870.32  112.83 6884.16  112.63    6898  111.03 6911.86  110.76  6925.7  111.16
 6936.08  112.21 6946.46  111.71 6963.77  110.28 6977.61  110.92 6994.91  112.28
  7005.3  111.79 7060.68  110.74 7074.52  111.79 7100.13  110.79 7112.59   111.1
 7122.97  111.98 7136.81  112.09 7147.65  112.95 7156.56  114.42 7164.51  114.71
 7181.81  113.63  7192.2  113.62 7205.18  111.32 7212.98  107.76 7215.57  105.75
 7233.73  102.91 7249.62  100.98 7274.16    98.7 7316.12   95.66 7343.04   94.78
 7355.71   93.88 7368.77    93.9 7393.71   92.43 7407.96   91.26 7434.88    87.7
 7470.71   90.43 7491.19   96.18 7520.87   97.08 7539.98   97.48 7549.54   98.08
 7559.09   98.11  7578.2   98.81 7597.31  100.54 7622.25  100.72 7642.72  104.91
 7672.82  108.41 7685.36  112.23 7700.51  111.44 7723.25  110.63 7764.94  111.91
 7772.52  111.78 7795.26  110.66 7805.23  110.79 7833.16  109.92 7854.41  110.51
 7874.85  110.71  7903.6  110.21 7925.11  109.56 7940.47  109.65 7949.69  111.35
  7958.9  111.42 7971.19  110.27 7983.47  106.91 7992.69   106.9 7998.82  108.35
 8008.04  112.86 8017.25  115.03 8029.53  114.05 8038.74  113.93 8057.17   113.1
 8069.46  113.38 8094.03  113.36 8178.05  113.73 8207.66  114.17 8216.87  114.96
 8231.12  114.76 8246.27  115.45 8253.72  115.32 8305.93  116.37    8352  116.48
 8413.42  117.38 8447.19  117.12  8468.7  117.36 8487.12  118.34 8493.25  117.94
 8505.54  116.08 8517.83  118.22 8536.25  116.96 8573.09   117.1 8585.38  118.18
 8591.52  116.85 8597.66  118.28 8606.87  117.28 8652.94  117.02  8677.5  117.11
 8735.84  116.91 8766.54  117.15 8800.33  117.08 8895.52  117.17 8966.14  117.07
 9024.48  117.25 9087.66  117.17 9187.23  117.55 9217.94  117.36 9279.35  117.21
 9334.62  117.26 9392.96  117.11 9466.65  117.16 9500.44  117.06 9564.92  117.05
 9592.56  117.15 9681.61  117.03 9727.67  117.65 9739.95  117.36 9819.79  117.06
 9853.57  117.27 9896.55  117.12  9933.4  117.16    9948  116.9910001.05  117.25
 10023.8  117.0710046.53  116.5410065.48  117.4210088.23  118.8510095.81  118.79
10118.54   117.2 10133.7  116.7110179.18  116.7710228.46  116.69 10289.1  116.86
10315.62  116.7210366.37  116.76   10437  116.6210476.91  116.38 10498.4  116.47
10544.47  116.3610556.75   116.510642.73  116.3410728.74   116.410796.96  116.34
10861.39  116.4310880.34  116.2610910.65  116.98 10933.4   117.310946.73  117.25
10962.08  119.2910971.29  119.3310978.94  117.4910989.14  116.6611009.54  116.56
11032.48   116.111045.23  114.8811078.37  114.6111086.02  115.4811101.31  115.59
11114.06  118.4411129.36  118.59 11142.1  118.2911172.69  115.4711185.44  116.18

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3430.43     .12 7249.62    .025 7597.31    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7192.2 7685.36          1754.79  1830.6 1749.92            .1       .3
Left Levee      Station=81.70667      Elevation=134.6333
Right Levee     Station=10971.29      Elevation=  119.33
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  2246.8 3471.96  110.53

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 178.80*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  129.52    6.45  127.95   22.58  127.98    25.8  129.82   37.63  133.39
   40.85  133.47   56.48  129.26   72.11  124.24    84.6  119.48  100.22  117.16
  108.88  116.91  141.52  117.02  168.97   116.6   197.1  117.48  225.26  117.37
  258.03  116.22  268.95   114.4  283.52  114.01  327.92  111.05  353.34  111.39
  384.58  111.01  393.96  111.46  418.96  110.85  437.71  111.12  450.21  110.84
  478.33   111.4  503.33  111.01  518.95  111.46  528.33  111.08  553.33  111.42
  565.83  110.51  581.46  110.16   612.7  111.27  622.08  110.88  640.83  111.04
  659.58  111.64  678.32  110.93  697.07  112.27   725.2  110.19  740.83  106.27
  756.44  105.91  794.08     106  816.28  108.06  831.44   108.2  840.81  109.07
  850.19  110.69  881.44  111.89  920.68  111.03  946.17   111.6  960.74  112.21
   975.3  113.34  993.93  113.59 1015.34  113.06 1031.44  113.03 1059.55  113.67
 1077.24   113.2 1103.31  113.65 1143.93  113.57 1159.55  113.82 1186.47  113.61
 1200.18  113.81 1209.55  113.37 1272.05  112.56  1313.9  112.92 1328.47  112.83
 1383.08  113.34 1431.42  114.03 1440.79  113.86  1474.1  114.43 1528.72  114.89
 1572.04  115.09 1603.28  114.71 1643.91  114.66 1678.28  115.38 1697.03  115.22
 1703.28  115.59 1725.33  114.42 1797.03  114.75 1809.53  114.42 1822.03  114.76
 1847.02  114.62 1862.65  115.18 1890.78  115.43  1918.9  115.34 1937.65  115.64
 1959.52  115.45 1984.53  115.93 1998.39  115.67 2034.52  115.56 2047.02  114.54
 2053.27   112.3 2062.64  111.21 2075.14   110.7 2103.27  110.79 2112.64  111.68
 2122.02  113.81 2125.14   113.4 2134.51  115.61 2140.76   115.3 2150.14  116.08
 2181.39  115.59 2206.38  115.56 2215.76  115.88 2247.01  115.39    2272  112.97
  2318.8  109.91 2344.28   108.8 2362.62  108.47 2390.75   108.7 2406.38  109.17
    2447   109.9 2500.12  109.07 2525.12  108.34 2590.74   108.2 2631.36  108.75
 2656.36  109.47 2678.24  110.99 2712.61  110.21 2725.11  110.62 2734.48  109.91
 2743.86  109.98 2778.23  108.74 2803.23  108.86  2837.6  108.73 2881.35  108.94
 2900.09  108.79 2946.97  109.35 2968.84  109.23 3000.09  109.75 3062.59  109.12
 3109.46   109.5 3131.33  109.23 3184.45  109.42 3246.95     110 3331.32  110.11
  3378.2  110.71 3396.94  110.41 3418.82  110.57 3468.81  110.23 3487.57  110.51
 3503.19  110.06 3531.31  110.52 3546.94  110.35 3564.02  110.87 3607.72  111.23
 3625.06  111.02  3651.4  111.31  3695.1  111.41 3734.43  111.91  3756.3  111.78
 3815.67  112.41 3821.92  113.08 3853.17  112.73 3893.79  114.19 3903.17  113.97
 3912.54  114.56  3931.3  113.59 3937.55  114.26 3964.53   115.2 3984.41  114.87
 4003.17  115.42  4015.5  113.98 4031.28  115.59 4048.53116.2337 4065.66  113.91
 4087.54  113.14 4093.79  114.43 4103.16  114.41 4134.41  113.09 4162.54  113.92
  4184.4  113.37 4203.15  113.96  4259.4  113.25 4268.77  113.56 4278.15  114.73
 4303.15  114.26 4312.53  113.45 4325.02  113.29 4368.77  113.49 4375.02  113.82
 4409.39  113.22 4440.65  113.66  4446.9  114.17 4462.52  113.59 4490.64  113.84
 4496.89  113.48 4509.39  114.67 4525.02  113.48 4537.52  114.07 4556.26  113.79
 4584.39  114.15 4593.76  113.59 4615.63  113.96 4640.63  113.28 4693.75  114.51
 4709.38  114.38 4731.26   115.1 4740.63  114.15 4756.26     114 4771.88   115.5
 4796.88  114.25    4825   113.8 4846.87  114.17 4868.75  115.33 4912.49  114.36
 4968.75  114.54 4978.12  113.34 4990.61  110.98 5009.37  109.77 5037.49  109.43
  5064.1  109.97 5089.58  110.02 5111.42   110.7 5146.86  111.26 5187.89  111.29
 5202.45  111.64 5227.93  111.36 5249.98  111.42 5293.47  112.18 5308.03     112
 5318.96  112.48 5337.48  112.48  5365.6  114.79 5371.85  114.26 5387.48  114.84
 5399.98  114.24 5412.48   112.8 5440.59  113.12  5453.1  114.96 5462.47  114.76
 5474.97  113.69 5487.47  114.35 5511.92  113.88 5531.22  112.72 5537.47     113
 5543.72  111.67 5562.47  112.24 5571.85  111.67 5590.59  111.37 5624.97  111.76
 5634.34  111.35 5662.46  111.57 5681.21  112.37 5687.46  112.08 5718.71  112.22
 5737.46  112.73 5753.08  112.74 5778.08  113.64 5809.33  113.78 5821.83  113.07
  5839.6   113.2 5846.88  113.97 5857.82  116.53 5868.74  117.22 5879.66  116.58
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 5897.86  116.68  5931.2  114.87 5953.07  113.96 5984.32   113.7 5999.95  112.97
 6012.45  112.96 6031.19  112.18 6056.19  112.64 6062.45   112.4  6081.2  113.54
 6090.57  113.66 6103.06  113.05 6115.56  113.23 6124.94  114.38 6137.44  113.53
 6162.44  113.18 6171.82  114.13 6184.31  113.25 6215.56   113.4 6228.06   114.3
 6262.43  114.82 6278.06  114.65 6287.44  113.29  6321.8  114.43 6340.55  114.64
 6359.31  115.65 6374.93  115.31 6403.05   114.6 6451.27  115.15 6468.68  116.29
 6487.42  115.93 6506.17  116.72 6531.18  116.15 6549.58  114.84 6562.42  114.66
 6596.92  115.21 6634.29  114.54 6656.17  115.52 6684.29   114.7 6693.66  115.28
 6699.91  114.45 6709.29  114.84 6740.54  114.55 6765.54     114 6800.81  114.17
 6812.41  114.01 6824.91  112.46 6840.53  111.97 6871.78  112.63 6881.16  112.22
 6903.03   113.2 6920.96  113.16 6934.28  112.02 6971.93  112.44  7004.7  111.89
 7044.74  112.16 7065.52  112.76 7095.72  112.21 7117.56  112.71 7131.15  113.69
  7164.9  114.08 7197.67  113.58 7212.23  112.73  7226.8  112.46 7252.29  113.16
 7281.42  112.21 7314.19  113.36 7343.32  112.95 7365.51  112.23 7393.63  111.99
 7412.39  112.27 7424.89  110.81 7448.92  111.35 7462.38  111.22 7474.88  111.97
 7484.26  114.78 7506.13  115.42 7521.75  114.74 7531.32  112.55 7538.97  108.39
 7552.35  104.47 7562.13103.2716 7566.37102.7521 7576.18  101.55 7607.28   95.87
 7622.83   93.86 7651.87   92.41 7680.75   90.53 7700.59   88.63 7729.92   90.77
 7737.26   90.88 7749.48   92.33 7759.25   94.09 7788.59   95.52 7808.14   96.21
 7817.92   97.36  7827.7   97.38 7850.5899.25404  7866.8  102.05 7892.32   102.4
 7913.28  104.72 7924.03105.4948 7944.08  106.94  7956.9  112.57 7964.08112.3779
 7971.03   111.1 7992.25  109.65 8009.92  110.79 8016.99  110.77 8031.12  112.27
 8038.19     112 8059.41  109.74 8073.55  110.05 8094.75  108.48 8112.43  109.13
 8133.64  110.32 8154.84  109.47 8180.51  108.97 8194.84  109.02 8203.44  109.87
 8223.48  109.31 8234.93  107.59 8249.26  108.26 8257.85  110.48 8266.44  111.54
  8277.9  111.01 8303.68  110.55 8315.13   110.7 8416.41  110.82  8465.9  111.77
 8480.03  113.62 8578.64  114.29 8635.93  114.95 8667.43   114.8 8687.48  114.99
 8704.66  115.52 8721.85  114.34  8733.3  115.38 8750.48   114.8 8784.85  114.98
  8796.3  115.53 8802.03  114.87 8807.76  115.58 8816.35  115.08 8844.12  115.16
 8925.18  115.11 9042.06  115.49 9158.71  115.58 9205.83  115.84 9264.75  115.88
 9314.24   116.2 9349.58  116.66 9413.21  116.35 9549.49  116.22 9618.22  116.28
 9709.87  116.12  9818.7  116.15 9861.65  116.48 9897.47  116.18 9947.57  116.09
 9975.23  116.2110019.17  116.0210045.93  116.0810067.14  115.8510102.49  116.11
10113.09  115.7710116.63  116.4310137.84  116.1210159.04  114.9610176.72  116.73
10183.79  118.0810197.93  119.74   10205   119.6 10226.2  116.4210240.34  115.55
10275.69   115.410282.75  115.6410328.71  115.5810385.27  115.93   10410  115.71
10473.64  115.9210560.43  115.5610623.44  115.5110650.37  115.7310742.28  115.54
10770.55  115.77 10795.3  115.6210805.91  115.9110858.92  115.6610919.01  115.98
10936.69  115.6210964.96  117.0410986.17  117.7510998.61  117.7811012.93  118.86
11021.52  118.9211034.26  117.1811048.84  116.6611074.34  114.9411098.01   114.6
 11114.4  114.9611123.51   116.311143.54  116.19 11165.4  114.7411174.51  115.08

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154  7956.9    .066 7992.25    .015 8223.48    .066 8266.44    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7521.75  7956.9          1754.79  1830.6 1749.92            .1       .3
Left Levee      Station=40.85333      Elevation=133.4667
Right Levee     Station=11021.52      Elevation=  118.92
Blocked Obstructions     num=       2
   Sta L    Sta R    Elev   Sta L   Sta R    Elev
 6812.41 7521.75  114.01  7956.9   10000  112.57

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 178.5

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   132.3    16.4  127.63    32.8  122.29   45.91  117.23   62.31  116.36
   68.87  117.07  134.46  116.66  163.98   117.5  170.54  116.97  203.33  117.24
  226.29  117.91  236.13  117.39     305  117.25  327.96   117.7  360.75  117.13
  370.59  117.79  396.83  116.88  416.51  117.28  429.62  116.86  459.14   117.7
  485.38  117.11  501.77  117.78  511.61   117.2  537.85  117.71  550.97  116.37
  567.37  115.86  590.32  116.76  600.16  117.53     610  116.93  629.68  117.17
  649.36  118.23  669.03  117.09  688.71  119.05  718.23  115.86  734.63  109.95
  751.02  109.37  829.73  109.59  839.57  110.79  849.41  113.12  865.81  114.15
  882.21  114.59  924.84  112.83  967.48  113.08  987.15   112.6 1000.27  113.24
 1013.39  112.76 1039.63  112.77 1049.47  113.43  1059.3  113.14 1069.14  113.74
  1092.1  112.86 1115.06  113.67 1138.01  113.67 1147.85  114.15 1157.69  113.53
 1174.09  113.88 1203.61  113.63 1216.73   113.9 1226.56  113.22 1239.68  113.24
 1272.48  112.25 1292.16  111.96 1321.67  112.23 1347.91  112.17 1400.38  112.83
 1459.42  114.11 1469.25   113.8 1515.17  114.68 1531.57  114.63 1564.36  115.25
    1607  115.59 1639.79  115.08 1682.43  114.98  1718.5   115.9 1738.18  115.47
 1744.74  115.85 1757.86  114.81 1774.26  114.51 1843.13  115.07 1856.25  114.55
 1869.37  115.16  1895.6  114.93    1912  115.74 1931.68  115.57 1941.52  115.98
 1971.03  115.97 1990.71  116.48 2013.67  116.16 2039.91  116.77 2046.46   116.5
 2092.38  116.23  2105.5  114.68 2112.06  111.32 2121.89  109.67 2135.01  108.91
 2164.53  109.13 2174.37  110.45 2184.21  113.64 2187.49  113.01 2197.32  116.32
 2203.88   115.8 2213.72  116.84 2246.52  116.06 2272.75   116.1 2282.59  116.57
 2315.39  115.76 2341.62  112.14 2354.74  111.06 2384.26  109.78 2436.73  109.04
 2466.25  109.39 2482.65  110.09 2525.28  111.19 2581.03  109.95 2607.27  108.85
 2676.14  108.64 2718.77  109.47 2745.01  110.55 2767.97  112.82 2804.04  111.66
 2817.16  112.27    2827  111.21 2836.84  111.31 2853.23  110.19 2872.91  109.45
 2899.15  109.63 2935.22  109.44 2981.14  109.75 3000.81  109.52 3050.01  110.37
 3072.96  110.19 3105.76  110.96 3171.35  110.02 3220.54  110.59  3243.5  110.19
 3279.58  110.53 3299.25  110.47 3364.84  111.34  3387.8  111.06 3397.64  111.39
 3423.88  111.28 3453.39   111.5 3502.59  112.41 3522.26  111.96 3545.22   112.2
 3597.69  111.68 3617.37   112.1 3633.77  111.43 3663.28  112.02 3679.68  111.54
 3699.36  111.71  3709.2  111.32 3719.04  111.92 3751.83  111.92 3761.67  111.61
 3814.14  112.25 3827.26  112.15 3876.46  112.55 3899.41  112.29 3925.65  112.39
 3961.72  112.95 3968.28     114 3978.12  113.39 3987.96  113.76 4001.08  113.35
 4007.64  113.88 4043.71  114.69 4053.55  114.13 4063.39  114.84 4083.07  113.52
 4089.63  114.42 4132.26  116.21 4138.82   115.5  4158.5  116.12 4178.18   114.8
 4188.01  116.65 4201.13  116.93 4207.69  117.81 4217.53   115.3 4224.09  114.56
 4247.05  113.69 4253.61  115.65 4263.44  115.93  4286.4  114.51 4296.24  114.29
 4325.76  115.71 4348.71  114.89 4368.39  115.77 4378.23  115.11 4388.07  115.55
 4427.42  114.89 4437.26   115.3  4447.1  116.95 4473.34   116.2 4483.18  114.94
 4496.29  114.65 4542.21  114.99 4548.77  115.46 4584.84  114.42 4597.96  115.06
 4617.64  115.21  4624.2  115.97  4640.6   115.1 4656.99     115 4670.11  115.49
 4676.67  114.89 4689.79  116.66 4706.19  114.95 4719.31  115.83 4738.98  115.36
  4768.5  115.83 4778.34  114.98 4801.29  115.57 4827.53  114.57 4853.77  115.61
 4883.28  116.39 4899.68  116.19 4922.64  117.25 4932.48  115.79 4948.88   115.5
 4965.27  117.72 4971.83  117.73 4991.51  115.89 5021.03  115.35 5043.98  115.78
 5066.94  117.49 5093.18  116.66 5103.02  116.81 5112.85  115.98 5135.81  116.25
 5171.89  116.12 5181.73  114.35 5194.84  110.95 5214.52  109.13 5244.04  108.49
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 5253.88  108.93 5286.67  108.84 5358.82  110.62 5375.22  110.25 5457.21  110.18
 5467.05  109.96 5493.29  110.59 5526.08  110.45 5558.88  111.58 5588.39  114.53
 5594.95  113.72 5611.35  114.94 5624.47  114.75 5637.59  113.86 5644.15  114.13
  5667.1  113.63 5680.22  115.63 5690.06  115.07 5703.18  113.36  5716.3  114.27
 5729.42  114.36 5742.53  113.55 5762.21  113.41 5768.77   114.6 5775.33  113.38
 5781.89  114.44 5795.01  115.02 5804.85  114.17 5824.52  113.76 5850.76  113.95
  5860.6  114.42 5870.44  113.82 5899.95  114.19 5919.63  115.37 5926.19  114.93
 5958.99  114.78 5978.66  115.69 5995.06  115.53  6021.3  116.27 6031.14  115.86
 6054.09  116.75 6067.21  116.17 6080.33  116.78 6086.89  116.32 6139.36  116.42
 6155.76  117.47    6182  117.16 6195.12  117.37 6204.95  116.64 6237.75  116.52
 6254.15  115.44 6267.27  115.61 6286.94   114.5 6313.18  115.33 6319.74  114.99
 6339.42  116.76 6349.26  116.94 6362.37  115.99 6375.49  116.23 6385.33  117.94
 6398.45  116.63 6424.69  116.11 6434.53  117.41 6447.64  115.91 6480.44   115.8
 6493.56  117.12 6529.63  117.84 6546.03  117.58 6555.87  115.54 6591.94  117.16
 6611.62  117.37  6631.3  118.79 6637.86  117.88  6647.7  118.13 6677.21  116.43
 6739.53  117.27 6746.09  118.13 6765.76   117.3 6785.44  118.26 6798.56  117.71
 6811.68  118.15 6818.24  117.56 6844.47  117.07 6883.83  118.08  6919.9  117.09
 6942.86  118.36 6972.38  117.79 6982.21  118.66 6988.77  117.43 6998.61  118.14
 7031.41  118.27 7057.65  117.41 7106.84  117.51 7119.96  115.49 7136.35  114.75
 7169.15  115.43 7178.99  114.89 7201.95  116.33 7221.62  115.78 7234.74  114.65
  7274.1  115.54 7306.89  114.52 7329.85   114.1 7372.48  115.25 7395.44  114.21
  7418.4  114.29 7441.36  114.88 7474.15  114.41 7520.07  114.55  7546.3  114.07
 7611.89  114.17 7647.97  114.61 7664.37  114.46 7687.32  113.32 7703.72  113.78
 7716.84  112.63 7736.52   113.2 7749.64  110.84 7762.75  111.01 7788.99  110.39
 7802.11  110.98 7811.95  115.13 7834.91  116.77  7851.3  115.85 7857.86  113.63
 7870.98  106.04  7886.3  103.45  7906.3   95.55  7916.3   92.55  7946.3   89.95
  7966.3   89.55  7996.3   91.55  8016.3   90.95  8026.3   91.95  8046.3   92.95
  8056.3   93.95  8076.3   94.95  8086.3   96.65  8096.3   96.65  8116.3   98.55
  8136.3  103.55 8212.05  105.12 8215.33  105.47 8228.45  112.92    8235  112.68
 8241.56  110.77 8261.24  108.67 8277.64  110.29  8284.2  110.13 8297.31  112.62
 8303.87  112.21 8323.55  108.82 8336.67  109.38 8356.34  107.05 8372.74  107.87
 8392.42  109.92 8412.09  108.73 8431.77  108.39 8471.12  108.39 8530.16  107.93
  8585.9   108.1 8654.77  107.91 8700.69  108.79  8713.8  111.78  8746.6  111.96
    8763  111.74 8854.82  112.52 8881.06  112.44 8920.41  112.72 8949.93  112.53
 8992.56  112.87 9038.47  112.89 9051.59  113.22 9136.85  113.18 9235.24  113.83
 9343.46  114.08 9412.33  114.62 9441.85  114.59 9487.76  115.04 9520.55  115.78
 9579.58  115.38 9681.25   115.3 9769.79  115.41  9832.1  115.17 10009.2  115.31
10028.87  115.0510101.02  115.1710137.09  114.9210166.61  114.9810186.29   114.7
10219.08  115.0810228.92   114.6 10232.2   115.610251.88  115.1610271.55  113.37
10287.95  116.0510294.51  118.0910307.63  120.6410314.19  120.4110333.86  115.65
10346.98  114.3810379.78  114.1410386.33   114.510428.97  114.4810481.44  114.99
10504.39   114.710563.43  115.1710602.78  114.8710665.09  114.66   10711  114.67
 10727.4  114.9910812.67  114.74 10838.9   115.110861.86  114.85 10871.7  115.27
10920.89  114.9810976.64  115.5410993.04  114.9811019.27  117.0911038.95  118.21
11071.74  118.5111088.14  116.7511097.98  115.1511134.05  114.1411163.57  113.99

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154  7851.3    .066  7886.3    .015  8136.3    .066    8235    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7851.3 8228.45         1087.82    1400 1513.92             .1       .3
Left Levee      Station=       0      Elevation=   132.3
Right Levee     Station=11071.74      Elevation=  118.51
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7664.37 7811.51  114.94    8235 8854.82  112.52

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            132.07    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                 0.154      0.037      0.061
  W.S. Elev (ft)            131.98    Reach Len. (ft)          1087.82    1400.00    1513.92
  Crit W.S. (ft)            118.78    Flow Area (sq ft)       139518.80   12809.16   51891.78
  E.G. Slope (ft/ft)      0.000104    Area (sq ft)            139518.80   12809.16   51891.78
  Q Total (cfs)           235000.00    Flow (cfs)              93272.66   54751.95   86975.38
  Top Width (ft)          11162.46    Top Width (ft)           7850.19     377.15    2935.12
  Vel Total (ft/s)            1.15    Avg. Vel. (ft/s)            0.67       4.27       1.68
  Max Chl Dpth (ft)          42.43    Hydr. Depth (ft)           17.77      33.96      17.68
  Conv. Total (cfs)       23068850.0    Conv. (cfs)             9156141.0   5374743.0   8537966.0
  Length Wtd. (ft)          1315.72    Wetted Per. (ft)         7865.48     384.91    2955.24
  Min Ch El (ft)              89.55    Shear (lb/sq ft)            0.11       0.22       0.11
  Alpha                        4.13    Stream Power (lb/ft s)      0.08       0.92       0.19
  Frctn Loss (ft)              0.13    Cum Volume (acre-ft)    265274.90   84337.12   271335.90
  C & E Loss (ft)              0.00    Cum SA (acres)           27404.14    3290.76   28980.93


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 178.23*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  130.68    8.75  132.95   21.95  130.22   35.15  126.41   54.52  119.49
   70.87  117.18  124.25  115.64  172.23  114.52  178.77  114.03  211.46  113.92
  234.35  114.49  246.35  114.39  262.85  115.02  282.65  116.58  319.38116.6406
  328.85  116.82  368.45   116.1  378.22  116.56  404.38     116     424  116.31
  437.07  116.03  464.15  116.58  492.66   116.1     509   116.5  518.81  116.09
  544.97  116.43  558.05  115.56   574.4  115.28  607.09  116.37   616.9  115.99
  636.52  116.14  656.14  116.82  675.76  116.06  695.38  117.36  724.81  115.28
  741.16  111.33   757.5  110.83  790.84  110.98  835.97  110.94  845.78   111.8
  855.59  113.31  871.94  113.93  888.29  114.16  906.34  113.51  922.84  112.13
  936.04  111.46   973.3  111.66  992.91  111.37 1005.99  112.18 1040.45112.0571
 1074.66   112.6 1097.55  112.05 1120.44  112.63 1143.32  112.78 1153.13  113.13
 1162.94  112.76 1200.04  112.61  1221.8   112.8  1231.6  112.41 1244.68  112.55
 1256.14  112.11    1297  111.49 1325.44  111.72 1352.58  111.66 1398.04  112.01
 1463.76  112.97 1473.56   112.8 1516.84  113.44 1553.14  113.65 1592.74  114.42
 1629.04  113.96 1648.84  114.08 1665.34  113.76 1678.54   113.9 1698.34  114.75
 1728.04  114.36 1748.22   114.7  1761.3   113.1 1777.65  112.63 1846.31  112.98
 1859.39  112.65 1883.14  113.12 1898.62  112.86 1914.97  113.39 1939.24  113.59
 1965.64  113.53 1998.64  113.86 2016.33  113.69 2042.49   114.1 2054.74  113.87
 2094.81  113.71 2107.89  112.69 2114.43  110.46 2124.23  109.38 2137.31  108.88
 2166.74  109.01 2176.55  109.89 2186.36  111.98 2189.63  111.55 2199.43  113.77
 2205.97  113.45 2215.78  114.18 2248.48  113.65 2274.63  113.68 2284.44  113.99
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 2317.14  113.51 2343.29  111.01 2356.37  110.29  2385.8  109.51 2438.11  109.02
 2467.24  109.15  2483.9  109.68  2526.4  110.43 2581.98  109.59 2608.14  108.85
  2676.8  108.77 2718.03  109.27 2737.83  109.95 2747.73  111.61 2757.63   112.5
 2774.13  112.78 2804.32  112.26  2817.4  112.45 2827.21  111.56 2837.02  111.62
 2863.23  110.57 2916.03   110.4 2949.03  110.43 2975.43  111.06 3000.49   110.8
 3061.23  111.59 3074.43  111.28 3087.63  111.69 3133.83  111.77 3166.83  110.56
 3183.33   111.4 3189.93  110.98 3213.03  110.95 3229.53  109.63 3242.45  109.48
 3298.03  109.67 3363.42  110.25 3386.31  110.06 3396.12  110.28  3451.7  110.36
 3500.75  110.96 3520.37  110.66 3552.93  111.14 3595.57   110.8 3615.19  111.05
 3631.54  110.62 3660.96  111.06 3677.31  110.73 3696.93   110.8 3706.74  110.52
 3716.55  110.93 3749.24  110.95 3759.05  110.75 3811.36   111.2  3873.5  111.36
 3922.54  111.26  3958.5  111.65 3965.04  112.35 3974.85  111.95 3997.74  111.94
 4004.28  112.31 4040.24  112.93 4050.05  112.68 4059.86  113.57 4079.48  113.56
 4086.02   114.4 4113.93  115.26 4135.06  115.07 4154.68  115.42  4174.3  114.58
  4184.1  115.89 4197.18  116.03 4203.72  116.62 4213.53  114.97 4220.07   114.5
 4242.97     114 4249.51  115.29 4259.31  115.43 4292.01  114.26 4321.44  115.22
 4344.32  114.71 4363.94  115.44 4373.75  115.01 4384.53  115.18 4422.79  114.89
  4432.6   115.2 4442.41  116.19 4468.57   115.7 4478.38  114.85 4491.45  114.63
 4537.23  114.85 4543.77  115.27 4579.73  114.42 4592.82  114.88 4612.44  115.02
 4618.98  115.55 4651.67  114.97 4664.75  115.43 4671.29  115.17 4684.37  116.28
 4700.72  114.91  4713.8  115.45 4733.41  115.19 4762.84  115.44 4772.65  114.91
 4795.53  115.27 4821.69  114.62 4856.44  115.59 4877.27   115.8 4893.62  115.67
 4916.51  116.37 4926.32   115.4 4942.68  115.22 4959.02  116.73 4965.56  116.75
 4985.18  115.53 4998.34  115.29 5037.49  115.41 5060.38  116.71 5086.54  116.01
 5096.35  116.11 5106.15  115.55 5129.04   115.9 5165.01  115.68 5174.82   114.6
 5187.89  112.28 5207.51  110.89 5236.94  110.17 5265.65  110.01 5298.65  110.51
 5311.85   111.1 5364.65  111.05 5387.75  109.51 5449.47  109.48 5459.28  109.33
 5485.44  109.75 5518.13  109.66 5550.83  110.41 5580.25  112.38 5586.79  111.84
 5603.14  112.65  5629.3  111.93 5635.84  112.11 5658.73  111.78 5671.81  113.11
 5681.62  112.74  5694.7   111.6 5707.78   112.2 5720.86  112.26 5733.93  111.72
 5753.55  111.63 5760.09  112.42 5766.63  111.61 5786.25  113.79 5806.86  115.64
 5829.96  114.61 5851.64  114.89 5861.45  114.44 5890.87  114.85 5910.49  115.63
 5917.03  115.33 5949.73  115.12 5969.34  115.71 5985.69  115.65 6011.85  116.11
 6021.67  115.85 6044.55  116.44 6057.63  116.04 6070.71  116.49 6077.25  116.21
 6129.56   116.2 6145.91  116.89 6172.07  116.68 6185.15  116.87 6194.95  116.38
 6227.65   116.3    6244  115.74 6257.08  115.72 6272.17  115.16 6309.39  115.77
 6321.67  116.51 6338.82  116.67  6351.9  116.07 6364.98   116.1 6374.79  117.15
 6387.87  116.35 6414.03  116.02 6423.84  116.85 6436.91  115.83 6469.61  115.86
 6482.69  116.65 6518.65  117.22    6535  117.03 6544.81  115.71 6580.77  116.88
 6600.39  116.88 6620.01  117.75 6626.55  117.19 6636.36  117.31 6665.78  116.15
 6727.92  116.83 6734.46   117.5 6754.07  116.88 6773.69  117.37 6786.77  116.97
 6799.85  117.33 6806.39  116.97 6832.54  116.58 6871.78  117.23 6907.74  116.55
 6930.63  117.41 6960.06     117 6969.86  117.62  6976.4  116.82 6986.21  117.25
 7018.91  117.32 7054.29  116.89 7094.12  117.04 7110.39  115.53 7133.49  116.11
 7143.39  115.88 7166.05  114.09 7188.94  114.19 7208.55  113.77 7221.63  113.04
 7260.87   113.6 7278.69  113.18 7316.45  112.66 7364.49  113.31 7381.84  112.69
 7427.62  113.26  7456.9  112.93  7476.7  113.15  7516.3  113.08    7546  113.59
  7572.4  112.58  7585.6  111.83  7615.3  111.62 7633.61  111.71  7664.8  111.33
 7672.84  110.96 7689.19  111.25 7702.27  110.54 7721.89  110.94 7734.97  109.33
  7763.8  109.64 7774.21  109.39 7787.29  110.16  7797.1  113.48  7806.7  115.16
 7819.99  116.25 7836.33  115.63 7839.86  114.64 7846.94  110.89 7870.02  105.41
 7873.33105.1185 7896.25   103.1 7930.05   96.38 7947.62   93.67 7955.13 93.0989
 7986.28   90.73 7998.98   89.98 8033.22   89.18 8056.33   90.61 8071.73   90.27
 8117.94   93.45 8125.64    94.7 8137.6795.30705 8148.74   96.45 8164.14  100.11
 8177.15  101.48 8184.59  100.96 8192.03  102.02 8214.37  102.89 8225.01  106.07
 8227.57108.0017 8235.11  113.69 8240.62113.5607 8246.19  112.31 8262.82  110.99
 8276.68  112.04 8282.23  111.87 8293.31  113.54 8298.85  113.32 8315.49  111.13
 8326.58  111.53  8343.2  109.95 8357.06  110.44  8373.7  111.85 8389.76   110.8
 8406.95   110.6 8462.12  110.64 8477.63   110.3 8518.98  110.33 8570.68  109.66
 8595.43  109.62 8634.24  109.98 8645.32  111.93 8686.91  111.78 8764.51  112.01
 8819.95  112.01  8844.9  111.78 8880.93   111.9 8919.73  111.81 8930.82  111.97
 8979.01  111.82 9086.04  112.14 9177.51  112.24 9235.71  112.68 9260.66  112.69
 9299.47  113.01 9327.18   113.5 9377.07   113.3    9463  113.25 9537.84  113.37
  9590.5  113.28 9650.97  113.34 9723.34  113.57 9756.81  113.37 9817.79  113.48
 9873.23  113.39 9889.86  113.21 9917.57  113.46 9925.89  113.14 9928.66  113.81
 9945.29  113.52 9961.92  112.32 9975.78  114.11 9992.41   117.2 9997.96  117.06
10014.58  113.9110025.67  113.0610053.39  112.9310058.93  113.1910139.32  113.37
10158.71  113.1810208.61   113.610240.24  113.5910276.42  113.9310333.34  114.11
 10347.2  114.3610384.96  114.1610419.27  114.2910441.44  114.6810460.84  114.56
10469.16  114.8510510.74  114.7710557.86  114.9810571.72  114.5410602.05   116.6
10622.74  118.3410638.23  118.9710656.66  116.75   10682  116.1110702.73  116.03

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154 7836.33    .066 7896.25    .015 8177.15    .066 8235.11    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7836.33 8235.11          1087.82    1400 1513.92             .1       .3
Left Levee      Station=8.746667      Elevation=132.9467
Right Levee     Station=10641.51      Elevation=  119.04
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7110.39 7836.33  115.53 8235.11 8645.32  111.93

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 177.97*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  129.06   13.12  133.04   17.49  133.59   30.65  131.91   43.81  128.46
   63.13  121.75   79.43  118.01   86.58  116.98  116.19  115.52  132.64   114.5
  158.96  113.29  168.83  112.34     187   111.1  201.73  110.66  234.63  110.65
  254.37   111.4   277.4  113.49  290.56  115.85  318.77115.9255  336.62  116.08
  346.49  115.44  376.06  115.07  385.84  115.33  411.93  115.13  431.49  115.34
  458.35  115.15  471.51  115.52  499.94  115.09  516.23  115.23  526.01  114.98
  552.09  115.15  563.63  114.77  593.24   114.8  603.11  115.13  643.37   115.1
  662.93  115.42  682.48  115.03  702.04  115.67  721.55  114.84  731.38  114.69
  747.68   112.7  763.98   112.3  797.21  112.49  842.21   112.3  861.77   113.5
  894.37  113.72  912.36  113.17  918.94  112.66  928.81  111.09  941.97  110.05
  971.58  110.31  988.03  110.06 1004.48  110.33 1014.35  111.33 1038.46111.4544
 1050.84   111.3 1080.17  111.46 1116.34   111.3 1158.41  112.12 1205.17  111.52
 1218.33  111.92 1236.64   111.6 1251.23  111.86  1261.1  111.32 1301.85  111.03
 1330.19  111.22 1343.35  111.09 1376.25  111.31 1402.57  111.27 1412.44   111.5
 1445.34  111.56  1458.5  111.83 1474.95  111.69 1488.11  112.32 1494.69  112.05
 1521.01  112.24 1527.59  112.72 1540.75  112.29  1557.2  112.34 1596.68  113.39
 1606.55  112.89 1632.87  112.61 1652.61  113.09 1669.06  112.49 1682.22  112.81
 1701.96  114.21 1724.99  112.89 1748.02  113.76  1754.6  113.25 1761.18  111.62
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 1777.63  110.77 1873.04  110.81  1886.2  111.18 1901.64  110.79 1928.97  110.98
 1942.13  111.41    1952  111.03 1961.87  111.37 1968.45  111.08 1981.61   111.3
 2037.54  111.19 2057.28  111.28 2097.23  111.18 2110.27   110.7 2116.79   109.6
  2139.6  108.85 2168.94   108.9 2178.73  109.33 2188.51  110.32 2191.77  110.09
 2201.54  111.21 2217.84  111.52 2234.94   111.3 2276.51  111.26 2286.29   111.4
 2318.89  111.27 2344.96  109.89 2366.54  109.38  2412.6  109.02 2425.76  109.16
 2468.53  108.92 2488.27  109.32 2527.51  109.67 2582.93  109.23 2609.01  108.84
 2636.31  108.79 2718.56   109.1  2738.3  109.66 2748.17  112.45 2758.04  113.24
 2767.91  112.67 2774.49  112.92 2794.23  112.72 2810.68  113.09 2827.41  111.92
 2846.87  111.93 2863.32  111.33 2873.19  111.58 2906.09  111.14 2929.12  111.05
 2948.86  111.32 2975.18   112.4 3000.17  112.09 3024.53  112.22 3060.72   112.9
 3073.88  112.33 3087.04  112.84 3096.91  112.62  3133.1     113    3166  111.05
 3175.87  112.44 3182.45  112.64 3189.03  111.72  3198.9  111.89 3212.06  111.38
 3228.51  108.85  3241.4  108.78 3296.81  108.87    3362  109.16 3450.02  109.21
 3498.92  109.52 3537.77  109.43 3550.93  110.18 3577.25  109.84 3613.01  109.99
 3629.31  109.82 3658.64   110.1 3704.28  109.73 3714.06  109.93 3756.43  109.88
 3808.59  110.16 3840.45  110.07 3870.53  110.17 3919.42  110.13 4000.92  110.73
 4047.72  111.29 4056.33   112.3 4075.89   113.6 4083.91  114.51 4093.78  114.87
 4110.23  114.92  4120.1  114.35 4133.26  114.85 4170.43  114.36  4180.2  115.14
 4199.76  115.42 4216.06  114.45 4238.88   114.3  4245.4  114.94 4271.44  114.67
 4287.77  114.24 4317.12  114.72 4339.93  114.53 4363.56  115.17 4380.01  114.82
 4418.16  114.89 4432.65   115.4  4463.8  115.19 4478.72  114.59 4501.75  114.78
 4514.91  114.57 4532.26  114.71 4538.78  115.09 4560.97  114.48 4574.63  114.41
 4607.23  114.84 4630.05  115.33 4639.93  114.96 4653.09     115 4678.95   115.9
 4695.25  114.88 4712.31  115.13 4732.05  115.04 4745.21  115.33 4766.96  114.84
 4789.77  114.98 4815.85  114.67 4834.04  114.79 4850.49  115.34 4887.57  115.14
 4910.39  115.49 4920.17     115 4936.03  114.91 4942.61  115.55 4965.64  115.75
 4991.96  114.92    5015  115.38 5024.87  114.99 5041.32  115.32 5053.82  115.92
  5079.9  115.37 5103.83  115.14 5123.57  115.56 5133.44  115.31 5158.13  115.25
 5172.92  114.52 5182.79  113.51 5192.66  113.37 5205.82  112.29 5225.56  112.24
 5238.72  111.25 5258.46  111.14 5271.62  111.89 5291.36  111.71 5304.52  112.55
  5311.1  112.13 5320.97  112.32 5330.84  111.73 5347.29  111.43 5357.16  111.78
 5363.74   111.3 5373.61  109.24 5380.19  108.79 5441.73  108.77 5477.59  108.91
 5510.18  108.86 5542.78  109.24 5572.12  110.22 5578.64  109.95 5594.94  110.36
 5650.35  109.92 5663.39  110.59 5686.21  109.83 5712.29  110.17 5744.89  109.85
 5751.41  110.25 5757.93  109.84 5771.71  110.98 5788.16  115.45 5801.32  117.47
  5807.9  116.12 5821.06  115.35 5842.68  115.35 5853.96  115.06 5870.41  115.48
 5901.35  115.89 5940.48  115.46 5985.57  115.93 6012.19  115.84    6035  116.12
 6048.04  115.92 6061.08   116.2 6084.27  116.01 6119.76  115.98 6136.06   116.3
 6156.65  116.19 6175.18  116.37 6184.95  116.11 6232.32  116.09 6261.93  115.56
 6278.38  115.81 6311.28  116.93 6321.15  116.25 6328.39   116.4 6354.46  115.98
 6364.24  116.36 6377.28  116.07 6403.36  115.93 6413.14  116.28 6426.17  115.76
 6442.89  115.79 6452.76  116.14 6462.63   115.9 6492.24  116.51 6523.97  116.48
 6533.75  115.88 6551.46  116.09 6567.91   116.6 6589.16  116.38 6608.73  116.72
 6654.36  115.88 6692.93  116.26  6702.8  116.74 6712.67  116.27 6729.12  116.95
 6742.37  116.46 6774.97  116.23 6788.02  116.51 6820.61  116.09 6850.85   116.4
 6895.58  116.01  6918.4  116.47 6947.74  116.21 6957.51  116.57 6964.04  116.21
 7031.81  116.43 7041.68  116.35 7061.42   116.7 7081.39  116.57 7097.61  115.72
 7114.06  117.16 7120.64  117.27 7130.51  116.59 7153.11  113.29 7169.99     112
 7175.93  112.05 7208.52  111.44 7247.64  111.66  7265.4  111.38 7303.05  111.21
 7350.94  111.61 7373.97  111.12    7397  111.57 7420.04  111.59  7429.9  111.83
 7443.07  111.41 7462.81  111.85 7482.55  111.56 7502.29  111.79 7512.16  112.39
  7531.9  113.08 7541.77  111.93 7558.22  111.02 7571.38  109.51 7600.99  108.85
 7637.18  108.63 7650.34  108.93 7660.21  108.56 7674.67  108.72 7687.71  108.45
 7707.27  108.68 7720.31  107.83 7742.46  108.25 7749.04  108.65 7758.91  108.37
 7772.46  109.34 7791.81   114.5 7804.97  115.72 7821.35   115.4 7826.36  114.14
 7831.37  110.51 7836.38  108.03 7860.37105.7566 7869.06  104.77  7906.2  102.74
 7923.14  100.87  7946.6 97.8594 7966.43   96.27 7979.57   94.74 8033.67   90.86
 8060.73   89.66 8100.15   88.82 8116.35   89.67 8127.16   89.59 8139.05 90.4521
 8159.57   91.94 8181.18   94.36 8194.15   96.83 8201.11   99.05 8206.33   97.82
 8211.55   99.73 8227.22  100.89 8233.82106.0042 8241.77  114.46 8246.23114.2334
 8264.41  113.31 8280.26  113.61 8289.31  114.46 8307.42  113.44 8316.48  113.69
 8330.06  112.85 8341.39  113.02 8354.97  113.77  8368.1  112.84 8382.14  112.81
  8427.2  113.08 8439.87  112.55 8460.99  112.41 8473.64  112.62 8490.53  111.91
 8515.88  111.32  8541.2  111.39  8567.8  111.17 8576.85  112.07 8599.49  111.98
 8642.54  111.57 8719.49   111.3 8748.08  110.97 8810.05  110.72 8849.42  110.45
 8878.97  110.53 8967.64  110.36 9011.55   110.4  9059.1  110.74 9111.17  110.98
 9133.81  111.23 9267.42   111.2 9305.88  111.34  9398.3  111.46 9427.85  111.74
 9457.41  111.85  9474.3  111.68 9508.07  111.84 9593.43  111.72 9625.12  112.02
 9638.71  111.87 9652.29  111.28 9663.61  112.17  9677.2  113.76 9681.73   113.7
 9695.31  112.18 9704.37  111.73 9727.01  111.71 9740.29  111.96 9765.62  111.98
 9813.04  111.66 9845.84  111.89 9879.63  112.29 9909.19  113.14 9972.52  113.76
 9997.85  113.4710027.41  113.8510043.98  114.2610107.62  114.6410154.07  114.19
10175.17  115.5710192.07  118.3510204.73  119.4410215.35  118.3510241.89  118.06

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154 7821.35    .066  7946.6    .015 8194.15    .066 8241.77    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7821.35 8241.77          1087.82    1400 1513.92             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 7804.97  115.72       T
 8241.7710241.89  114.46       T
Left Levee      Station=17.49333      Elevation=133.5933
Right Levee     Station=10211.28      Elevation=  119.57
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 3201.38 3566.27  109.75 5184.17 5803.79  113.48 7132.53 7518.07  112.62

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 177.7

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  127.44   19.68  133.41   26.24  134.24   39.36   133.6   52.48  130.52
   75.44  122.76   91.84  117.62   95.12  116.93  124.64  114.84  141.04  113.36
  157.44  112.42  167.28   111.5  177.12  109.92  190.24   108.4  209.92  107.45
  242.72  107.14   262.4   108.4   278.8  110.37  285.36  111.57  298.48  115.12
  305.04  114.92  318.16  115.48  331.28  115.11   344.4  115.34  354.24  114.34
  383.76  114.04  449.36  114.43  465.76   114.1  478.88  114.47  485.44  114.25
  537.92  113.84  570.72  113.89  580.56  114.18  600.24  114.04  610.08  114.33
   623.2  113.98   639.6  114.27  652.72  114.02  711.76  113.98  728.16  113.79
  744.56  114.32  767.51  113.74  803.59  114.01  816.71  113.75  849.51  113.65
  856.07  113.84  905.27  113.23  918.39  112.84  924.95  112.21  934.79  110.06
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  947.91  108.65  977.43  108.95  993.83  108.66 1010.23  109.05 1020.07  110.42
 1036.47  110.94 1062.71  110.45 1088.95   110.3 1102.07   110.5 1121.75  110.29
 1141.43  110.84 1174.23  111.23 1184.07  110.82 1210.31  110.43 1223.43  111.02
 1233.27  110.55 1256.23   111.2 1266.07  110.54 1282.47  110.66 1311.99  110.54
 1334.95  110.72 1348.07  110.53 1380.87  110.76 1407.11  110.54 1416.95   110.8
 1449.75  110.53 1462.87   110.8 1479.27  110.59 1492.39  111.48 1498.95  111.02
 1525.19  111.05 1531.75  111.75 1544.87  111.11 1561.27  111.03 1600.63  112.36
 1610.47  111.57 1636.71  111.26 1656.39   112.1 1672.79  111.22 1685.91  111.71
 1699.03  113.38 1705.59  113.67 1715.43   112.4 1728.55  111.39 1735.11  111.55
 1751.51  112.82 1758.07  112.06 1764.63  109.89 1781.03  108.87 1840.07  108.71
 1863.03  108.88 1876.15  108.69 1889.27  109.24 1899.11  108.74 1931.91  108.65
 1945.03  109.23 1954.87  108.55 1964.71  109.06 1971.27  108.64 1984.39   108.9
 1997.51  108.55 2004.07  108.78 2033.59  108.72 2040.15  108.49 2053.27  108.94
 2059.83  108.68 2102.47  108.66 2135.27  108.83 2181.19  108.77 2197.59  108.59
 2223.83   108.9 2236.95  108.74 2259.91  108.87 2299.27   108.8 2312.39  109.12
 2341.91  108.77 2368.15  108.73 2381.27  109.01 2414.07  108.82 2427.19  109.13
 2469.83  108.69 2489.51   108.9 2505.91  108.76 2532.15  108.94  2637.1   108.8
 2663.34  109.06  2719.1  108.93 2738.78  109.37 2748.62  113.29 2758.46  113.98
  2768.3  112.63 2774.86  113.07 2794.54  113.08 2810.94  113.66 2820.78  112.44
  2833.9  112.12 2847.02  112.58 2863.42  112.08 2873.26  112.65 2906.06  111.91
  2915.9  112.13 2929.02  111.84 2938.86  112.36  2948.7  112.21  2965.1  113.41
 2974.94  113.74 2988.06  113.38 3024.14  113.36  3047.1  113.66 3060.22  114.21
 3073.34  113.38 3086.46  113.98  3096.3  113.54  3112.7   113.6 3132.38  114.22
 3165.18  111.54 3175.02  113.62 3181.58  113.87 3188.14  112.45 3197.98  112.66
  3211.1  111.82  3227.5  108.07 3535.82  108.07 3548.94  109.22 3575.18  108.84
 3585.02  109.11 3601.42   108.9 3663.74  109.17 3706.38   108.9 3722.78  109.02
 3775.26  109.02 3821.18  109.16 3837.58  108.96 3935.98  109.01 3985.18  109.09
  4031.1  109.34 4044.22  109.83 4067.18  113.06  4080.3  114.53 4090.14  114.86
 4106.54  114.58 4116.38  113.52 4122.94  113.53  4129.5  114.49 4139.34  113.99
 4165.58  114.11 4175.42  114.39 4191.82  114.19 4237.74  114.64 4254.14  114.37
 4267.26  114.54 4280.38  114.21 4323.02  114.23 4349.26  114.47  4359.1     115
  4375.5  114.46 4427.98  115.06 4434.54  114.57 4467.35  114.73 4473.91  114.47
 4496.87  114.79 4509.99  114.42 4529.67  114.59 4532.95  114.92 4555.91  114.31
 4611.67  114.72 4624.79  115.45 4634.63  114.92 4647.75  114.88 4660.87  115.76
 4677.27  115.45 4696.95  114.49 4706.79  114.83 4726.47  114.85 4739.59  115.17
 4749.43  114.64 4765.83  114.81 4792.07  114.62 4808.47  114.74 4828.15  114.53
 4844.55  115.09 4860.95  114.62 4929.83  114.61 4936.39  115.16 4949.51  114.63
 4959.35  115.06 4985.59  114.56 5008.56  115.33  5018.4  114.65  5034.8   114.7
 5041.36  115.23 5074.16  114.71 5097.12  114.69  5116.8  115.22 5126.64  114.86
  5149.6  114.76    5166  115.26 5175.84  114.88 5185.68  115.12  5198.8  113.93
 5205.36  114.33 5218.48  114.07  5231.6  112.43 5251.28  112.27  5264.4  113.41
 5284.08   112.9  5297.2  114.01 5303.76  113.29  5313.6  113.46 5323.44  112.45
 5339.84  111.88 5349.68  112.51 5356.24  111.82 5366.08  108.74 5372.64  108.07
 5753.13  108.07 5762.97  109.09 5772.81  112.93 5779.37   116.1 5789.21  119.03
 5792.49  119.27 5799.05   117.3 5812.17   116.1 5844.97  115.67 5861.37  116.19
 5897.46  116.15 5933.54  115.77  5956.5  115.75 5976.18     116  5989.3  115.78
 6018.82  115.89 6031.94  115.73 6058.18  115.98 6074.58  115.84 6146.74  115.67
 6166.42  115.89 6192.66  115.76 6209.06  115.88 6222.18  116.37 6238.58   115.9
  6251.7  115.96 6261.54  116.64  6268.1  116.28  6284.5  116.65 6287.78  117.32
  6300.9  117.35 6310.74  115.97 6327.14  116.35 6353.38  115.57 6379.62  116.01
 6412.43  115.59 6425.55  115.98 6432.11  115.76 6441.95   116.3 6451.79  115.76
 6464.91  115.69 6481.31     116 6520.67  115.92 6527.23  116.35 6540.35  115.96
 6556.75  116.36 6592.83  115.56 6602.67  115.82 6628.91  115.49 6681.39  115.91
 6691.23  116.57 6701.07   115.8 6717.47  116.49 6740.43  115.71 6760.11  115.44
 6783.07  115.79 6799.47  115.58 6838.83  115.68 6858.51  115.32 6874.91  115.56
 6888.03  115.41 6910.99  115.55 6930.67  115.36 6953.64  115.63 6966.76  115.34
 7002.84  115.44 7019.24  115.93 7029.08  115.81 7048.76  116.32 7084.84  115.91
 7101.24  118.33  7107.8  118.43 7117.64  117.31 7130.76  114.12 7147.16  111.28
    7157  110.02  7173.4   109.7 7209.48  109.91 7252.12  109.58 7265.24  109.88
 7327.56  109.59  7337.4  109.92 7360.36  109.57 7383.32  110.14 7406.29  109.99
 7416.12  110.42 7429.25  109.88 7448.93  110.54 7468.61  110.08 7488.29  110.51
 7498.13  111.49 7517.81  112.58 7527.65  110.84 7544.05  109.47 7557.17  107.19
 7586.69  106.08 7622.77  105.76 7635.89  106.54 7645.73  106.16 7668.69  106.21
 7678.53  106.53 7711.33  106.28 7727.73  106.98 7734.29  107.66 7744.13  107.36
 7753.97  107.92 7767.09  110.06 7776.93  113.84 7790.05   115.2 7806.38  115.18
 7812.86  113.63 7819.34  108.54 7825.82  105.17 7829.07  105.12 7849.07  104.88
 7891.07  103.25 7917.07  102.36 7938.07  100.96 7961.07   98.75 7978.07   97.84
 7994.07   97.35 8011.07   95.85 8040.07   93.93 8060.07   92.35 8081.07   90.99
 8116.07   89.55 8150.07   88.65 8167.07   88.45 8184.07   88.95 8203.07    90.6
 8221.07   93.43 8225.07   96.63 8228.07   94.68 8231.07   97.45 8240.07   98.88
 8248.43  115.23 8271.24  115.74 8281.02  115.19  8290.8  115.62 8313.67  115.95
 8320.22  115.54  8336.6   115.7 8346.43  114.87 8392.28  115.53 8402.11   114.8
 8418.49  114.62 8428.31  114.91 8441.41  113.82 8461.07  112.99 8480.72  113.06
 8503.65  112.28 8533.12  111.89 8559.33  111.29 8624.84  110.52 8641.21  110.15
 8680.52  109.71 8696.89  109.27 8719.82  109.08 8742.75  109.15 8811.53  108.57
 8837.74  108.51 8903.24  108.93  8949.1  108.96  8975.3  109.18 9044.09  109.13
 9116.14  109.55 9145.62  109.58 9168.55  109.98 9191.48  110.13 9204.58   109.9
 9230.78  110.21 9260.26  110.07 9273.36  110.22 9351.97  110.23 9378.18  110.46
 9391.28  110.33 9410.93  110.69 9430.58  110.69 9456.79  110.08 9492.81   110.3
 9519.02  110.99 9541.95  112.34 9558.32  112.72 9591.08  113.15 9610.73  112.77
 9620.55  113.29 9633.66  113.39 9650.03  113.96 9669.69  114.03 9695.89  114.42
 9731.92  113.58 9748.29  114.53  9761.4  118.35 9771.22   119.9 9781.05   120.1

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  318.16     .12 7938.07    .025 8240.07    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7806.38 8248.43         2073.72    1400 1374.03            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 7806.38  115.18       T
 8248.43 9781.05  115.23       T
Left Levee      Station=   26.24      Elevation=  134.24
Right Levee     Station= 9781.05      Elevation=   120.1
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 3121.13 3554.93   109.4 5205.63 5780.28  114.37 7076.06 7515.49  112.68

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            131.53    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                 0.119      0.062      0.066
  W.S. Elev (ft)            131.46    Reach Len. (ft)          2073.72    1400.00    1374.03
  Crit W.S. (ft)            119.10    Flow Area (sq ft)       124827.70   15331.31   24736.76
  E.G. Slope (ft/ft)      0.000184    Area (sq ft)            146433.20   15331.31   30835.56
  Q Total (cfs)           235000.00     Flow (cfs)             135316.40   51631.86   48051.70
  Top Width (ft)           9732.60    Top Width (ft)           7757.93     442.05    1532.62
  Vel Total (ft/s)            1.43    Avg. Vel. (ft/s)            1.08       3.37       1.94
  Max Chl Dpth (ft)          43.01    Hydr. Depth (ft)           16.09      34.68      16.14
  Conv. Total (cfs)       17301800.0    Conv. (cfs)             9962627.0   3801378.0   3537790.0
  Length Wtd. (ft)           1803.01    Wetted Per. (ft)         7770.38     458.53    1545.03
```

Min Ch El (ft)	88.45	Shear (lb/sq ft)	0.19	0.39	0.18	
Alpha	1.94	Stream Power (lb/ft s)	0.20	1.30	0.36	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	254557.50	82969.39	266944.40	
C & E Loss (ft)	0.01	Cum SA (acres)	26819.38	3251.26	28748.02	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 177.40*

INPUT
Description: RGV-03,
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	124.44	9.8	125.8	19.61	127.64	23.81	127.63	26.61	126.41
56.01	128.38	61.62	130.87	75.62	133.75	79.82	134.05	92.34	133.3
104.85	130.28	126.75	123.09	142.4	118.32	152.44	116.86	173.69	115.4
189.33	113.85	214.36	111.65	223.75	110.4	236.27	109.22	255.04	108.52
286.33	108.49	305.74	109.7075	327	111.95	339.52	114.47	358.29	115.18
370.81	114.92	383.32	115.16	392.71	114.55	420.87	114.34	453.82	114.58
483.45	114.55	499.09	114.34	511.61	114.6	537.33	114.37	555.49	114.41
567.93	114.13	636.77	114.48	649.28	114.23	664.93	114.41	677.44	114.26
733.76	114.27	749.41	114.13	765.05	114.46	786.95	114.06	821.36	114.25
833.88	114.08	896.81	114.06	930.88	113.58	937.13	113.16	946.52	111.73
959.04	110.78	996	110.86	1018.49	111.12	1027.87	111.97	1043.52	112.28
1068.55	111.9	1124.87	111.94	1169.13	112.69	1190.92	111.98	1205.44	109.28
1216.34	109.49	1234.49	110.55	1253.15	110.65	1262.54	110.18	1285.32	110.34
1306.35	110.19	1328.25	110.29	1340.76	110.15	1372.05	110.31	1397.08	110.18
1406.47	110.35	1437.76	110.13	1450.28	110.31	1465.92	110.19	1478.44	110.81
1484.69	110.51	1509.73	110.51	1515.98	110.97	1528.5	110.54	1544.14	110.5
1581.69	111.41	1591.08	110.87	1616.11	110.63	1634.88	111.2	1650.53	110.62
1663.04	110.96	1675.56	112.07	1681.82	112.25	1691.2	111.4	1703.72	110.74
1725.62	111.72	1731.88	111.22	1738.14	109.75	1753.78	109.06	1810.1	108.94
1844.52	108.99	1857.04	109.38	1866.42	109.04	1913.48	108.96	1920.74	110.15
1929	110.6	1947.77	110.61	1994.71	110.4	2013.48	110.55	2062.35	110.34
2087.77	110.51	2151.15	110.36	2171.29	110.62	2188.7	110.4	2211.22	110.56
2248.15	110.49	2260.67	110.74	2280.22	110.51	2313.86	110.47	2326.37	110.63
2357.66	110.51	2370.18	110.71	2410.85	110.46	2516.23	110.66	2570.69	110.52
2599.74	110.76	2648.64	110.6	2667.42	110.88	2676.8	113.5	2686.19	113.95
2695.58	113.06	2701.83	113.36	2720.61	113.37	2736.25	113.77	2745.64	112.91
2758.15	112.71	2770.67	113.05	2786.31	112.78	2795.7	113.24	2836.38	112.41
2848.89	111.48	2867.67	111.23	2883.31	112.18	2892.7	112.48	2905.21	112.29
2926.53	112.36	2951.95	113.41	2974.05	113.96	2986.57	113.48	2999.08	113.81
3008.47	113.4	3024.11	113.44	3042.89	113.77	3074.18	111.83	3083.56	113.14
3089.82	113.31	3096.08	112.41	3105.46	112.57	3117.98	112.03	3133.62	109.59
3191.59	109.56	3202.48	109.3	3249.69	109.64	3271.47	108.12	3289.63	107.19
3315.05	108.44	3344.1	108.15	3373.14	108.06	3427.74	108.26	3440.26	109.17
3460.29	109.08	3490.32	108.73	3549.77	108.8	3569.22	108.64	3630.95	108.51
3645.47	107.94	3699.96	108.03	3715.6	107.9	3809.47	107.93	3856.4	107.99
3900.21	108.15	3912.72	108.48	3934.63	110.63	3947.14	111.61	3956.53	111.83
3972.17	111.65	3981.56	110.94	3994.08	111.59	4003.46	111.25	4037.88	111.52
4053.53	111.39	4097.33	111.69	4125.49	111.62	4138.01	111.4	4178.68	111.41
4203.71	111.57	4213.1	111.93	4228.75	111.57	4278.81	111.97	4285.07	111.64
4316.36	111.75	4322.62	111.57	4344.53	111.79	4357.04	111.54	4378.94	111.87
4400.85	111.47	4454.04	111.74	4466.55	112.23	4475.94	111.87	4488.46	111.85
4500.97	112.43	4516.62	112.23	4535.39	111.59	4544.78	111.81	4576.06	112.04
4585.45	111.69	4601.1	111.8	4660.55	111.62	4676.19	112.52	4691.83	112.39
4734.77	112.57	4757.54	112.46	4763.8	112.84	4776.32	112.51	4785.7	112.83
4810.73	112.59	4832.65	113.19	4842.03	112.75	4857.68	112.78	4863.94	113.14
4895.22	112.94	4917.13	112.97	4935.9	113.4	4945.29	113.19	4967.19	113.32
4982.83	113.76	4992.22	113.46	5001.61	113.63	5014.12	112.85	5020.38	113.1
5032.9	112.85	5045.41	111.7	5064.19	111.62	5076.7	112.49	5095.48	112.04
5107.99	112.79	5114.25	112.31	5123.64	112.39	5133.02	111.63	5148.67	111.27
5158.05	111.77	5164.31	111.43	5173.7	109.38	5179.96	108.9	5192.28	108.85
5210.43	108.26	5224.95	107.53	5243.11	107.41	5279.42	107.62	5312.1	107.49
5322.99	107.62	5377.46	107.43	5406.51	107.58	5428.29	107.26	5439.18	107.51
5453.71	107.24	5475.49	107.43	5500.91	107.45	5515.44	107.28	5542.92	107.41
5552.31	108	5567.95	112.56	5577.34	114.55	5580.47	114.76	5586.72	113.5
5599.24	112.65	5630.53	112.26	5646.17	112.65	5678.83	112.74	5693.36	112.44
5715.02	112.32	5744.19	112.5	5751.45	112.77	5768.21	112.52	5791.4	112.69
5808.89	112.46	5833.92	112.62	5849.56	112.46	5867.64	112.63	5914.85	112.55
5929.37	112.91	5962.2	113.1	5976.57	113.31	5990.36	113.95	6018.52	113.93
6049.19	114.4	6052.94	114.89	6065.46	115	6074.85	114.01	6090.49	114.32
6115.52	113.75	6140.55	114.06	6171.85	113.74	6200.01	114.21	6209.4	113.85
6237.56	114.04	6275.11	114.02	6281.36	114.31	6293.88	114.08	6309.52	114.39
6343.94	113.8	6353.33	114	6378.36	113.86	6428.42	114.25	6437.81	114.68
6447.2	114.21	6462.84	114.75	6503.52	114.08	6525.42	114.31	6541.06	114.16
6578.61	114.22	6597.38	114.03	6613.03	114.18	6647.45	114.17	6666.22	113.99
6700.65	114.31	6750.71	114.9	6771.76	114.95	6789.92	115.23	6813.29	114.89
6828.93	116.56	6835.19	116.6	6844.58	115.8	6857.09	113.61	6882.12	110.62
6897.77	110.45	6938.79	111.35	6972.86	111.12	6985.38	111.33	7054.22	111.34
7076.12	110.94	7098.02	111.19	7119.93	111.07	7129.31	111.35	7141.83	111.05
7160.61	111.32	7179.38	111.02	7198.16	111.22	7207.54	111.85	7226.32	112.52
7235.7	111.42	7251.35	110.53	7263.86	108.9	7292.02	108.12	7326.44	107.76
7338.96	108.24	7348.34	107.97	7370.25	108.1	7379.63	108.42	7389.03	108.22
7410.92	108.23	7426.57	108.51	7432.82	108.92	7442.21	108.62	7451.6	108.92
7464.11	110.78	7473.5	113.65	7483.74	114.5333	7501.59	114.68	7506.51	113.54
7511.44	110.04	7516.36	107.69	7524.07	107.1156	7546.34	104.53	7557.25	103.81
7585.66	102.45	7601.61	101.32	7619.07	99.47	7627.46	98.86066	7644.13	97.65
7657.05	96.15	7693.67	92.55	7710.21	91.36	7736.79	89.9	7762.61	88.87
7785.52	88.58	7801.95	89.37	7812.9	89.56	7851.24	91.28	7877.5	93.45
7884.31	95.65	7889.42	94.66	7894.53	96.57	7909.86	98.41	7916.11	104.0489
7920.76	108.2441	7922.44	109.76	7924.1	115.22	7944.93	115.25	7953.86	114.94
7983.68	115.43	7989.66	115.15	8004.62	115.2	8013.59	114.61	8055.46	114.92
8064.44	114.44	8079.39	114.35	8088.36	114.63	8100.32	114.19	8114.22	114.27
8126.36	113.6	8138.48	113.36	8184.07	113.06	8215.34	112.51	8235.56	111.75
8267.82	112.06	8280.05	111.97	8292.19	111.2	8333.62	110.58	8354.55	110.39
8393.3	110.25	8425.67	110.29	8462.23	110.05	8494.43	110.04	8551.06	110.29
8567.24	110.24	8587.85	110.49	8664.31	110.72	8688.58	110.62	8700.72	111.25
8720.95	111.24	8733.07	110.75	8761.39	110.98	8785.25	110.96	8797.21	110.77
8821.14	111.01	8848.06	110.9	8866.55	111.16	8911.05	111.26	8967.7	111.64
8983.86	112.08	9003.58	111.98	9027.52	111.54	9060.41	111.64	9084.34	112.07
9105.28	112.97	9150.15	113.79	9165.87	113.31	9177.06	114.05	9203.98	114.5
9221.93	114.43	9245.85	114.62	9278.75	114.28	9293.7	115.46	9305.67	118.25
9314.64	119.25	9323.62	119.65	9329.08	118.94	9344.36	118.41	9384.76	118.41
9398.95	118.24	9410.96	118.51	9424.06	118.19	9444.81	118.07	9498.31	118.16

```
Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   79.82     .12  7812.9    .025 8055.46    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7501.59  7924.1          2073.72    1400 1374.03            .1       .3
Left Levee      Station=   79.82      Elevation=134.0467
Right Levee     Station=9323.616      Elevation=119.6467
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3069.42 3947.22  110.47

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 177.10*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  121.45    7.02  121.89   16.38  123.19    23.4  124.76   32.77  125.89
   39.79  125.45   44.47  122.72   49.15   122.6   86.59  123.37   93.61  123.74
  102.98  128.25  112.34  129.82  126.38  133.43   133.4  133.85  143.77  133.26
  157.22  130.03  185.24  121.16  192.96  119.02  202.52   117.3  212.88  116.88
  233.61  114.87  250.89  112.78  270.38  110.87  282.29  110.05  293.32109.7514
  316.55  109.62  333.83  110.01  362.69  111.84  380.56  113.82  389.12  114.49
  399.49  114.89  409.86  114.73  422.25  114.98  457.98  114.64  478.97  114.63
  489.34  114.91   499.7  114.59  532.43  114.58  544.34  114.73  568.82  114.64
   586.1  114.88  596.46  114.43  663.45  114.63  675.37  114.48  785.55   114.6
  806.38  114.39  866.01  114.53   890.2  114.39  910.94  114.61  943.36  114.31
  955.54113.5656  970.16   112.9  1007.7  112.85 1035.67  113.52 1050.56  113.62
 1073.35  113.35 1114.82  113.47 1135.56  113.76 1149.38  113.71 1170.11  114.21
 1187.38  113.74 1190.85  113.24 1201.22  108.86 1204.67  108.08 1215.04  108.22
 1228.86  110.31 1259.96  109.82 1280.69  110.04 1294.52  109.86 1339.44  109.77
 1395.99   109.9 1425.77  109.72 1452.57   109.8 1464.48  110.14 1494.26  109.98
 1500.22   110.2 1527.02  109.97 1562.75  110.46 1571.69  110.16 1595.51     110
 1613.38   110.3 1628.26  110.03 1640.18   110.2 1658.04  110.82 1678.89  110.09
 1699.73  110.62 1711.64  109.62 1726.53  109.24 1750.66  109.31 1774.85  109.15
 1812.89  109.29  1824.8  109.52 1833.73  109.33 1871.61  109.27 1878.52  108.92
 1885.43  111.68 1893.29  112.13 1911.16  112.32 1937.27  112.07 1961.78     112
 1999.47  112.24  2020.2  112.01  2044.4  112.21 2065.13  112.08 2078.95  112.18
 2099.68  112.06 2123.88  112.39 2134.24  112.11 2154.98  112.06 2161.89  112.24
 2179.16  112.05 2208.94  112.35 2227.55  112.15 2248.28  112.28 2327.76  112.18
 2345.04  112.28 2372.68  112.19 2424.52  112.24 2452.16  112.45 2459.07  112.27
 2503.99  112.23 2531.65  112.47 2578.18  112.27 2596.05   112.4 2604.99   113.7
 2613.92  113.93 2622.85  113.49 2661.56  113.87  2670.5  113.38 2682.41   113.3
 2694.32  113.53 2709.21  113.47 2725.16  113.89 2738.99  113.63 2756.26  112.75
 2776.99  110.25 2786.63  110.26 2804.64  111.11 2842.66  111.36 2863.39  112.75
 2866.84  113.28 2877.21  113.75 2899.79  113.57 2904.85  113.76 2918.68  113.29
 2953.39  113.31 2967.06  112.89 2983.17  112.13 2998.06  112.76 3004.01  112.37
 3012.95  112.48 3024.86  112.23 3039.75  111.11 3077.64  110.96 3094.91  111.06
 3105.28  110.52 3150.21   111.2 3170.94  108.16 3188.22   106.3 3212.42  108.82
 3215.87  108.92 3240.06  108.24  3267.7  108.06 3274.61  108.34 3288.43  108.17
 3305.71  108.45 3316.09  108.32 3331.58  109.12 3350.64  109.25 3357.55  108.83
 3379.22  108.55 3426.67   108.5 3454.31  108.25 3471.59  108.29 3513.06     108
 3526.88  106.86 3578.74  106.91 3593.63  106.84 3727.63  106.88 3769.32  106.97
 3781.23  107.13 3813.99   108.7 3837.81  108.71 3846.74  108.36 3858.65  108.68
 3867.59  108.52 3900.34  108.65 3915.23  108.58 3956.92  108.73 3995.63  108.59
 4058.17  108.68  4067.1  108.85 4081.99  108.67 4129.64  108.87 4135.59  108.71
 4192.18  108.78 4204.09  108.66 4224.94  108.83 4245.78  108.62  4296.4  108.76
 4308.32     109 4329.16  108.81 4341.07  109.11 4373.83  108.68 4412.54  108.91
 4436.36  108.79 4494.47  108.72 4511.75  110.22 4549.76  110.31 4563.58  110.53
 4573.94  110.28 4591.21  110.52 4603.12  110.38 4612.06   110.6 4635.88  110.62
 4656.73  111.05 4665.67  110.85 4712.18   111.2 4732.91  111.18 4750.19   111.6
 4760.55  111.45 4774.37  111.85 4802.03  112.27 4817.53  112.14 4829.45  111.76
 4847.31  111.63 4859.22  110.96 4877.09  110.96 4891.87  111.61 4906.87  111.18
 4918.78  111.56 4933.67  111.31 4947.16  110.66 4957.49  110.65 4972.38  111.04
 4981.72  109.98    4999  109.64 5005.91  108.91 5016.28  108.46  5030.1     107
 5047.37  106.75 5054.28  106.96 5081.94  107.17 5113.04  106.91  5123.4  107.18
 5133.77   106.8 5140.68  106.97 5175.24   106.8 5202.88   107.1  5216.7  106.86
 5223.62  106.46 5233.98  106.95  5247.8  106.42 5261.62  106.47 5268.53  106.78
 5282.37  106.51 5292.73  106.84 5306.55  106.49 5341.64  106.91 5356.53  109.02
 5368.44  110.24  5374.4  109.69 5386.31   109.2 5416.09  108.84 5430.98  109.11
 5455.14  109.04 5462.05  109.34 5475.88  108.88 5510.44  108.93 5524.26  109.16
 5531.17   109.6 5541.54  109.32 5558.81  109.21 5569.19   109.5 5579.55  109.17
 5596.83  109.34 5624.55  109.08 5641.75  109.47 5659.03  109.36 5686.68  109.41
  5700.5  110.02 5717.78  110.17 5745.42  110.76 5758.55  111.54 5776.53  112.23
 5786.89  111.88 5800.71  112.24 5814.54  112.17 5830.02  112.64 5838.95  112.06
    5856   112.3 5877.66  111.94 5904.38  112.11 5931.27  111.88 5958.07  112.13
 5967.01  111.95 5993.81  112.08 6047.41   112.2  6062.3  112.42 6080.63  112.06
 6149.73  112.29 6184.39  112.79 6193.32  112.62 6208.21     113 6225.76  113.06
 6246.92  112.73 6267.77  112.84  6308.7  112.66 6329.43   112.8 6363.06  112.78
 6374.36  112.89 6395.09   112.6 6419.28  112.82 6434.54  113.29 6464.21  113.88
 6502.22  113.78 6519.49  114.26  6526.4  113.94 6541.74  113.86 6556.63   114.8
 6571.52  114.29 6583.43   113.1 6607.25  111.22 6619.71  111.11 6661.18  112.85
 6685.37  112.66  6761.4  112.96 6791.88   112.3 6833.57  112.14  6842.5  112.28
 6872.29   112.1 6878.89  111.92 6896.16  112.07 6908.02  111.94 6934.82  112.46
 6958.64  111.59 6970.55  110.61 6997.36  110.15 7030.11  109.76 7042.02  109.94
 7062.04  109.76 7082.77  110.35 7089.68  109.99 7113.87  110.27 7120.78  110.02
 7131.36  110.18 7144.98  109.72 7151.89  110.15 7161.14  111.49 7170.07  113.47
 7179.68114.0994 7196.81  114.19 7200.17  113.46 7206.89  110.21 7215.15   108.6
 7218.25 107.433 7227.38  104.81 7234.84  103.92 7254.24  102.54 7272.12  100.98
  7294.2   97.95 7316.8594.34486 7328.04    92.7 7365.33   89.61 7383.97   88.71
 7403.97   88.71 7427.19      90 7442.66    90.2  7450.4   90.81 7473.62   91.22
 7481.35   91.85 7489.09   91.94 7496.83   91.56 7504.57   92.26 7527.79    92.9
 7543.56   94.66 7550.78   94.63 7558.74   95.73 7579.66   97.95 7592.16103.7533
 7596.59105.8099 7597.43   106.2 7599.78   115.2 7614.43  114.65 7653.69  114.91
 7672.63   114.7 7680.75  114.35 7705.92  114.44 7726.76  114.08  7740.3  114.08
 7764.49  114.76 7771.81  115.35 7782.79  114.19 7793.77  113.75 7815.73  114.34
 7848.67  114.09 7870.64   113.5 7881.61  112.57 7896.25  112.84  7910.9   113.6
 7921.87  113.73 7932.85  112.36 7954.81  112.02 7989.29  111.69 8024.35  111.52
 8053.64   111.9 8071.94  111.91 8086.73  111.59 8115.86  111.35 8134.16  111.36
 8167.11  111.64 8181.74  111.49 8214.69  111.98 8269.59  112.22 8291.54  111.88
 8302.53  113.06  8313.5  112.79 8320.83  112.93 8331.81  111.94 8350.11  111.82
 8357.43  112.03 8372.07   111.7 8383.05  111.79 8397.69  111.57 8412.33  111.82
 8430.63  111.63 8452.59  112.11 8492.85   112.3 8514.81  112.63 8533.12  112.67
 8558.74   113.5 8609.99  112.87 8649.67  113.15 8712.47  114.45 8723.44  113.81
 8730.76  114.74 8752.73  115.08 8767.37  114.87 8796.64  114.81 8814.95  115.06
 8822.27  114.88 8829.59  115.22 8839.11   116.4 8849.95  118.14 8866.18  119.19
```

```
 8872.74  118.86  8877.1  117.78 8883.66  117.74  8890.2  117.17 8907.68  116.73
 8927.32  116.82 9016.85  116.39 9040.87  116.93 9067.08  116.29 9093.28  116.32
 9108.56  116.04 9141.32  116.29 9158.79  116.14 9213.38  116.12 9215.56  116.23

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154  6842.5    .066 7227.38    .015 7592.16    .066 7599.78    .084

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7196.81 7599.78          2073.72    1400 1374.03             .1       .3
Left Levee      Station=   133.4      Elevation=133.8533
Right Levee     Station=8866.184      Elevation=119.1933
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 4905.34 7154.33  111.33

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 176.8

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  118.45    9.84  118.91   22.96  120.57    32.8  122.72   45.93  124.13
   52.49  124.12   55.77  123.27   62.33  119.03   68.89  118.72  121.37  118.75
  131.21  119.09  144.34  125.63  157.46  127.87   167.3  130.77  177.14  133.11
  186.98  133.66  196.82  133.05  206.66  130.63   216.5  127.82  236.19   121.6
  249.31  118.23  252.59  117.74  262.43  117.51  282.11  115.42  298.51  112.91
  311.64  111.65  324.76  110.92  344.44  110.64  360.84  110.79  377.24  111.31
  393.64  112.31  419.89  112.95  429.73  114.22  439.57  114.61  449.41  114.54
  472.37  115.04  515.02  114.86  524.86  115.24   534.7  114.73  600.31  114.92
  616.71  115.35  626.55  114.72  649.51   114.8  656.08  115.07  662.64  114.73
  682.32  114.81  711.84  114.69  784.01  114.87  810.25  114.71  866.02  114.72
  882.42  114.94  905.38  114.69  925.07  115.16  931.63  114.99  967.71  115.08
 1016.92   114.9 1030.04  115.36 1049.72  114.93 1072.68     115 1079.24  114.79
 1098.93  115.06 1118.61  114.99 1138.29  115.38 1151.41  115.12 1171.09  115.74
 1187.49  115.22 1190.78   114.5 1200.62  108.01  1203.9  106.87 1213.74  106.95
 1217.02  107.38 1226.86  110.18 1230.14  110.37 1239.98  109.62 1256.38  109.46
 1276.06  109.75 1289.19  109.51 1331.83  109.37 1384.31  109.46  1420.4  109.29
 1459.76  109.52 1489.29   109.4 1541.77  109.52 1568.01  109.36 1627.06  109.47
  1636.9  109.37 1679.54  109.55 1692.67  109.39 1722.19  109.56 1745.15  109.36
 1791.08  109.66 1827.16  109.54    1837  109.39 1843.56  108.89 1846.84  111.76
 1850.12  113.22 1863.24  114.01 1882.93  114.05 1899.33  113.72 1948.53  113.79
 1958.37  114.03 1978.05  113.68 2001.02  113.91  2020.7  113.71 2033.82  113.87
  2053.5  113.76 2066.62  114.17 2076.47  114.17 2086.31  113.75 2105.99  113.68
 2112.55  113.93 2128.95  113.66 2155.19  113.99 2174.88  113.79 2194.56  114.04
 2217.52  113.86  2253.6  113.89 2270.01  113.79 2286.41  114.03 2312.65  113.85
 2325.77     114 2361.86   113.9  2388.1  114.24 2394.66  113.97 2417.62  113.89
 2427.46  114.11  2437.3  113.94 2463.55  114.18 2509.47  113.93    2539   113.9
  2588.2  113.98 2598.04  113.81 2630.84  114.13 2647.25   114.6 2660.37  114.38
 2676.77  113.07 2696.45  109.22 2712.85  109.33 2722.69   109.9 2758.78  110.35
 2778.46  112.38 2781.74  113.16 2791.58  113.77  2804.7  113.38 2817.82  113.83
 2830.95  113.11 2844.07  113.18 2857.19  112.87 2876.87  112.84 2903.11  112.12
 2912.95  112.36 2932.64  112.44  2939.2  112.72  2955.6  112.49 2981.84   112.4
 2998.24  112.55 3008.08  111.75 3037.61  112.41 3044.17  112.23 3050.73  112.77
 3054.01  112.23 3070.41  108.21 3086.81  105.42 3109.78  109.19 3113.06  109.35
 3136.02  108.32 3162.26  108.05 3168.82  108.48 3181.94  108.22 3198.34  108.64
 3208.19  108.45 3218.03  108.98 3240.99  109.41 3247.55  108.79 3257.39  108.43
 3313.16  108.18  3339.4  107.85  3355.8  107.98 3395.17  107.49 3408.29  105.78
 4323.51  105.78 4326.79  105.79 4343.19  107.85 4379.27  108.16 4392.39  108.49
 4402.23  108.12 4428.48  108.24 4484.24  108.95 4507.21  108.94 4533.45  109.41
 4553.13  109.43 4569.53  109.86 4579.37  109.67 4592.49  110.37  4608.9   110.5
 4618.74  110.83  4625.3  110.62 4648.26  110.69 4671.22  110.22  4690.9  110.31
 4704.03  110.75 4717.15  110.32 4740.11  110.35 4756.51  109.85 4772.91  110.16
 4786.04     111 4789.32  110.62 4805.72  110.42 4812.28  109.33 4822.12  108.65
 4835.24  106.46 4851.64  106.09  4858.2  106.41 4884.45  106.72 4913.97  106.33
 4923.81  106.73 4933.65  106.17 4940.21  106.42 4973.02  106.16 4999.26  106.61
 5012.38  106.25 5018.94  105.65 5028.78  106.39  5041.9  105.59 5055.02  105.67
 5061.58  106.14 5074.71  105.73 5084.55  106.22 5097.67   105.7 5123.91  106.11
 5137.03  105.58 5150.15  105.41    5160  105.91 5202.64  105.42 5212.48  105.59
 5238.72  105.48 5245.28  105.93 5258.41  105.31 5291.21  105.51 5304.33  105.82
 5310.89  106.43 5320.73  106.04 5337.13   105.9 5346.98  106.32 5356.82  105.85
 5373.22  106.08 5399.46   105.7 5415.86   106.3 5432.26  106.17 5458.51  106.28
 5471.63  107.13 5488.03  107.34 5514.27   108.2  5543.8  110.38 5553.64  109.78
 5563.48  109.78 5566.76  110.22 5579.88  109.94    5593  110.32 5606.12  110.03
 5619.24  110.31 5645.49  110.07 5665.17  110.18 5675.01  109.94 5701.25  110.09
 5720.94  110.03 5789.82  110.23 5819.35  110.48 5832.47  110.13 5878.39   110.6
 5898.07  110.59 5917.76  111.02  5927.6  110.85 5953.84  111.26 5970.24  111.67
 5993.21  111.33 6016.17  111.37 6048.97  111.16 6068.65  111.47  6094.9   111.4
  6111.3  111.59 6130.98  111.18 6153.94  111.44 6167.06  112.22 6196.59   113.1
 6209.71  112.82 6222.83   112.9 6232.67   112.6 6249.07   113.3 6255.63  112.86
 6268.75  112.81 6281.88  113.07  6311.4  112.56 6317.96  112.59 6331.08  111.82
  6344.2  111.79 6363.88  113.15 6373.73  113.51 6383.57  114.34 6406.53  114.17
 6442.61   114.3  6478.7  114.65 6488.54  114.16 6521.34  113.32 6554.15  113.19
 6567.27  113.38 6590.23   112.7 6606.63     113 6613.19   112.7    6646  112.38
 6659.12  112.85  6678.8  112.28 6698.48  112.25 6741.13  111.65 6764.09  111.55
 6783.77  112.27 6790.33  111.76 6813.29  112.19 6819.85  111.65 6836.26   111.3
 6842.82  110.76 6849.38  111.03 6865.78  113.23 6875.62  113.79 6892.02  113.69
 6898.58  112.53 6901.86  110.42 6905.14   107.1 6908.42  105.09 6912.42  104.04
 6920.42  102.88 6932.42  101.64 6942.42   98.84 6952.42   95.64 6962.42   92.84
 6972.42   91.64 6982.42   89.84 6992.42   88.84 7022.42   88.84 7032.42   89.64
 7042.42   89.84 7052.42   90.64 7072.42   90.84 7082.42   91.64 7102.42   91.64
 7112.42   91.84 7122.42   92.64 7132.42   92.64 7142.42   91.84 7152.42   92.64
 7182.42   92.84 7192.42   93.64 7202.42   93.64 7212.42   94.64 7222.42   94.84
 7242.42   96.64 7252.42   97.84 7262.42  100.64 7272.42  102.64 7275.45  115.19
 7288.56  114.16 7298.38  114.44 7327.86  114.39 7350.79  114.05 7370.44     114
 7383.54  113.67  7403.2  113.83 7409.75  114.12 7422.85  115.36  7429.4  116.44
 7432.68  116.35 7439.23  114.77 7449.05  114.14 7468.71  115.41 7498.18  115.38
 7511.29  115.15 7517.84  114.71 7527.66  113.39 7540.76  113.89 7553.87  115.14
 7563.69  115.49 7573.52  113.53 7593.17  113.16 7606.27  113.22 7645.58  112.73
  7655.4  112.78 7681.61  113.51 7697.99  113.59 7707.81   113.2 7737.29  112.65
 7753.67   112.6 7783.15  112.98 7796.25  112.74 7825.73  113.39 7835.55  113.28
 7845.38  113.62 7874.86  113.72 7894.51  113.13 7904.34  114.86 7914.16  114.42
 7920.72  114.62 7930.54  113.12 7946.92  112.84 7953.47  113.08 7966.57  112.51
  7976.4  112.67  7989.5  112.35  8002.6  112.63 8009.15  112.28 8018.98  112.39
 8038.63  113.05 8074.66  113.33 8094.31  113.81 8110.69  113.78 8133.62  114.92
    8150  114.55  8163.1   114.6 8179.48  114.22 8192.58  114.34 8225.33  114.17
 8248.26  114.42 8254.81   114.8 8271.19  115.14 8281.01  114.31 8287.56  115.56
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8307.22	115.75	8320.32	115.31	8346.52	115.02	8362.9	115.65	8369.45	115.48
8376	115.9	8389.1	118.1	8402.2	117.94	8408.75	118.74	8418.58	118.24
8425.13	116.62	8434.96	116.56	8444.78	115.7	8454.61	115.72	8470.99	115.04
8493.91	115.37	8500.46	115.18	8536.49	114.94	8569.25	114.87	8592.17	115.03
8598.73	114.75	8634.75	114.53	8670.78	115.34	8687.16	114.8	8696.99	114.94
8710.09	114.38	8729.74	114.49	8742.84	114.07	8749.39	114.43	8772.32	114.01
8791.97	114.26	8821.45	114.38	8847.66	114.16	8929.54	114.13	8932.82	114.29

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.154	6875.62	.066	6912.42	.015	7272.42	.066	7275.45	.084

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
6892.02 7275.45 1153.45 2530 2395.52 .1 .3
Left Levee Station= 186.98 Elevation= 133.66
Right Levee Station= 8408.75 Elevation= 118.74
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	6875.62	114.44	7275.45	8932.82	115.19

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	130.74	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.68	Wt. n-Val.	0.153	0.022	0.084	
W.S. Elev (ft)	130.06	Reach Len. (ft)	1153.45	2530.00	2395.52	
Crit W.S. (ft)	120.17	Flow Area (sq ft)	103562.70	13648.76	24438.48	
E.G. Slope (ft/ft)	0.000159	Area (sq ft)	103562.70	13648.76	24438.48	
Q Total (cfs)	235000.00	Flow (cfs)	78530.25	123911.50	32558.25	
Top Width (ft)	8724.16	Top Width (ft)	6683.36	383.43	1657.37	
Vel Total (ft/s)	1.66	Avg. Vel. (ft/s)	0.76	9.08	1.33	
Max Chl Dpth (ft)	41.22	Hydr. Depth (ft)	15.50	35.60	14.75	
Conv. Total (cfs)	18645210.0	Conv. (cfs)	6230695.0	9831303.0	2583215.0	
Length Wtd. (ft)	2078.34	Wetted Per. (ft)	6686.17	398.84	1673.09	
Min Ch El (ft)	88.84	Shear (lb/sq ft)	0.15	0.34	0.14	
Alpha	15.95	Stream Power (lb/ft s)	0.12	3.08	0.19	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	235301.90	81573.84	264309.10	
C & E Loss (ft)	0.13	Cum SA (acres)	25788.07	3211.47	28597.08	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 176.40*

INPUT
Description: RGV-03,
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	122.02	6.85	122.42	15.98	123.64	22.82	125.16	31.96	126.21
38.81	125.73	43.37	122.96	47.94	122.81	84.46	123.14	91.3	123.43
100.44	127.86	109.57	129.43	123.27	133.03	130.11	133.45	137.3	133.04
151.68	129.55	166.06	125.4	175.65	123.15	185.23	122.55	199.61	120.84
211.59	118.9	230.76	117.14	245.14	116.46	269.1	116.08	281.08	116.34
300.26	116.13	307.45	116.76	338.59	116.33	367.53	115.32	376.94	115.49
384.13	115.08	444.04	114.73	451.23	114.18	492.47	113.88	529.96	113.34
566.25	113.33	585.42	113.17	626.16	113.21	638.14	113.37	654.91	113.22
674.09	113.45	700.45	113.54	736.4	113.42	745.98	113.73	760.36	113.44
781.92	113.35	810.68	113.48	825.06	113.75	834.64	113.59	849.02	114.03
861	113.7	863.4	113.22	870.59	108.91	872.99	108.15	882.57	108.5
889.76	110.38	911.33	109.93	925.7	110.15	935.29	110	967.29	109.96
1004.78	110.51	1042.27	111.68	1067.25	111.99	1138.98	111.54	1251.61	111.72
1268.38	111.6	1301.93	111.95	1335.48	111.8	1340.27	111.46	1345.06	114.35
1354.65	114.89	1381.01	114.7	1416.95	114.77	1424.14	114.93	1438.52	114.71
1455.3	114.87	1469.67	114.74	1493.63	114.79	1503.22	115.07	1517.6	114.77
1536.77	114.88	1548.75	114.69	1567.92	114.93	1582.3	114.81	1596.68	114.98
1613.45	114.87	1651.8	114.85	1663.78	115.02	1718.89	114.93	1738.06	115.16
1742.85	114.98	1774	114.95	1793.18	115.11	1826.73	114.95	1884.24	114.98
1891.43	114.87	1915.39	115.08	1927.38	115.39	1936.96	115.25	1948.94	114.37
1963.32	111.81	1975.3	111.88	1982.49	112.26	2008.85	112.56	2032.81	114.84
2042.39	114.58	2051.98	114.88	2061.57	114.4	2095.12	114.22	2114.28	113.74
2140.65	114.15	2171.8	113.94	2183.78	114.04	2190.97	113.51	2222.12	114.19
2236.5	111.15	2248.48	109.3	2265.26	111.81	2284.43	111.24	2303.6	111.06
2317.97	111.17	2361.11	111.97	2373.09	111.32	2413.83	111.16	2433	110.95
2444.98	111.03	2473.74	110.71	2483.33	109.57	2879.06	109.66	3066.47	109.93
3091.45	109.81	3154.3	109.78	3166.28	111.15	3192.64	111.38	3202.23	111.62
3209.41	111.38	3228.59	111.48	3269.32	112	3286.1	112.02	3319.65	112.49
3331.63	112.83	3338.82	112.68	3348.4	113.12	3367.58	113.37	3389.14	113.26
3405.91	112.98	3429.88	113.38	3439.47	113.11	3456.24	113.16	3468.22	112.82
3480.2	113.03	3489.79	113.58	3504.17	113.19	3516.15	112.01	3525.73	110.55
3537.71	110.3	3561.68	110.71	3583.25	110.45	3590.43	110.71	3626.38	110.32
3645.55	110.62	3659.93	109.95	3667.12	110.42	3676.7	109.85	3691.08	110.22
3700.67	109.95	3707.86	110.28	3717.44	109.93	3736.61	110.21	3755.78	109.75
3762.97	110.09	3794.12	109.71	3820.48	109.7	3825.27	109.99	3834.86	109.57
3858.83	109.7	3873.2	110.31	3892.37	109.96	3899.57	110.24	3906.75	109.93
3918.74	110.08	3937.9	109.83	3949.88	110.21	3981.04	110.13	3990.62	110.67
4002.61	110.79	4021.77	111.32	4043.35	112.75	4050.53	112.34	4060.12	112.63
4069.7	112.44	4079.29	112.69	4098.46	112.67	4139.2	112.4	4223.07	112.54
4244.64	112.7	4254.22	112.46	4287.77	112.69	4323.72	112.76	4354.87	113.26
4371.65	113.01	4388.42	113.01	4412.38	112.79	4426.76	112.89	4457.91	112.73
4472.29	112.31	4489.06	112.31	4498.65	112.74	4520.22	113.11	4546.58	112.51
4558.56	112.89	4563.35	112.57	4582.52	112.64	4608.88	112.24	4618.47	111.72
4628.05	111.7	4656.81	113.39	4673.58	113.26	4699.94	113.3	4726.3	113.49
4757.45	112.56	4781.42	112.43	4791.01	112.54	4807.78	112.09	4848.52	111.9
4858.1	112.23	4872.48	111.89	4886.86	111.91	4918.01	111.59	4934.79	111.56
4949.16	112.08	4953.95	111.75	4970.73	112.05	4975.52	111.7	4997.09	111.31
5009.07	112.78	5016.27	113.16	5028.24	113.11	5037.25	110.52	5046.25	106.24
5049.96	105.0611	5056.24	104.06	5083.7	102.04	5096.57	99.23254	5110.97	95.55
5124.88	92.83	5152.33	90.17	5166.06	89.36	5186.06	89.36	5195.95	89.96
5215.75	90.72	5235.55	90.91	5245.45	91.49	5275.14	91.68	5285.04	92.22
5294.94	92.26	5304.83	91.77	5314.73	92.35	5344.43	92.39	5354.33	92.89
5364.22	92.95	5374.12	93.66	5391.28	94.23	5402.51	95.67	5406.82	96.58137
5410.68	96.74	5433.28	104.9366	5436.51	114.02	5464.08	113.15	5471.33	112.22
5485.85	111.83	5509.06	111.66	5522.12	113.33	5529.37	113.54	5549.69	113.41
5561.3	113.13	5588.87	113.26	5603.38	113.1	5710.93	113.06	5750.24	113.24
5760.43	113.58	5776.44	113.38	5831.03	114.32	5848.56	114.9	5884.18	113.27
5901.15	112.69	5953.77	113.34	5981.73	113.21	5987.55	112.48	6002.11	112.17
6025.4	112.25	6045.79	112.78	6053.07	114.07	6064.71	113.96	6085.27	113.36

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 6111.55  112.22 6140.42  112.63 6152.06  113.02 6159.34  114.31 6179.73  114.64
 6191.37  114.42 6207.98  114.67 6234.29  113.12  6272.9  112.96 6291.83  112.68
 6323.86  112.75 6339.87  112.64 6382.09  112.65  6421.4  112.33 6456.35  112.39
 6475.27  112.75 6486.92   113.2 6497.11  112.65 6533.51  112.85  6569.9  112.87
 6594.66  112.49 6649.98  112.28 6671.81  112.47 6683.46  112.81 6686.37  113.24
 6698.02  113.29 6708.21  112.99 6728.59  113.89 6738.79  113.74 6746.07  112.93
 6757.71  112.74 6778.09  112.97 6807.21  113.07 6823.23  112.91 6847.98  113.01
 6856.71  112.86 6880.01  113.09  6916.4  113.24 6930.96  113.09 6945.52  113.24
 6961.54  113.94  6965.9   113.2 6996.48  113.56  7002.3  113.83 7021.23  113.62
 7043.07  113.73 7069.27  114.17 7083.83  113.91 7098.39  113.91 7102.76  114.52
 7118.77  115.24 7127.51  114.68 7136.25  115.27 7144.98  114.35 7152.26  114.54
 7165.36  114.23 7185.75  113.01  7200.3  112.69 7210.49  112.76 7217.77  113.18
 7229.42  112.61 7238.16  112.57  7249.8  113.09 7261.45  112.66 7283.29  112.85
 7289.09112.6108 7300.76  112.79 7313.86  112.35 7321.14  112.74 7326.96  112.04
 7337.16  113.08 7341.52  112.97 7356.08  109.97  7372.1  110.22 7392.48   110.2
  7398.3  112.29 7414.32  112.69 7418.69  113.21 7433.25  112.05 7436.16  112.86
 7453.63  112.82 7482.75  113.18 7488.57     113 7514.77  112.98 7542.44  113.31
 7561.36  113.02 7565.73  113.29 7578.83  113.12 7587.57  113.94 7602.13   113.1
 7612.32  113.24 7629.79  112.67 7641.44  113.15  7645.8   112.9 7670.56  113.36
  7705.5  113.62 7738.98  114.11 7760.82  113.88 7807.41  113.86 7827.79  114.03
 7849.63  113.66 7886.02  113.59 7920.96  113.06 7934.07  113.16 7938.44  112.89
 7950.08  113.26 7957.36  112.91 7963.19   113.2 7974.84  112.72 7983.57  113.42
 7990.85   112.4 8001.04  112.79 8006.86  113.51 8047.63  113.38 8050.54  113.14
 8066.56  113.68 8092.76  113.15 8111.69  113.27 8127.89  112.56 8137.89  112.85
 8149.54  113.61 8185.94     114 8215.06  113.25 8248.54  113.79 8260.19  112.99
 8270.38  113.09 8276.21  113.67 8283.48  113.59 8296.58   114.4  8322.8  114.52
 8347.07   114.9 8379.58  114.61  8395.6  115.18 8411.61  116.08  8421.8  115.77
 8430.54  116.11  8455.3  116.56  8466.9  118.92 8479.53  118.15 8486.01  116.97
 8495.75  116.79 8505.48  116.08 8515.22  116.06 8531.44   115.4 8554.14  115.48
 8560.63  115.33 8596.32  115.07 8628.77  115.12 8651.48  115.27 8657.97  115.09
 8693.65  114.81 8729.34  115.39 8745.57  115.04  8755.3  115.13 8768.28  114.76
 8787.74  114.97 8800.72  114.74 8809.21  114.98 8829.92  114.57 8872.44     115
 8905.71   114.8 8922.35  115.24 8935.67  115.27 8962.29  115.05  8988.9  115.17

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154 5028.24    .066 5096.57    .015 5410.68    .066 5436.51    .084

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5028.24 5436.51          1153.45    2530 2395.52            .1       .3
Left Levee      Station=130.1133      Elevation=133.4533
Right Levee     Station=8467.616      Elevation=  119.01
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1927.71 5014.34   112.9 5436.51  8988.9113.7933

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 176.00*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   125.6    8.99  126.71   17.99   128.3   21.85  128.18   24.42  126.88
    51.4  127.76   56.54  130.09   69.39  132.95   77.78  133.04  101.98  128.06
  108.03  127.59  130.72  124.04  145.84  122.27  160.96  120.86  180.62  119.32
  185.16  119.29  204.82  117.63  223.08  115.77  254.63   114.9  271.36  114.11
  278.27  113.52  301.93  112.95  325.59  111.94  365.01   111.6  404.45  111.76
  461.92   112.1   484.6  111.91  517.88  112.06  526.95  112.31  536.03  111.94
  542.08  109.43  548.12  109.63  552.66  110.58  601.59  110.54  625.25  111.55
  648.91  113.98  664.68  114.51  709.94  113.71  781.02  113.88  790.85  113.83
  814.51  114.26  836.98  114.04     840  115.49  846.05  115.76  862.69  115.69
  909.57  115.83  968.55  115.73  980.65  115.87 1041.14     116 1143.98  115.96
 1213.55  116.11 1221.11  115.67 1230.18  114.39 1258.92  114.77 1274.04   115.9
 1313.36   115.6 1325.46  115.36  1342.1  115.57 1369.32  115.53 1373.85  115.27
 1393.52  115.61 1410.15  113.17 1420.74  114.44 1444.94  114.07 1481.23  114.54
 1488.79  114.22 1534.16  114.09 1552.31  113.93 1558.36  113.37 1808.11  113.55
 1926.39  114.07 1942.15  113.85 1981.82  113.77 1989.38  114.44 2012.06  114.74
  2028.7  114.72 2076.22  115.28 2091.98  115.79 2116.41   115.9 2140.61  115.73
 2155.73  116.01 2179.93   115.8 2193.54  116.17 2202.62  115.97 2216.23  114.63
 2257.06  114.69 2279.75  114.48 2291.84  114.62  2311.5  114.12 2331.17  114.33
 2365.95  114.27 2411.32  113.82 2426.44  113.89 2435.51   114.2 2447.61  114.02
 2476.35  113.95 2483.91  114.12 2503.57  113.97 2529.28  114.44 2542.89  115.12
 2603.38  114.86 2669.93  114.91 2719.84  114.66 2739.49  114.85 2770.16  114.57
 2804.53  113.87 2824.18  113.19 2843.85  113.12 2860.48  112.42 2883.17  112.21
  2911.9  111.61 2930.05  112.44 2973.91  112.34 2993.57   111.8 3025.33  111.48
 3051.04  111.41 3105.48  111.58 3128.16  111.92  3144.8  111.58 3156.93112.4118
 3164.46  112.53 3167.15  112.07 3177.96  107.51  3187.5105.3757 3200.07  104.09
 3213.61  103.84 3236.95102.2132 3242.46  101.61 3257.29   97.91 3269.88   95.39
 3287.33   92.83 3296.84   91.86 3322.24   90.49 3339.69   89.87 3349.69   89.87
 3379.08    90.8 3398.67   90.97 3423.46   91.61 3437.86   91.51 3457.45   91.88
 3467.25    91.7 3479.04   92.08 3506.43   91.94 3526.03   92.26 3535.82   92.67
  3552.8   92.96 3563.92   94.82 3566.0895.80383    3572   96.01 3594.15107.1731
 3597.57  112.85 3618.81  112.62 3623.53  112.13 3642.41  111.93 3654.21  110.26
    3666  110.15 3677.81  109.36  3689.6  109.43 3701.41  108.55 3715.57  108.88
 3736.81  112.23  3748.6  112.67 3781.64  112.42 3786.36  112.59 3800.52  111.86
 3845.36  112.19 3868.96  111.95 3897.27  112.15 3963.38  112.11 4003.63  112.32
 4043.89  112.32 4065.19   112.6  4086.5  112.55 4107.82  112.73 4124.39  113.38
 4150.43  112.93 4164.64  113.17 4197.79  113.35  4219.1  113.19 4264.09   113.4
 4290.14  112.63 4306.71  112.64  4351.7  111.25 4439.31  111.27 4451.15  111.04
 4467.72  111.31  4484.3  111.01 4493.77  109.56 4512.71  109.44 4517.45  108.95
 4538.75  109.14 4543.49  109.56 4555.33  109.12 4569.54  109.38 4588.48  110.27
 4600.32  112.89 4619.26  112.74 4633.47  112.26 4650.04  112.07 4668.99  111.54
 4695.04  111.05 4742.39  111.46 4761.33  111.95 4773.17  114.27 4777.91  114.52
 4806.32   114.2 4825.26  113.57 4839.47  113.56 4846.57  113.85 4860.78  113.68
  4903.4   112.6 4915.24  112.73 4957.86  112.65 4981.54  112.43 4988.65  112.18
 5040.73  112.29 5066.78  112.15 5088.09  112.49 5102.29   112.2 5135.45  112.36
 5149.65  112.14 5170.97   112.2 5199.38  111.91 5213.58  112.07 5256.21  111.98
 5286.98  112.49 5305.93  113.28  5315.4  113.14  5322.5  112.07 5353.29  112.01
  5381.7  112.17  5440.9  112.18 5481.15  111.79 5571.13  111.75 5606.64  112.28
 5613.75  112.84 5620.85   112.7 5630.32  113.84 5649.27  113.96 5665.84  113.36
 5675.31   114.1 5687.15   114.2 5698.99  115.12 5710.83   114.6 5715.56  114.77
  5727.4  113.12 5746.35  112.69 5779.49  113.04  5793.7     113 5826.85  113.23
  5852.9  113.04 5893.15  113.13 5907.36  112.77  5919.2  112.96 5945.24  113.02
 5952.35  112.87 5973.65  113.11 6004.44  113.12 6028.12  112.87  6051.8  113.06
 6077.84  114.27 6084.94  112.78 6099.15  113.17 6110.99  113.14 6122.83  113.58
 6134.67  113.45 6144.14     114 6151.25  113.46 6160.72  113.82 6174.92  113.55
  6198.6  113.83 6210.44  113.76 6231.75  114.56 6253.06  114.94  6257.8  114.64
 6276.73  114.58 6286.21  115.12 6300.42  114.37 6307.52  115.29 6321.73  115.82
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 6333.57  115.69 6340.67  114.65 6347.77  114.64 6361.98  115.96 6369.08   115.8
 6376.18  114.27 6383.29  113.94 6388.02   114.6 6395.13  113.91 6409.34  113.94
  6438.4112.8179 6466.16  112.32 6473.26   112.7 6482.74  112.53 6494.58  113.41
 6513.52  112.36 6518.26   112.9 6527.73  112.24 6546.67  113.11 6565.61   112.4
 6582.19  112.55 6601.13  113.13  6610.6  112.69 6629.54  112.99 6646.12  112.57
 6650.86  112.05 6662.69  112.88 6672.16  111.54 6679.27  112.04 6688.74  113.71
 6695.84  113.54 6705.31  111.55 6712.42  108.96 6719.52  107.53 6738.47   107.6
 6745.57   107.9 6755.03  107.62 6771.61  107.61 6778.71  107.96 6788.19  112.27
 6792.92  112.91 6800.03  112.55 6814.23  113.04 6821.34  114.07 6840.28  112.41
 6845.02  111.63 6849.75   113.2 6878.16  112.92 6885.27  113.13 6925.52  113.29
 6934.99  112.93  6963.4  113.04 6977.61   112.8 7001.29  113.25  7008.4  113.09
  7022.6  113.39 7032.08  112.87 7039.18  113.21 7053.38  112.74 7060.48  113.27
  7081.8  112.88  7088.9  114.03    7096  114.45 7107.84  113.22 7119.68  112.63
 7136.26  112.82 7145.73  112.27 7152.83  112.35 7164.67  111.52 7183.61  112.49
 7190.72     112 7202.56  112.56 7212.03  112.41 7230.97  112.94 7247.54  112.78
 7283.06  113.11  7287.8  112.85 7299.64  113.13 7323.32  112.98 7356.46  113.49
 7377.77  113.06 7410.93  113.29 7429.87  113.14 7446.44  113.32 7453.54  113.12
 7467.75  113.57 7474.85  113.08 7486.69   113.6 7508.01  113.54 7522.21  113.04
 7571.94  112.73 7581.41  112.86 7609.82  112.25  7619.3  112.29 7638.23  111.83
 7659.54  112.07 7666.65  111.52 7685.59  112.29 7690.33  111.67 7697.43   111.6
  7706.9  112.19 7714.01  111.24 7725.85  111.25 7735.31  112.69 7740.05  112.64
 7747.15  110.81 7751.89  110.58 7768.46  111.31 7777.94  112.73 7787.41   113.1
 7794.51  112.48 7813.46   112.3 7818.19  112.62 7844.23  112.17 7848.97  111.63
 7867.91  111.83 7875.02  112.48  7898.7  111.97 7917.64  111.23 7941.31  111.39
 7948.42  111.72 7953.15  111.32 7974.78  110.82 7991.04  110.67 8002.88  110.88
 8009.99  111.64 8024.19  111.97 8047.87  111.86 8069.18   112.3 8088.12  111.81
 8107.07  111.04 8116.54  110.97 8140.21  111.48 8144.95  111.79 8161.52  111.78
    8171  112.34  8178.1  111.36 8189.94  110.78 8206.52  111.03 8215.99  112.21
 8227.82  112.08 8239.66  112.71 8249.13  113.76 8291.76  113.75 8334.39  114.17
 8384.12  113.39 8398.32   113.9 8410.16  113.61 8436.21   114.4 8445.68  114.29
 8452.79  113.47 8457.52  114.13    8467  114.19 8490.68   114.9 8507.26  115.04
 8526.12  119.24 8530.83  119.27 8537.42  118.19  8546.9  117.33 8566.18  116.47
 8583.57  116.23 8593.45   115.7 8662.67  115.17 8710.78   115.5 8735.18  115.21
 8764.84  115.14  8787.9  115.44 8834.05  115.14 8847.24  115.47 8867.01  115.56
 8890.08  115.11 8909.85  115.43 8919.75  115.24 8929.63  115.64 8942.82  115.39
 8962.59  115.45 8979.07  116.33 8992.26  116.39 9018.62  115.97 9044.99  116.05

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3164.46    .025 3398.67    .066 5826.85    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3164.46 3597.57          1153.45    2530 2395.52             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3164.46  112.53       T
 3597.57 9044.99  112.85       T
Left Levee      Station=   77.76      Elevation=  133.04
Right Levee     Station=8526.483      Elevation=  119.28
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3597.57 9044.99112.3967

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 175.6

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  129.17    6.55  131.14   16.38  133.04   29.49  132.97   42.59  129.64
   58.97  123.22   78.63  116.22   91.74  114.92  101.56  112.91  111.39  112.02
  121.22  110.53   137.6  110.05  167.09  110.48  196.58  110.46  235.89  111.13
  245.72   112.6  255.55  116.28   262.1  117.02  278.48  115.88  314.52  116.06
  324.35  116.56  376.77  116.86   386.6  116.75  416.09  116.99  527.48  116.97
  638.87  117.17  737.16  117.43   786.3  118.22  792.85  117.88  812.51  117.74
  848.55  118.23   855.1  118.81  868.21  118.33  887.87  118.78  940.29  118.62
  946.84  118.36  969.77  118.45  986.15  118.08 1015.64  118.08 1038.57  117.51
 1100.82  117.09 1113.93   116.6 1136.86  116.23 1149.97  115.14 1176.18  112.12
 1189.28  111.54 1205.66  111.48 1238.43  110.87 1251.53  110.87 1281.02  111.73
 1300.68  111.95 1303.95  111.39 1317.06  105.37 1320.33  104.85 1340.33  104.07
 1360.33   104.3 1377.33  103.45 1395.33  102.19 1413.33   97.89 1428.33    95.3
 1447.33   93.06 1461.33   91.69 1478.33    91.1 1513.33   90.39 1531.33   90.78
 1567.33   91.09 1586.33   91.59 1604.33   91.29 1641.33   91.79 1677.33   91.39
 1695.33   91.69 1714.33   91.69 1725.33   93.97 1728.33   95.88 1731.33   94.99
 1733.33   95.28 1758.63  111.68 1788.05  111.52 1794.59  110.83  1814.2  110.49
 1820.74   110.7 1827.27  109.41 1837.08  108.31 1853.42  108.11 1869.77  106.88
 1886.11  106.95 1895.92  106.55 1902.46   105.6 1922.07   106.1 1951.49  111.14
 1967.83  111.79 2013.59  111.42 2020.13  111.68 2039.74  110.59 2069.16  110.75
 2101.85  111.12 2134.54  110.81 2173.76  111.15 2265.32  111.15 2307.96  111.25
 2321.08  111.48 2376.84  111.57 2406.35  112.05 2435.87  111.97 2458.83  112.43
 2465.39  112.22 2488.35  113.18 2494.91  112.77 2501.47  113.22 2508.03  112.69
 2524.42  112.49  2544.1  112.78 2580.18  112.65 2590.02   112.8 2619.54  112.32
 2652.33  112.22 2681.85  111.95 2717.93     111 2740.89  111.47 2754.01  111.33
 2767.13  110.71  2803.2   109.8 2839.28  109.57 2855.68  109.66 2875.36  109.39
 2924.55   109.2 2940.95  108.86 2963.91  109.27 2980.31   108.6 2986.87  108.82
 2993.43  108.16 2999.99  106.64 3026.23  106.46 3032.79  105.73  3062.3  106.01
 3068.86  106.65 3085.26  105.99 3104.94  106.39 3121.34  107.48 3131.18  107.76
 3137.74  108.94 3147.58  111.71 3173.81  111.53 3193.49  110.89 3216.45  110.73
 3242.69   110.2 3278.77  109.87 3314.84   110.2 3344.36  110.29  3354.2  110.77
 3364.04  110.49  3370.6  110.89    3387  114.24 3393.56  114.55 3432.92  113.77
 3459.15  112.72 3478.83  112.64 3488.67  113.05 3508.35  112.97 3518.19  112.42
 3528.03  112.63 3567.39  112.16 3583.78  112.38 3616.58  112.31 3623.14  112.11
 3642.82  112.35 3675.62  112.06 3685.46  111.69  3695.3   111.9 3714.97  111.75
 3757.61  111.83 3793.69  111.66 3823.21  112.19 3842.88  111.78  3888.8  112.07
 3908.48  111.76    3938  111.88 3977.35  111.49 3997.03  111.73 4056.07  111.56
  4098.7  112.23 4111.82     113 4124.94  113.35 4138.06  113.11  4147.9  111.49
 4190.54   111.3  4229.9  111.49 4279.09  111.42 4311.89   111.5 4367.65  111.09
 4426.68  111.12 4446.36  111.27 4492.28  111.22 4541.47  112.09 4551.31  112.94
 4561.15  112.73 4567.71  113.16 4574.27  114.44 4600.51  114.63 4623.47  113.74
 4636.58  114.85 4652.98  114.99 4669.38  116.35 4685.78  115.56 4692.34   115.8
 4708.74  113.31 4734.98  112.63 4751.38  112.64 4780.89  113.11 4800.57  113.03
 4846.49   113.4 4882.57  113.16 4895.69  113.34 4938.32  113.25    4958  112.67
  4974.4  112.93 5010.48  112.96 5020.32  112.71 5049.83  113.02 5072.79   112.8
 5092.47     113 5125.27  112.66 5144.95  112.97 5158.07  112.89 5194.14   114.6
 5203.98  112.36 5223.66  112.93 5240.06  112.89 5256.46  113.54 5272.86  113.34
 5285.98  114.16 5295.82  113.35 5308.94  113.89 5328.61  113.48 5361.41  113.89
 5377.81   113.8 5394.21  114.31 5407.33  115.06 5436.85  115.71 5443.41  115.28
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 5469.64  115.25 5482.76   116.1 5502.44  114.83 5512.28  116.06 5531.96  116.57
 5548.36  116.13  5558.2  114.58 5568.04  114.59 5577.88   115.9 5587.72  116.65
 5597.55  116.45 5607.39  114.19 5617.23  113.68 5623.79  114.65 5633.63  113.59
 5653.31  113.65 5699.23  112.31 5718.91  112.39 5732.02  111.96 5741.86  112.54
 5754.98   112.3 5761.54  113.34 5771.38  113.65 5791.06  112.78 5797.62   112.1
 5804.18  112.92  5817.3  111.91 5843.54  113.14 5859.93  112.74 5869.77  112.15
 5892.73  112.45 5902.57  113.07 5909.13  112.84 5918.97  113.42 5932.09  112.77
 5945.21   113.2 5958.33  113.18 5981.29  112.52 5987.85  111.74 6004.24  113.03
 6017.36  111.04  6027.2  111.81 6040.32  114.34 6050.16  114.11 6063.28  111.15
 6073.12  107.25 6082.96  105.09  6109.2  105.15 6119.04  105.57 6132.15  105.14
 6155.11  105.16 6164.95  105.72 6171.51  109.54 6178.07  112.24 6184.63  113.22
 6194.47  112.67 6214.15  113.39 6223.99  114.93 6233.83  113.75 6250.23  112.39
 6256.79  111.21 6263.35  113.55  6269.9  113.66  6302.7  113.01 6312.54   113.3
 6348.62  113.27  6368.3  113.41 6381.42  112.86 6420.77     113 6440.45  112.62
 6450.29     113 6460.13  112.82 6473.25  113.27 6483.09  113.03 6502.77  113.47
 6515.89  112.68 6525.73  113.19  6545.4  112.47 6555.24  113.26 6584.76  112.64
  6594.6  114.35 6604.44  114.95 6620.84  113.08 6630.68  112.95 6637.24  112.16
  6660.2   112.4 6673.31  111.55 6683.15  111.65 6699.55  110.38 6706.11  111.02
 6715.95  111.13 6725.79  111.84 6735.63   111.1 6752.03  111.95 6765.15  111.72
 6791.39  112.52 6814.34   112.2 6843.86  112.41  6853.7  112.14 6863.54  112.49
  6870.1  112.07  6886.5  112.43 6896.34   112.1  6919.3  112.06 6945.54  112.58
 6955.37   112.4 6965.21  112.84 6994.73  112.25 7014.41  112.56 7040.65  112.66
 7066.89  112.43 7089.84  112.68 7099.68  112.38 7106.24  112.94 7119.36  113.07
  7129.2  112.35  7145.6  113.17 7175.12  113.13  7194.8  112.42 7214.47  112.43
 7263.67  111.94 7276.79  112.13 7316.15  111.21 7329.27  111.28  7355.5  110.61
 7385.02  110.97 7394.86  110.16 7407.98  110.74 7414.54  110.55  7421.1  111.32
 7427.66   110.4  7437.5   110.3 7450.62  111.19 7460.46  109.76 7476.86  109.79
 7489.97  111.95 7496.53  111.87 7506.37  109.11 7512.93  108.76 7535.89  109.84
 7549.01  111.96 7562.13  112.49 7571.97  111.56 7598.21  111.26 7604.77  111.74
 7640.84  110.97  7647.4  110.12 7673.64  110.33 7683.48  111.29 7716.28  110.47
 7726.12  109.71 7742.52  109.31 7775.31   109.6 7785.15  110.17 7791.71  109.62
 7827.79  108.96 7844.19   108.5 7860.59  108.55 7870.43  109.68  7890.1  110.15
  7922.9  109.96 7936.02  110.45 7952.42  110.59 7978.66  109.84  8004.9  108.75
 8018.02  108.69 8050.81  109.55 8057.37  110.02 8080.33  110.03 8093.45  110.89
 8103.29  109.42 8119.69  108.57 8136.09  108.59 8142.65  108.96 8155.77  110.75
 8172.16  110.57 8188.56  111.53 8201.68  113.12 8221.36  113.25 8224.64  113.89
  8231.2   113.2 8260.73  112.97 8319.77  113.44 8349.29  113.08 8388.65  112.16
 8408.33  112.71 8424.73  112.04 8460.81  112.73 8473.93  112.38 8483.77  111.16
 8490.33  112.16 8503.46  112.26 8536.26  113.37 8559.22  113.52 8585.35  119.55
 8591.87  119.54  8598.4  118.09 8627.78  116.81  8644.1  116.65 8653.89  116.02
 8666.95  115.75 8722.44  115.29 8738.76  115.58 8781.19   115.8 8794.25   115.5
 8823.62   115.3    8853  115.54 8892.17   115.5 8905.23  115.98 8924.81  116.14
 8947.66  115.64 8967.24  116.01 8977.04  115.71 8986.83  116.28 8999.89  115.93
 9019.47  116.09 9035.79  117.42 9048.85  117.51 9074.96  116.88 9101.07  116.93

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 1377.33    .025 1725.33    .066 5587.72    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1300.68 1758.63          1212.33 1503.33 1122.85             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1300.68  111.95       T
 1758.63 9101.07  111.68       T
Left Levee      Station=   16.38      Elevation=  133.04
Right Levee     Station= 8585.35      Elevation=  119.55

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            129.78    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                 0.066      0.037      0.074
  W.S. Elev (ft)            129.70    Reach Len. (ft)          1212.33    1503.33    1122.85
  Crit W.S. (ft)            116.76    Flow Area (sq ft)       16976.99   15656.06   124781.50
  E.G. Slope (ft/ft)      0.000087    Area (sq ft)            17224.37   15656.06   129301.90
  Q Total (cfs)           235000.00    Flow (cfs)              20114.31   60352.54   154533.20
  Top Width (ft)           9058.73    Top Width (ft)           1258.34     457.95    7342.44
  Vel Total (ft/s)            1.49    Avg. Vel. (ft/s)            1.18       3.85       1.24
  Max Chl Dpth (ft)          39.31    Hydr. Depth (ft)           13.49      34.19      16.99
  Conv. Total (cfs)       25253030.0    Conv. (cfs)             2161477.0   6485465.0   16606080.0
  Length Wtd. (ft)         1243.27    Wetted Per. (ft)         1262.42     466.19    7368.25
  Min Ch El (ft)             90.39    Shear (lb/sq ft)            0.07       0.18       0.09
  Alpha                       2.22    Stream Power (lb/ft s)      0.09       0.70       0.11
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)    230286.70   79017.84   251972.20
  C & E Loss (ft)             0.00    Cum SA (acres)           25472.41    3138.17   27854.68


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 175.27*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  123.94    18.5  125.36      37  131.82   46.96  132.81   54.35  132.73
   66.16   129.2   76.51  125.61   79.46  125.22   85.37  126.17   89.81  124.81
  116.44  122.78  168.22  117.62   206.1  114.13  239.62  113.23  264.73   111.9
  292.48  111.35   311.7  110.37  353.12  109.93  432.26  110.24  464.07  110.16
  515.85  110.21  608.15  110.63  633.28  111.69  651.94  112.94  717.03  111.72
  724.43  112.36  731.82  111.74  809.17  111.84   834.3  112.18  968.31  112.38
  993.44   112.3 1068.84  112.46  1154.9  112.46 1165.26  113.25 1172.66  114.48
 1191.89   114.5 1211.12  114.25    1291  114.46 1304.31  114.79 1316.15   116.4
 1323.54   115.8  1326.5  116.67 1339.82  116.05 1353.13   117.5 1363.49  116.14
 1381.24   117.1 1388.63  117.05 1394.55  115.73 1400.47  116.71  1412.3  115.82
 1430.05  116.99 1444.84  115.04  1455.2  115.71 1459.64  115.25 1475.91  115.74
 1496.62  115.28 1530.65  115.17    1541  115.29 1622.36  115.42 1666.74  115.22
  1748.1  115.26 1813.19  115.63 1885.68   115.6 1924.14  115.95 1944.85  115.92
 1952.25  115.04 1959.65  114.91 1968.52  115.76 1990.71  115.74 2002.55  116.06
  2020.3  115.93 2036.57  115.28  2082.3  114.92 2174.44  115.14 2191.18  115.59
 2217.05  115.09 2225.93  115.45 2230.37  114.45 2237.76  116.02 2277.71  116.29
 2408.98  116.17 2438.96  115.97  2478.9  116.07 2515.88  115.82 2601.61   115.8
 2660.23  115.43 2711.16  115.32 2795.48  115.24 2819.38   115.4  2852.9  115.07
 2911.52  114.84 2945.03  114.09 3012.04  112.13 3048.36  111.73 3063.12  110.76
 3167.94  110.25 3173.84  110.02 3185.65  110.85 3212.23  111.19 3222.56  111.81
 3228.47  111.59 3247.66  111.86 3253.56   111.1 3271.28  110.55 3293.42  112.42
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 3303.76  112.62 3311.14   112.1 3330.33  112.15 3340.71  109.99 3349.17  106.41
  3356.3  104.87  3370.6103.8059 3398.92  102.13 3406.05101.2678 3432.08   98.12
 3439.17   97.68 3459.87    94.6 3477.11   92.84 3515.06   90.37 3574.86    89.4
 3620.62   89.96 3651.97    90.7 3683.33   92.25 3699.86   92.75  3711.3   95.89
  3721.5   96.92 3735.8797.44773 3745.19   97.79 3749.8498.76688 3757.06  101.14
  3761.3  100.77 3782.74  111.84 3807.75  111.76  3813.3  111.34 3835.53   111.4
 3849.42  109.83 3863.31  109.74 3877.21  109.02  3891.1  109.05    3905  108.09
 3921.67  108.43 3946.68  111.81 3960.57  112.25 3999.46  112.19 4005.02  112.39
 4021.69  111.73  4046.7  111.63 4074.49  111.74 4105.71  111.62 4125.89  111.19
 4141.03  111.22 4161.21  111.58 4181.39   111.4 4226.82  111.63 4260.84  112.13
 4282.32  111.86 4317.64   111.9 4332.78   112.7 4347.93  112.39 4403.03  113.58
 4454.06  112.77 4469.27  113.21 4489.45  113.17 4542.42  112.55 4570.59  111.75
 4598.18  111.22  4617.7  111.57 4670.67   110.6 4715.28  110.74 4752.95   110.4
 4793.48  110.18 4808.68  110.76 4832.37   109.6 4837.95  108.59 4854.26  108.98
 4865.83  108.35 4884.66  108.06 4896.49  108.65 4910.43  108.35 4927.16  108.49
 4949.46  109.39  4963.4  111.91  4985.7  111.64 5002.43  111.16 5036.64  111.29
 5046.76  111.53 5067.03  110.66 5082.22  110.53 5107.56   110.9 5130.68  110.87
 5152.98  111.21 5166.92  113.47  5172.5  113.69 5205.96  113.23 5228.25  112.72
 5254.46  113.09 5278.44  112.44  5286.8   112.6 5320.26  112.26 5362.08   113.1
 5384.38  112.83 5401.38  112.34 5420.63  112.22 5428.99  112.44 5477.37  112.49
 5497.62  111.88 5512.63  111.83 5537.72  112.36 5554.44  112.03 5593.47  112.27
  5610.2   112.1  5635.3  112.42  5664.8  112.08 5685.47  112.29 5720.51  112.16
 5750.92  112.61 5766.11  112.48 5783.05  113.14 5805.36  113.04 5813.72     112
 5883.42  112.07 5913.03  111.89 5953.12  111.88 6004.21  111.23  6034.6   111.3
 6064.99  111.05 6148.27  111.71 6156.64  112.23 6170.58  112.44 6176.15  113.32
 6198.46  113.45 6217.98  112.88 6229.12  113.73 6243.06  113.97    6257  114.94
 6270.94  114.45 6276.52  114.62 6290.46  112.95 6312.76  112.48 6351.79  112.63
 6368.52  112.52 6407.55  112.76 6449.37  112.78 6485.61  112.58 6502.34  112.01
 6520.92  111.92 6546.25  111.33 6555.32  111.42 6576.64  113.09 6586.78  113.41
 6607.04  112.31  6642.5  112.88 6672.41  113.02 6683.03  113.28 6703.07  114.23
 6711.43  112.79 6728.16  113.19  6742.1  113.19 6756.04  113.64 6769.99  113.51
 6781.14  113.88  6789.5  113.31 6800.66  113.71 6817.38  113.49  6859.2  113.68
 6884.29  114.53 6909.38  114.91 6914.96  114.63 6937.26  114.67 6948.41  115.34
 6965.14  114.49  6973.5  115.29 6990.23  115.59 7004.17  115.27 7012.54  114.21
  7020.9   114.2 7037.63  115.54 7045.99  115.39 7054.35  113.86 7062.72   113.5
 7068.29  114.14 7074.37113.6097 7093.38  113.47 7132.42  112.71 7149.15  112.86
 7160.29  112.53 7168.66  112.89 7179.81  112.69 7193.75  113.54 7209.87  113.13
 7216.05   112.6 7221.63  113.11 7232.78  112.35 7255.09  113.15 7277.39  112.55
 7310.84  112.83 7319.21  113.24 7330.36  112.83 7352.67  113.17 7372.18  112.59
 7377.76  112.07 7391.69  112.92 7402.84  111.59 7411.21   112.1 7422.36  113.76
 7430.72  113.58 7441.88  111.57 7450.24  108.94 7458.61  107.47 7480.91  107.38
 7489.28  107.66 7500.42  107.39 7519.94  107.39  7528.3  107.73 7539.45  112.08
 7545.03  112.74 7553.39  112.38 7570.12  112.87 7578.49  113.84 7600.79  112.05
 7606.37  111.25 7611.95  112.81  7645.4   112.4 7653.76  112.59 7701.16  112.61
 7712.31  112.24 7745.76  112.28 7762.49  111.99 7790.37  112.35 7798.73  112.17
 7815.46  112.42 7826.62  111.86 7834.98  112.18  7851.7  111.77 7860.06  112.34
 7885.16  111.93 7893.52  113.02 7901.89  113.38 7915.83  112.06 7929.77  111.37
 7949.29  111.48 7960.43  110.98 7968.79  111.09 7982.73  110.24 8005.04  111.19
  8013.4  110.69 8027.34  111.24  8038.5  111.14  8060.8  111.91 8080.31  111.64
 8122.13  112.03 8141.65  111.73 8152.11  111.13 8169.53  110.99 8208.56  111.34
 8233.65  110.93 8268.63  111.21 8294.99  110.95  8314.5  111.11 8322.86  110.91
 8339.59  111.59 8347.96  111.36  8361.9  112.01 8386.99  112.06 8403.72  111.56
 8425.67  111.64 8462.26  111.13 8473.41  111.15 8506.87  110.49 8518.02  110.56
 8540.32  110.12 8565.41  110.25 8573.78  109.68 8590.51  109.91 8596.08  110.44
 8610.02  109.78 8621.18  110.39 8629.54  109.45 8643.48   109.5 8654.63  110.98
  8660.2  110.97 8668.57  109.18 8674.14  108.98 8693.66  109.82 8704.81  111.28
 8715.96  111.65 8724.33  111.05 8746.63  110.84 8752.21  111.14 8782.87  110.64
 8788.45  110.08 8810.75  110.25 8819.12   110.9    8847  110.42 8855.36  109.95
  8869.3  109.75 8896.79  110.06 8905.54  110.62 8911.12  110.37 8932.25  110.32
 8955.73  109.89 8969.67   110.1 8978.03  111.06 8994.75  111.55 9018.38  111.37
 9033.57  110.74  9043.7  110.66 9063.96   111.4  9074.1  111.44 9103.49  110.74
 9131.36  111.02 9136.94  111.29 9156.46  111.14 9167.61  111.66 9175.97  110.65
 9189.92  110.04 9209.43  110.24 9220.58  111.39 9234.52  111.23 9248.46  111.82
 9259.61  112.85 9337.51  112.91 9359.99  113.07 9393.25   112.7 9418.54   111.7
 9435.27  112.59 9449.21  112.26 9479.88  112.97 9491.03  112.71  9499.4  111.82
 9504.98  112.43 9516.14  112.59 9563.54  115.06 9570.54  116.67 9585.75  119.47
 9592.18  119.04 9598.62  117.64 9605.96  116.94 9627.61   116.2 9643.71  116.01
 9653.37  115.55 9690.21  115.17 9710.42  115.44 9721.01   115.3 9778.97  115.66
 9820.83  115.39 9849.82  115.58 9888.47  115.55 9901.35  115.87 9920.67  115.97
 9943.22  115.63 9962.54  115.87  9972.2  115.66 9981.86  116.05 9994.75  115.89
10014.07  116.2110030.17  117.3310043.05  117.4810068.82  116.9910094.58  116.96

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3330.33    .025 3782.74    .066 7037.63    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3330.33 3782.74          1212.33 1503.33 1122.85             .1       .3
Left Levee      Station=   46.96      Elevation=  132.81
Right Levee     Station= 9583.56      Elevation=  119.53

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 174.93*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  118.72   11.75  118.62   30.54  119.61   35.25  120.88      47  125.88
    61.1  131.28   68.15  132.27   77.54  132.58   89.42  132.44  108.44  125.39
  125.08  118.23  129.83  117.46  139.34  119.85  146.48  117.58  165.52  116.81
  189.32   116.3  272.62  113.75  333.58  112.03   387.5  111.53  427.89   110.9
  472.54  110.83  503.47  110.01  570.11  109.76  582.01  109.84  660.55   109.9
  674.83  110.04  748.61  109.86  758.13  110.08  786.69  109.85  841.43  110.06
  893.79   110.1  908.07  109.94  936.63  110.12  988.99  110.17 1005.65  110.62
 1038.96  110.84 1050.87  110.55 1055.63  109.84  1069.9  109.01 1077.04  107.95
 1160.35  107.57 1167.48  108.82 1174.62  107.65 1179.38  107.58 1303.82  107.63
 1344.25  107.79 1559.86  107.89 1600.29  107.86 1721.58  107.94 1860.05  107.93
 1876.72  109.51 1888.61  111.98 1919.55  112.01 1924.31  111.33 1933.83  111.75
 1950.49  111.52 2052.83  111.88 2062.35  112.09 2079.01  111.94 2083.77  112.58
 2100.43   112.6 2107.57  114.28 2119.47  115.83 2126.61  115.81 2131.37  114.62
 2136.13  116.37 2140.89  115.29 2145.65  116.24 2157.55  115.14 2169.45  117.43
 2178.97  118.02 2195.63  115.31 2202.77  115.56 2224.19  117.21 2236.09   117.1
  2245.6  114.45 2255.13  116.42 2274.17  114.62 2286.06  115.27 2290.83  116.45
 2302.73  116.95 2307.49  115.06 2312.25  115.22 2326.52  113.04 2343.19  114.38
 2350.32  113.46 2362.22  114.26 2376.51  114.43 2409.83  113.48 2464.56  113.24
 2481.23  113.49  2495.5   113.4 2526.44  113.59  2566.9  113.57 2583.56  113.35
 2612.12  113.67 2645.44   113.4 2683.52  113.25 2716.84  113.31 2731.12  113.14
 2766.82  113.28 2814.42  113.24 2838.22  113.74 2852.49  113.48 2919.14   113.9
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 3035.75  113.78  3078.6  113.87 3097.63  114.25 3111.92  113.95 3130.96  114.07
 3142.86  112.26 3154.76  111.95 3159.52  113.16 3169.04  113.59 3204.74  113.42
 3223.78  113.98 3252.34  113.74 3278.52   112.7 3335.64   112.3 3352.09   112.1
 3416.56     112 3461.79  112.13 3490.35     112 3526.05  112.37 3559.37  112.18
 3568.89  111.73 3583.17  112.57 3590.31  110.53 3602.21  113.59 3618.87  113.72
 3649.81  113.66 3666.47  113.81 3687.89   113.7 3728.35  113.84 3792.61  113.81
 3833.08  113.68 3864.02  113.78 3897.34   113.6 3913.99   113.7  3961.6  113.58
 4037.76  113.64 4049.66  113.47 4075.84  113.59 4187.58  113.52 4232.92  113.38
 4363.82  113.27 4387.62  113.33 4466.17  113.26 4504.25  113.16 4530.43  113.72
 4591.86  113.54 4686.17  113.46 4799.37  112.62  4847.9  112.14 4906.34  111.92
 4915.83  111.52 4930.09     110 4941.96  109.83 4987.09  109.84 5072.59  109.62
 5098.71  109.61 5108.22  109.16 5112.97  109.83 5127.22  110.82  5148.6  111.08
 5160.47  111.94 5169.97  111.42  5186.6  112.54  5196.1  112.03 5207.97  112.46
 5226.97  112.35 5236.47  110.77 5248.35  110.48 5264.97  109.47 5267.35  110.11
 5276.85  110.55  5300.6  113.04 5317.23  113.41  5329.1  112.33 5350.48  111.99
 5359.98  112.36 5371.72  111.24 5381.27  107.46 5389.33  105.01 5399.75104.1636
 5434.77100.2237 5439.13   99.75 5466.03   94.84    5475   93.61  5506.4   91.32
  5525.9   90.38 5568.79   89.04 5600.52   88.86 5636.38    88.4 5687.63   89.07
 5699.62   90.11 5738.88   93.93 5748.26  100.36 5756.63   102.3 5760.55102.6228
 5774.35103.7592 5785.79   106.4 5789.26  106.27 5806.84  111.99 5832.02  111.85
 5850.33  112.11 5861.77  111.36 5896.09  111.15 5907.54  110.58 5921.27  110.77
 5941.86  112.48 5989.92  113.11 6035.42  112.36 6072.84   112.4 6089.46  111.34
 6101.93   111.3 6118.55  112.01 6135.17  111.66 6164.26  112.16 6172.58  112.07
 6197.51  112.87 6218.29   112.2 6247.39  112.05 6259.86  113.37 6272.33  112.77
 6297.04  113.64 6317.71  113.97 6343.06  113.68 6359.74  112.78 6372.26  113.73
    6382  113.52 6409.81  113.45 6439.01  112.69 6455.71  111.64 6478.44  111.44
  6503.7  111.64 6526.63  111.24 6555.83  111.77 6585.04  111.79  6605.9   111.5
 6639.28  111.38  6651.8  112.31 6662.13  111.31 6681.01  110.55 6689.34  111.44
 6714.37  110.19 6724.12  110.66  6739.4  110.84 6751.93  110.57 6767.75  111.02
 6779.23  112.12 6814.51   111.4 6839.54  112.21 6847.88  112.89 6864.58  111.37
 6877.09  111.11 6897.96   111.6 6935.36  111.53 6951.44  112.82 6985.57  112.58
 7018.94  113.13 7031.46  112.56 7056.49  112.27 7077.35  112.42 7094.05  112.99
 7110.73  114.05 7139.94  112.51 7173.32  113.21 7202.52  113.17 7219.21  112.01
 7240.06  112.07 7248.41  112.54 7273.44  112.25 7315.17  112.46 7327.68  112.98
 7356.89  112.63 7386.09  112.95 7402.78  112.71 7427.82  113.37 7440.33  112.83
 7452.85  113.27 7472.65  112.97 7479.54   112.5 7523.77  112.77 7561.33  112.34
 7582.19  112.42 7619.74  111.81 7636.42  111.38 7661.45  111.48 7686.49  110.85
 7719.87  111.54 7755.07  111.32 7768.85  111.52 7778.04   112.2  7790.8  112.38
 7812.48  112.02 7821.66  112.61 7844.62  113.53  7860.7  113.44 7872.18  112.59
 7890.55  112.32 7936.47  112.01 7982.72  112.06 7991.05  112.28  8032.9  111.91
 8061.99   110.9 8082.85  109.69 8087.02  109.75 8099.53  111.32 8107.88   113.2
 8116.23  113.86 8132.91  111.74 8141.26  111.72 8162.11  113.08 8174.64  112.87
 8195.49  113.09    8212  113.86 8218.89  113.23 8255.63  113.73  8276.3  113.61
 8283.19  113.27 8292.37  113.53 8316.49  113.65    8329  113.45 8361.25     114
 8404.88   114.1 8414.06  114.57 8427.84  114.14  8448.5  114.61 8473.76  113.81
 8487.54  114.42 8501.31  113.53 8512.79  113.62 8519.68  113.23 8561.02113.1643
 8579.39  113.34 8604.64  113.08 8609.23  113.38 8639.08  113.29 8648.27  112.78
 8666.64  113.16    8685  112.95 8719.45  113.05 8728.63  112.89 8750.39  113.13
 8767.67   112.4 8779.14  112.82 8788.33  112.14  8804.4  113.17 8811.29  113.04
 8820.47  111.99 8834.25  109.86 8852.62  109.61 8891.65  109.74 8900.84  111.93
  8926.1  112.34 8932.99  112.76 8955.95   111.3 8960.54  112.06 8988.09   111.8
 9021.58  111.99  9043.2  111.61 9070.75  111.57 9084.53  111.35 9128.16  111.37
 9137.34  111.05    9158  111.07 9164.89  111.43 9185.56  111.22 9199.33  111.81
  9222.3  110.58 9254.44  110.53 9265.92   110.1 9284.29  110.54 9291.18  110.28
 9309.46  110.46 9321.97  111.24 9359.53  111.04 9380.73  111.57 9392.91  111.34
 9405.42  110.17 9419.76  109.91 9472.57  109.62 9501.38  109.79 9513.89  109.52
 9555.62  109.65 9563.97  110.41    9589  111.04 9626.54  110.66 9630.71  110.91
  9693.3  109.79 9706.78  109.85 9745.81  109.54  9752.7   109.2 9771.07  109.55
 9782.55  109.26 9791.73   109.6 9798.62  109.15  9810.1  109.21 9823.87  110.06
 9835.36   109.2 9851.43  109.81 9860.61  110.61 9899.65  110.55  9924.9  110.31
  9929.5  110.04 9947.87  110.17 9954.76  110.51 9996.09  110.1910018.72  110.53
10025.93  111.0710047.93  111.4810072.96  111.3110089.66  112.7210110.52  113.07
10118.86  112.7410131.37  111.0310139.72  110.78 10156.4  112.7510164.75  113.23
10202.31  112.5610232.58  112.2410241.77  112.4210260.14  111.5110276.21  111.51
 10285.4  112.0410296.87  111.8910317.54  112.5810331.32  112.5110360.84  112.84
 10381.7   112.610400.21   112.7 10427.6  112.5510448.44  111.25 10456.8  112.28
 10473.7  112.4710498.95  113.2110515.03  112.4810523.56  112.6310548.59  114.27
10567.85  116.6110573.62  117.9110586.14  119.3910606.09  116.1210652.85  115.07
10689.19   114.810709.13   115.5 10732.4  115.1910776.75  115.5210818.05  115.48
10846.64  115.6110884.76   115.610916.53  115.7910938.77  115.6110967.37  115.62
10998.33  115.9911024.55  117.2511037.26  117.4611062.67  117.1111088.08  116.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .198 5359.98    .066 5399.75    .015 5687.63    .066 5806.84    .069

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5359.98 5806.84          1212.33 1503.33 1122.85             .1       .3
Left Levee      Station=   77.54      Elevation=  132.58
Right Levee     Station=10581.77      Elevation=  119.51

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 174.6

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  113.49   16.38  112.97   29.49  113.72   42.59  113.86   49.15  115.66
   65.53  122.92   75.36  126.49   85.19  130.73   95.02  132.07  108.12  132.35
   124.5  132.15  150.71  121.59  173.65  110.86   180.2  109.71  190.03  113.02
  193.31  113.53  203.15  110.35  206.43  110.02   229.4  109.79  249.08     110
   262.2  109.82   331.1  109.88  350.78  110.03  377.03  109.87  475.44  109.95
  564.02  109.79  636.19  110.07   652.6  110.31  678.84  110.07  695.24  109.66
  708.37  109.75   787.1  109.59   803.5  109.73  911.76  109.68  931.45  109.86
 1033.15  109.55 1046.27  109.89 1085.64  109.54 1128.29  109.73 1147.97  109.59
 1161.09  109.81 1207.02   109.7 1233.27  109.77 1252.95  109.49 1292.32   109.7
 1308.72  109.56 1334.97  109.74 1364.49  109.54 1387.46  109.91 1410.42  109.85
 1433.38  109.13 1439.95  108.23 1449.79  108.16 1456.35  106.88 1476.03  105.25
 1485.87  103.57 1492.44  103.41  1600.7  103.41 1610.54  105.28 1620.38  103.52
 1626.94  103.41  2565.2  103.41 2588.17  105.77 2604.57  109.48 2611.13  110.03
 2620.97  109.57 2647.22  109.53 2653.78   108.5  2666.9  109.13 2689.87  108.79
 2781.72  109.15 2791.56  109.04 2830.93  109.33 2844.05  109.64 2867.02  109.42
 2873.58  110.39 2883.42  110.16 2889.98  110.88 2896.54  110.42 2906.39  112.93
 2922.79  115.26 2932.63  115.23 2939.19  113.45 2945.75  116.07 2952.32  114.45
 2958.88  115.88 2968.72  115.32 2975.28  114.22 2991.68  117.66 3004.81  118.55
 3027.77  114.47 3037.61  114.85 3044.17     116 3050.73  115.95 3067.14  117.32
 3083.54  117.16 3096.66  113.18 3103.22  115.34 3109.79  116.13 3122.91  114.48
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 3136.03  113.43 3152.43   114.4    3159  116.17  3175.4  116.91 3181.96  114.07
 3188.52  114.31  3208.2  111.05 3231.17  113.05 3241.01  111.67 3257.41  112.87
  3277.1  113.11 3323.03  111.69 3342.71  111.46 3362.39  111.59 3398.48  111.31
 3421.45  111.68 3441.13  111.55 3483.78  111.82 3516.58  111.63 3539.55  111.78
 3562.51  111.45 3601.88  111.93 3637.97  111.76 3647.81  111.51  3700.3  111.27
 3746.23  111.35 3765.91   111.1 3815.12  111.29 3857.77   111.1 3880.73  111.22
 3913.54  111.96 3933.22  111.56 3949.63  111.92 3969.31  111.86 4025.08  112.18
 4071.01  112.13 4090.69  111.87  4107.1  112.06 4185.83  111.96  4225.2  112.14
 4244.89  112.02 4271.13  112.55 4290.82  112.07 4297.38  112.39 4317.06  112.22
 4333.47  109.48 4349.87  108.99 4356.43   110.8 4369.56  111.42  4395.8  111.24
 4402.36  110.92 4418.77  111.09 4425.33  111.58 4445.01   111.9 4484.38  111.55
 4520.47  110.11 4546.72  109.85 4599.21  109.57 4618.89  109.29 4704.19  109.11
 4710.75  109.02 4773.09  109.15 4812.46   108.9 4861.67  109.16  4907.6  109.01
 4920.72  108.38 4940.41  109.68 4946.97  106.92 4950.25   106.6 4966.65  111.16
 4983.06     111 4989.62  111.31 5032.27  111.14 5055.23  111.32 5084.76  111.17
 5140.53  111.39 5229.11  111.38 5284.89  111.19 5327.54  111.35 5373.47  111.18
 5396.43  111.36 5412.84  111.14 5429.24   111.3 5462.05  111.16 5501.42  111.34
 5514.54  111.18 5567.03  111.34 5583.43  111.12 5619.52  111.35  5708.1  111.32
 5836.05  111.17 5895.11  111.28 6016.49  111.22  6049.3  111.32 6157.57  111.29
 6180.53   111.2  6203.5   111.4 6210.06  111.16 6229.74  111.85  6236.3  111.44
 6246.15  112.03  6374.1     112 6485.64  112.09 6534.85     112 6616.87  112.19
 6629.99   112.1 6731.57  112.19 6764.31  112.11  6777.4  111.52 6797.05  109.24
 6813.42  108.99 6875.62  109.06 6993.48  108.93 7029.49  108.97 7042.59  108.31
 7049.14  109.31 7068.78   110.8 7098.25  111.19 7114.62  112.46 7127.71  111.65
 7137.53  112.68 7150.63  113.27 7163.73  112.48  7180.1  113.08 7206.29  112.85
 7219.38  110.44 7235.75  109.97 7258.67  108.39 7261.94  109.34 7275.04  109.97
 7294.68  112.01 7307.78  113.67  7330.7   114.2 7347.07  112.56 7376.53  112.03
 7389.63  112.56  7392.9  112.31 7402.72  112.48 7422.37  105.14 7428.91  104.79
 7477.91   97.51 7507.91   90.71 7517.91   89.11 7537.91   88.11 7617.91   87.71
 7657.91   87.81 7697.91   87.41 7737.91   87.81 7777.91   95.11 7785.23  104.83
 7791.76  107.68 7801.56  108.82 7814.62  111.69 7830.95  112.15 7844.02  112.14
 7866.88  112.87 7879.94  112.89 7896.27  113.43 7906.07  113.05 7948.52  113.19
 7984.45  114.05 8010.57  113.07  8026.9  112.92 8039.97  113.18 8053.03  111.48
 8062.83  111.37 8075.89  112.44 8088.95  111.91 8111.81  112.66 8118.35  112.51
 8131.41  113.56 8137.94   113.6 8154.27  112.54 8177.13   112.2 8186.93  114.03
 8196.73  113.16 8219.59  114.43 8252.31  114.28 8265.42  112.79 8275.26  114.24
 8285.09  113.88 8304.76  114.02 8327.71  112.97 8340.83  111.53 8376.89   111.8
 8396.56  111.76 8419.51  112.84 8442.46  112.95 8458.85   112.6 8478.52  112.81
 8485.08  112.58 8494.92  113.86 8504.75  112.42 8517.87  112.53 8524.42  113.91
 8530.98  113.69 8544.09  112.31 8563.76  113.21  8573.6  112.54 8583.43  112.74
 8606.38  111.92 8622.78  111.67 8642.45  113.12    8649  114.25 8662.12  112.08
 8671.95  111.69 8688.35  112.29 8714.57  111.83  8757.2  112.18 8773.59  113.13
 8783.42  113.17 8793.26  112.35 8803.09  112.59 8812.93  112.19 8829.32  112.51
 8842.44  113.31 8855.55  114.99  8878.5  112.68 8904.73  113.93 8927.68  113.84
 8940.79  112.15 8957.18  112.17 8963.74  112.76 8983.41  112.45  9016.2   112.8
 9026.03  113.55 9048.98  113.17 9071.93  113.58 9085.04  113.26 9104.72  114.14
 9114.55  113.18 9124.39  113.46  9137.5  112.84 9157.17  113.27 9180.12  113.46
 9209.63  112.79 9226.02   112.9 9255.53   112.1 9268.64  111.52 9288.31  111.67
 9307.98  110.65 9334.21   111.7    9367   110.8 9389.95  111.29 9399.78  110.82
 9426.01  112.05 9445.68  112.27 9471.91  112.15 9501.41  111.51 9540.76  111.46
 9547.31  111.83 9583.38  111.18 9603.05  109.89 9619.44  108.06 9622.72  108.21
 9632.55  110.55 9639.11  113.32 9645.67  114.32 9658.78  111.17 9665.34  111.09
 9681.73  113.28 9691.57  112.85  9701.4   113.3 9707.96  112.89 9724.35  113.65
 9763.69  113.88 9773.53  113.18 9803.04  113.64 9812.87  113.23 9829.26  113.62
 9848.93   113.3 9868.61  113.37 9881.72  113.89 9963.68  113.04 9989.91  113.26
10009.58  113.8110042.37  113.2410048.92  113.7610068.59  113.04 10098.1  113.42
10114.49   112.8   10144  113.1710153.83  112.7410180.06  112.6810209.57  112.25
10225.96  111.7910245.63  111.9910252.19  111.74 10281.7  111.8310298.09  111.38
10343.99  111.12 10357.1  111.3510366.94     11110386.61  110.9610455.46  110.14
10471.85  110.5710484.96  110.53 10524.3  109.55 10540.7  109.9910583.32   109.8
10593.15  110.7810622.66  110.3910642.33  111.2410648.89  110.8510658.72  109.21
10681.67  108.4610701.34  108.2710734.13  108.3610743.96     10810776.75  107.97
10783.31  109.2910802.98  109.9810832.48  109.7710835.76  110.1810852.15  109.88
10865.27  109.1910884.94  109.0110904.61  109.24 10937.4   108.610980.02  108.94
 11012.8   109.911035.75  110.0811052.14  109.8911101.32  110.1811140.66  110.99
11153.78  112.2211163.61  112.6311183.28   112.7 11196.4  114.1711212.79  114.57
11219.35  114.1211229.18  111.3311235.74  110.8911248.85  114.1111255.41  115.03
11268.52  115.1811284.92  114.2411311.14  113.2611386.55  112.14 11409.5  112.77
11425.89  112.2811461.96   112.411478.35  110.79 11484.9  112.1811520.97  113.56
11537.36  112.8511557.03   114.8 11576.7  119.1611586.54  119.3111606.21  115.29
11655.39  114.5511688.17  114.4211707.84  115.5611730.79  115.0311786.53  115.48
11855.38  115.6811970.12  115.5611993.07  115.9812025.86  117.4812081.59  117.01

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .198 7389.63    .066 7428.91    .015 7785.23    .066 7830.95    .069

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7389.63 7830.95           3662.8    2000 1560.98            .1       .3
Left Levee      Station=  108.12      Elevation=  132.35
Right Levee     Station=11579.98      Elevation=  119.49
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   64.26 7341.37  114.18 7983.9411911.65  114.01

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            129.43    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.61    Wt. n-Val.                 0.198      0.016     0.069
  W.S. Elev (ft)            128.82    Reach Len. (ft)          3662.80    2000.00    1560.98
  Crit W.S. (ft)            118.75    Flow Area (sq ft)       105691.80   15140.63   62088.79
  E.G. Slope (ft/ft)      0.000071    Area (sq ft)            105691.80   15140.63   62088.79
  Q Total (cfs)           235000.00    Flow (cfs)              39863.03   127906.00   67230.91
  Top Width (ft)          11948.83    Top Width (ft)           7256.87     441.32    4250.64
  Vel Total (ft/s)            1.28    Avg. Vel. (ft/s)            0.38       8.45       1.08
  Max Chl Dpth (ft)          41.41    Hydr. Depth (ft)           14.56      34.31      14.61
  Conv. Total (cfs)       27866940.0    Conv. (cfs)             4727066.0   15167450.0   7972424.0
  Length Wtd. (ft)          2650.93    Wetted Per. (ft)         7264.59     450.61    4264.49
  Min Ch El (ft)              87.41    Shear (lb/sq ft)            0.06       0.15       0.06
  Alpha                       23.75    Stream Power (lb/ft s)      0.02       1.26       0.07
  Frctn Loss (ft)              0.15    Cum Volume (acre-ft)    224607.40   77430.64   244350.10
  C & E Loss (ft)              0.18    Cum SA (acres)           25116.57    3091.61   27406.43


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION
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RIVER: Rio Grande
REACH: Lower Reach RS: 174.2

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	115.49	32.52	115.73	52.03	117.4	55.29	118.25	71.55	125.17
84.55	131.09	91.06	131.84	110.6	132.04	120.44	131.74	123.72	131.16
130.28	128.31	153.25	120.42	163.09	117.27	176.21	114.84	186.06	114.03
199.18	113.54	209.02	114.05	251.67	113.81	291.04	113.79	310.72	114.03
350.09	113.9	402.59	114.04	448.52	114.03	471.48	113.58	478.04	111.85
487.88	106.68	494.45	105.49	501.01	108.85	504.29	109.51	517.41	109.03
563.34	108.73	609.27	108.84	645.36	108.71	684.73	108.82	724.1	108.77
733.94	108.28	743.78	108.81	750.34	108.67	763.47	109.76	770.03	111.14
786.43	111.85	792.99	111.03	809.4	104.01	812.68	103.41	1235.89	103.41
1245.73	104.08	1255.58	107.25	1265.42	108.82	1278.54	109.62	1291.66	109.42
1301.51	109.81	1324.47	109.81	1331.03	110.22	1344.16	109.68	1396.65	109.78
1419.61	109.64	1488.51	109.79	1547.56	109.45	1557.4	109.61	1609.89	109.5
1701.76	109.56	1734.56	109.81	1760.81	109.53	1800.18	109.72	1829.7	109.66
1892.04	109.75	1898.6	109.89	1957.65	109.68	1980.62	109.75	1997.02	109.56
2019.99	109.67	2069.2	109.57	2085.6	109.74	2118.41	109.6	2161.06	109.83
2197.15	109.6	2233.23	109.59	2282.44	109.71	2298.85	109.49	2321.81	109.66
2341.5	109.49	2423.52	109.69	2439.92	109.52	2476.01	109.69	2508.81	109.65
2515.38	109.49	2544.9	109.64	2558.03	109.51	2571.15	109.76	2594.11	109.52
2630.2	109.64	2659.73	109.51	2682.69	109.9	2685.97	109.65	2712.22	109.39
2725.34	109.54	2777.83	109.43	2800.8	109.53	2850.01	109.48	2872.97	109.34
2895.94	109.53	2909.06	109.32	2922.19	109.54	2971.4	109.28	2984.52	109.47
3000.92	110.18	3023.89	110.58	3027.17	110.29	3037.01	106.94	3040.29	106.33
3046.85	107.16	3056.69	110.66	3066.54	111.57	3082.94	111.44	3092.78	110.9
3105.91	111.39	3115.75	111.19	3148.55	111.42	3197.77	111.31	3207.61	111.49
3233.85	111.07	3283.06	112.32	3299.47	111.92	3319.15	112.14	3335.56	112.07
3391.33	112.2	3443.82	112.02	3460.22	112.16	3473.35	111.95	3493.03	112.2
3561.93	112.08	3591.45	112.2	3624.26	112.01	3653.79	112.14	3683.31	111.86
3758.77	111.98	3768.61	111.72	3781.73	112.01	3801.42	112.02	3827.66	110.65
3850.63	110.36	3870.31	110.6	3890	110.43	3909.68	110.83	3935.93	110.51
3952.33	110.85	3975.3	110.48	4004.82	110.76	4040.91	110.75	4057.31	110.54
4086.84	110.79	4106.52	110.54	4126.21	110.76	4149.17	110.63	4178.7	110.81
4234.47	110.67	4241.03	110.82	4277.12	110.61	4313.21	110.82	4319.77	110.62
4346.02	110.53	4365.7	111.34	4395.23	111.48	4418.19	110.32	4451	109.83
4480.52	110.14	4523.17	110.13	4533.02	109.74	4562.54	109.28	4588.79	109.09
4634.72	108.97	4664.24	109.04	4674.09	108.87	4716.74	109.15	4739.7	108.99
4779.07	109.14	4811.88	108.96	4834.84	109.45	4847.96	108.11	4870.93	108.16
4887.33	108.82	4903.74	108.68	4939.82	108.92	4975.91	108.79	4995.6	108.96
5018.56	108.71	5028.4	108.98	5044.81	108.86	5077.61	109.08	5172.75	108.95
5192.44	109.13	5228.52	108.93	5244.93	109.13	5258.05	108.95	5290.86	109.15
5300.7	108.99	5320.39	109.16	5340.07	109	5353.19	109.19	5369.6	108.94
5399.12	108.99	5405.68	109.17	5445.05	108.98	5468.02	109.18	5494.26	109.04
5504.1	109.21	5527.07	108.96	5602.52	109.2	5628.77	108.88	5651.74	109.15
5658.3	108.9	5677.98	109.39	5694.38	109.3	5717.35	109.9	5730.47	108.9
5740.31	110.56	5750.16	110.97	5792.81	110.46	5799.37	111.01	5848.58	111.12
5907.63	111	5976.52	111.05	6029.02	111	6068.39	111.09	6137.28	111.05
6153.68	110.93	6163.52	111.49	6176.65	111.54	6186.49	111.22	6189.77	111.69
6268.51	111.57	6307.88	111.7	6327.56	111.48	6370.21	111.63	6458.79	111.68
6488.31	111.59	6537.52	111.68	6580.17	111.61	6649.07	111.79	6665.47	111.64
6724.53	111.71	6836.07	111.64	6904.96	111.67	6924.65	111.76	6967.3	111.71
6973.86	111.49	6990.26	111.66	7009.95	111.48	7029.63	111.64	7075.56	111.63
7082.12	111.48	7137.89	111.73	7160.86	111.54	7180.54	111.68	7193.67	111.53
7223.19	111.59	7262.56	111.97	7275.68	111.76	7301.93	111.71	7354.42	111.79
7433.16	111.72	7479.09	111.85	7515.17	111.51	7541.42	111.83	7613.6	111.76
7630	111.91	7649.68	111.54	7672.65	111.72	7702.18	110.22	7712.02	109.03
7771.07	109.29	7826.84	109.15	7853.09	109.29	7899.02	109.23	7918.7	109.03
7928.54	109.2	7954.79	109.01	7990.87	109.27	8023.68	109.02	8046.65	109.21
8056.49	109.08	8092.58	109.25	8108.98	108.65	8115.54	109.49	8125.38	109.42
8145.07	110.09	8161.47	108.64	8174.59	108.76	8194.28	108.22	8207.4	109.21
8217.24	109.4	8236.93	107.64	8246.77	107.07	8259.89	107.02	8269.73	109.11
8276.29	109.67	8289.42	107.64	8309.1	107.46	8328.79	107.77	8351.75	108.69
8361.59	108.23	8377.99	108.21	8394.4	107.84	8407.52	108.94	8427.2	111.7
8443.61	112.64	8450.17	111.8	8463.29	111.84	8473.13	111.13	8499.38	107.92
8515.78	106.98	8532.18	106.83	8551.86	107.74	8558.42	107.72	8584.67	106.69
8594.51	105.15	8601.07	104.79	8641.07	105.07	8661.07	103.49	8699.07	101.93
8718.07	101.7	8720.07	100.74	8729.07	99.4	8742.07	94.5	8758.07	91.7
8774.07	90.6	8807.07	89.1	8823.07	88.2	8840.07	87.9	8856.07	87.1
8891.07	86.71	8896.3	104.79	8902.86	105.35	8909.42	110.07	8915.97	110.99
8955.31	110.28	8974.97	110.26	9014.31	109.84	9024.14	110.82	9033.97	110.82
9053.64	109.08	9060.2	109.57	9092.98	109.25	9115.92	108.83	9129.03	109.18
9148.7	109	9155.26	108.63	9191.31	108.52	9197.87	108.72	9207.7	108.26
9230.65	108.14	9237.2	108.79	9266.7	108.01	9292.93	107.95	9312.59	107.55
9348.65	108.04	9378.15	107.63	9397.82	107.71	9433.87	107.34	9489.6	107.61
9512.54	106.9	9555.15	107.17	9564.99	107.07	9617.43	107.51	9633.82	107.03
9656.77	106.91	9673.16	106.57	9686.27	107.55	9715.77	107.89	9745.27	108.52
9771.49	108.06	9781.33	108.5	9797.72	108.65	9810.83	108.17	9817.38	108.46
9827.22	108.12	9843.61	108.34	9859.99	107.04	9873.11	106.99	9882.94	108.72
9905.88	110.15	9912.44	107.94	9928.83	106.95	9941.94	107.17	9958.33	106.72
9991.11	106.5210000.94		106.6610040.28		106.6910056.67		107.5910063.22		107.5
10076.33	108.110092.72		107.110105.83		107.2110115.67		107.6510132.06		107.85
10138.61	107.0110191.06		106.6810200.89		106.9610230.39		106.610240.23		106.69
10256.62	107.4110279.56		107.3510302.51		106.8110322.17		106.8910328.73		107.67
10335.28	110.910341.84		112.3710368.06		112.5110381.17		113.1610404.12		113.2
10420.51	113.9310427.06		113.3910446.73		114.0310456.56		113.6610469.68		113.85
10482.79	114.5110509.01		114.8810522.12		114.5810531.96		116.3110548.34		117.6
10558.18	116.5410571.29		115.8 10584.4		115.5610600.79		114.7810620.46		114.65
10630.29	115.0910653.24		114.8910669.63		114.3110728.63		113.8110745.02		114.16
10797.46	113.110810.57		111.4810817.13		112.9710840.07		112.5410846.63		112.86
10856.46	111.4610872.85		111.0810889.24		111.21 10895.8		112.1210905.63		115.65
10918.74	119.1710928.58		118.7910938.41		116.2910951.52		112.0810958.08		111.36
10971.19	110.9811020.36		113.9511030.19		113.5111046.58		114.6111079.36		114.81
11099.02	114.6711194.08		115.1211220.31		11511272.75		115.3811282.58		115.68
11305.53	115.2211315.36		115.8411328.47		117.1911348.14		117.4111371.09		117.19

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	8718.07	.025	8891.07	.06610918.74		.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
8584.67 8915.97 472.5 1764.5 2016 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
8915.9711371.09 110.99 T
Left Levee Station= 110.6 Elevation= 132.04
Right Levee Station=10918.74 Elevation= 119.17

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Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1278.54  109.62

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            129.10    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                0.066      0.048      0.068
  W.S. Elev (ft)            129.08    Reach Len. (ft)          472.50    1764.50    2016.00
  Crit W.S. (ft)            114.02    Flow Area (sq ft)       157885.40   10659.26   40920.17
  E.G. Slope (ft/ft)      0.000048    Area (sq ft)            157885.40   10659.26   45261.86
  Q Total (cfs)           235000.00    Flow (cfs)             172474.80   22380.62   40144.56
  Top Width (ft)          11242.58    Top Width (ft)           8456.16     331.30    2455.12
  Vel Total (ft/s)            1.12    Avg. Vel. (ft/s)            1.09       2.10       0.98
  Max Chl Dpth (ft)          42.37    Hydr. Depth (ft)           18.67      32.17      16.67
  Conv. Total (cfs)       34067530.0    Conv. (cfs)             25003370.0   3244479.0   5819686.0
  Length Wtd. (ft)          843.66    Wetted Per. (ft)         8463.19     348.30    2472.36
  Min Ch El (ft)             86.71    Shear (lb/sq ft)            0.06       0.09       0.05
  Alpha                       1.16    Stream Power (lb/ft s)      0.06       0.19       0.05
  Frctn Loss (ft)             0.04    Cum Volume (acre-ft)    213525.80   76838.36   242426.70
  C & E Loss (ft)             0.00    Cum SA (acres)           24455.95    3073.88   27286.28


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 174.10*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  123.76   17.22   123.9   29.28  125.16   44.78   131.6   58.58  132.08
   64.62  131.72   72.94  130.13   88.76  124.39  100.83  120.64  116.04  117.01
  130.41  115.41  155.55  114.81  166.32  115.04  257.78  114.78  278.91  115.03
  284.95  114.54  294.01  111.39  300.05  109.99  306.08  109.87  312.11   111.6
  324.19  111.29  351.36  111.16  405.68  111.31  453.65     111  460.83  110.15
   471.6  107.57  478.79  106.94  489.56  108.99   541.5  108.64  562.63  107.83
  571.69  106.57  601.87  106.37  613.94  106.06     644  106.01   687.1  106.07
   730.2  106.04  740.97   105.8  758.92  105.99   773.3  106.54  780.48  107.23
  798.43  107.58  805.61  107.18  823.58  103.67  827.17  103.37  991.24  103.37
 1000.28  103.77  1018.4  103.44 1033.49  104.21 1042.55  103.76 1054.61  103.93
 1063.67  105.29 1081.78  106.07 1096.87   108.1 1105.93  108.89 1111.96  108.88
 1121.02  107.51 1130.07  106.71 1178.36  106.54 1205.53  106.66 1244.77  106.62
  1265.9  106.71 1290.47  106.62 1301.24  106.98 1312.02   108.6  1322.8  109.41
 1337.16  109.83 1351.52  109.65 1394.62  110.08 1408.99  109.83 1440.96  109.91
 1491.59  109.78 1525.47  109.88 1537.54  109.63 1552.64   109.7  1579.8  109.42
 1628.09   109.3 1658.28  109.44 1667.33  109.36 1718.64  109.43 1772.97  109.37
 1794.09  109.49 1824.28  109.44 1836.38  109.56 1865.11  109.44 1908.21  109.53
 1972.17  109.47 2038.58  109.63 2077.81  109.47 2153.27  109.42 2201.56  109.57
 2216.66  109.79  2240.8  109.54 2303.28  109.71 2370.59  109.55  2388.7   109.7
 2409.82  109.63 2418.88  109.02 2430.95  107.02 2436.99  106.75 2443.03   107.3
 2452.08  109.45 2458.11  109.66  2503.4  109.24 2539.61  109.24 2593.94  109.38
 2633.17  109.26 2669.39  109.36 2691.16  109.25 2752.22  109.37 2777.35   109.3
 2816.86  109.37 2849.19  109.28 2874.32   109.5 2906.65  109.24 2928.97  109.37
 3004.42  109.26 3034.61  109.33 3082.63  109.16 3107.77  109.27 3122.14  109.16
 3155.33  109.31 3176.46  109.18 3212.68   109.7 3218.72  109.31 3227.77   107.7
 3236.83  107.59  3248.9  109.48 3251.92  109.53  3265.8  107.65 3272.98  108.07
 3283.75  109.84 3294.53  110.24 3323.26  109.83 3337.63  110.06 3348.41  109.97
 3375.67   110.2 3448.97   110.2 3477.69  110.03  3496.4  110.29 3517.53  110.31
 3549.53  110.57 3565.82   111.1 3599.02   111.3 3629.21  111.23 3644.29  111.39
 3671.46  111.42 3683.53  111.24 3725.79   111.4 3739.88  111.23 3761.43  111.39
 3836.85  111.32 3869.17  111.39 3928.01  111.26 3949.14  111.33  3991.4  111.15
 4048.74   111.3 4063.11  111.15 4077.47  111.36 4100.05  111.07 4112.13  111.13
 4127.75  110.71 4145.33  110.54 4187.59  110.71    4196  110.54 4217.54  110.79
 4246.28  110.57 4264.23  110.86 4289.38   110.7  4321.7  110.82 4379.16  110.73
 4411.49  110.86 4433.03  110.71 4454.59  110.87 4479.72  110.77 4512.05  110.89
 4549.79   110.8 4580.28  110.86 4619.79  110.68  4659.3  110.79 4679.58   110.6
 4695.22  110.66 4716.76     111 4742.95  111.13 4774.22  110.47 4810.14  110.25
  4866.7  110.53 4889.15  110.52 4918.01  110.04 4954.24  109.92 5035.73  109.87
 5054.37  109.72 5074.96  109.88 5126.19  109.89  5147.4  110.07 5159.48  109.84
 5171.55  110.03 5192.69  110.05 5201.73  109.84 5207.77  108.34 5213.81  107.75
 5222.86  109.12 5230.34  109.65 5244.71  108.99 5269.85   108.9 5287.81  109.19
 5305.77  109.13 5345.27  109.27 5406.33   109.3 5431.47  109.18 5442.24  109.32
  5476.4  109.27 5518.66  109.46 5560.91  109.36 5576.01  109.46 5661.32  109.42
 5693.64  109.35  5797.8   109.5 5815.76  109.37 5855.26  109.48 5898.96  109.39
  5923.5  109.58  5953.3  109.49    5963  109.62 5988.15  109.49 6070.75  109.59
 6131.81  109.43 6171.31  109.58 6196.45  109.92 6210.82  109.45 6221.59  110.25
 6232.37  110.42 6279.06   110.2 6286.24  110.49 6324.54  110.72 6339.64  111.23
 6366.81  111.38 6393.97  111.09 6406.04  111.28 6460.38   111.3 6481.51  111.15
 6490.58  111.31 6529.83  111.34  6572.1   110.5 6602.29  110.68 6644.56  110.51
 6674.12  110.65 6684.89  110.95 6710.04  110.75 6713.62  110.99 6810.64  110.98
 6864.47  110.87  6898.2  110.94 6937.46  110.87 6952.55  111.02 6982.75   110.9
 6994.82     111 7028.04  110.83  7115.6  110.95 7127.69  110.87 7182.03  111.03
 7234.39  110.94 7339.05  110.96 7384.34  111.03 7396.41  110.94 7438.69  111.02
 7499.08  110.96 7532.29  111.06 7547.39  111.83 7556.44  111.35 7589.94   111.4
  7611.5  111.26 7625.89   111.4 7707.43  111.34 7722.52  111.52 7776.88  111.34
 7782.92  111.46 7812.62  111.33 7855.39  111.32 7888.04  111.48 7900.68  111.36
  7988.6  111.47 8045.62  111.46 8075.81  111.38 8125.08  111.48 8164.58   111.2
 8211.69  111.44 8220.75   111.3 8272.33  111.31 8290.29  111.39 8311.83  111.17
 8336.98  111.27  8369.3  110.57 8380.08  109.95 8420.04  110.12 8474.39   110.1
 8489.49  110.02  8522.7  110.11 8571.02  110.09 8606.34  109.95 8617.11  110.05
 8652.55  109.95 8685.34  110.11 8721.26  109.96 8796.69  110.05 8814.64  109.77
 8821.82   110.2 8854.86  110.41  8872.1  109.82 8886.47  109.86 8908.02  109.56
 8922.38  110.06 8933.16  110.18 8954.71  109.26 8965.48  109.01 8979.85  109.02
 8990.62  110.01  8997.8  110.26 9012.17  109.18 9033.01  109.18 9045.09  109.48
 9057.16  110.33 9069.25  110.46 9084.34  108.91  9093.4  108.75 9099.45   109.1
 9105.48  110.12 9120.58  110.24  9127.1  109.96 9153.79  109.95 9168.89  111.26
 9180.97  112.85 9186.44  112.37 9197.37  112.26 9205.57  110.86 9226.08  106.73
9228.17106.5647 9241.12  105.54 9254.78  105.06 9271.19  105.03 9298.53  104.21
 9306.73  102.78 9315.17  102.11 9331.41   99.73 9345.53   98.8  9362.2    97.3
 9393.87   95.86 9409.71   95.45 9416.3794.47572 9429.71   91.42 9443.04   89.88
  9473.9   88.37 9497.21   87.56 9511.38   87.36 9524.72   86.79 9553.88   86.35
 9554.03   95.93 9560.65  105.53 9564.75  106.91 9572.75     111 9577.63  112.26
 9586.11  112.86 9606.14  112.54 9626.16  110.52 9651.31  109.94 9664.34  110.38
 9677.38   109.7 9692.88  110.12 9718.68  109.53 9740.41  109.51 9744.76  109.32
 9794.74  109.13 9799.08  109.47 9818.64  109.14 9849.07  109.07 9886.38  109.58
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 9899.72  110.68 9906.39   110.9 9939.76  110.24 9966.45  110.63 9981.63  110.12
10009.88  110.3410051.18  110.4910062.04   110.210088.12  109.8510096.82   110.3
10135.93   110.910153.32  110.6310170.71  110.89 10179.4  110.6510201.13  110.75
10211.99  110.1110220.69  110.0910227.21  110.9510242.42   111.510246.77  110.35
10257.63  110.0310266.71  110.2810286.72  109.8610313.43  110.1110331.52  110.11
10355.42  110.7910366.29  110.2810392.37  110.5710396.72  110.1610431.49  110.08
10438.01  110.2310457.57  110.0910474.96  110.4310505.38  110.0410518.42  110.12
10522.77  110.5210527.11  112.1510531.46  112.8910548.84     11310557.53   113.3
10572.75  113.3410583.62   113.810587.96  113.57   10601     11410607.52  113.88
10624.91  114.2410650.98   114.210657.51  114.7910683.58  114.2610693.74  114.35
10703.14  114.02 10722.7  114.1710760.47  113.22 10787.9  113.0710798.76  113.25
10810.66113.076610833.53  113.5910842.22  113.5110847.21  114.6710860.58  114.91
10866.13  115.5210872.65  115.3710894.38   116.810898.73  117.4510905.25  119.51
10913.94  121.6510921.46  121.2810928.98  119.8510939.01  117.4610951.48115.2959
10966.07  113.7910980.28  113.9510989.77  112.8710999.24  113.64 11011.7  114.11
11036.77  113.9111060.85  113.5311075.06  113.5311089.27  113.8911122.45  116.47
11131.92  116.7811192.18  117.0211209.73  116.1911227.27  116.9611259.87  116.88

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 9331.41    .025 9586.11    .06610928.98    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9226.08 9586.11            472.5  1764.5    2016             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9586.1111259.87  112.86       T
Left Levee      Station=   58.58      Elevation=  132.08
Right Levee     Station=10913.94      Elevation= 121.655
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  440.62 1356.28  109.46

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 174

INPUT
Description: RGV-03, New Cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections
Station Elevation Data    num=     461
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  132.04    6.56  132.12   13.12  131.57   19.68  129.96   39.35  123.17
   52.47  119.47   72.15  116.23   78.71   115.9   98.38  116.15  141.02  115.96
  163.97  116.08  196.77  115.82     223  115.76  245.96  116.04  252.52  115.07
  262.36   108.8  268.92  106.01  275.48   105.8  282.03  109.28  295.15  108.67
  304.99  108.75  324.67  108.35  337.79   108.5  370.58  108.43   383.7  108.58
  409.93  108.32  452.57  108.48  465.68  108.38   495.2  108.66  514.88  108.52
  521.44  108.15  531.27  108.47  547.67  107.73  554.23  106.92  564.07  104.38
  580.47  103.93  596.86   103.9  609.98  103.32 1019.92  103.32 1029.75  104.13
 1049.43  103.47 1055.99  103.84 1065.83  105.02 1075.67  104.11 1088.78  104.46
 1098.62  107.17 1111.74   107.9  1118.3  108.73  1134.7  112.79 1144.54  114.36
 1151.09  114.35 1160.93  111.62 1170.77     110 1223.24  109.68 1252.76  109.91
 1295.39  109.82 1318.35  110.01 1344.58  109.83 1393.78  110.07 1413.45  109.85
 1436.41  110.11 1452.81  109.92 1508.56  110.08 1570.87   109.9 1600.38  110.05
  1613.5  109.53  1629.9  109.64 1659.41  109.11 1685.65  109.27 1711.88  109.13
 1744.68   109.3 1754.52  109.15 1810.27  109.34 1816.83  109.17 1843.06  109.34
  1869.3   109.2 1892.25  109.42 1925.05  109.15 1938.17  109.31  1997.2  109.38
 2085.74  109.24 2118.54  109.44 2141.49  109.25 2157.89  109.45 2200.52  109.25
 2210.36  109.34 2239.88  109.18 2256.27  109.33 2282.51  109.18 2334.98  109.57
 2351.38  109.87 2377.61  109.41 2397.29  109.53  2459.6  109.61 2485.84  109.52
 2492.39  109.68 2518.63  109.51 2538.31   109.8 2561.26  109.61  2571.1  108.37
 2577.66  105.91 2584.22  104.34 2590.78   103.8 2597.34  104.97 2607.17  109.39
 2613.73  109.81 2623.57  109.36 2639.97  109.32 2662.93  108.99 2695.72  109.06
 2702.28   108.9 2735.07  108.92 2761.31   109.1 2803.94   108.9 2843.29  109.06
 2859.69  108.88 2872.81   109.1 2925.28  108.96 2974.47  109.14  3049.9  109.03
 3072.86  109.14 3115.49  109.05 3125.33  109.21 3158.12  109.07 3167.96  109.27
 3207.31     109 3240.11  109.16 3246.67  109.01 3269.62  109.11 3282.74  108.98
 3354.89  109.02 3371.28  109.18 3394.24  109.02  3417.2  109.63 3433.59  109.61
 3440.15  108.59 3449.99  105.14 3459.83  104.78 3466.39  106.31 3472.95  108.47
 3476.23  108.92  3512.3  109.02 3531.98  108.79 3577.89  108.71 3610.68  109.04
 3627.08  108.84 3643.48  109.08 3695.95  108.88 3741.86  109.07 3764.82  108.63
 3784.49  108.73 3807.45  109.46 3817.29  110.12 3853.36  110.51 3869.76  110.54
 3886.16  110.31 3902.55   110.6 3932.07   110.7 3945.19  110.39 3961.58  110.58
  3991.1  110.65  4007.5  110.49 4043.57  110.65 4053.41  110.47 4069.81  110.63
 4132.11  110.53 4164.91  110.65 4210.82  110.41 4233.78  110.63 4279.69  110.41
    4342  110.63 4355.12  110.53 4368.24  110.75 4387.91   110.6 4397.75  110.17
 4410.87  110.87 4446.94  110.64  4469.9  110.86 4479.74  110.71 4492.86  110.93
 4499.42  110.65 4532.21  110.77 4542.05  110.59 4565.01  110.66 4578.12   110.9
 4620.76  110.95 4650.27  110.83 4728.98  110.98 4751.94  110.85 4788.01  110.99
 4807.69   110.9 4856.88  110.98  4886.4  110.88 4899.51  111.05 4932.31   110.8
 4991.34  110.71  5014.3  110.79 5027.42  110.63 5047.09  110.81 5066.77  110.66
 5096.28   110.8 5102.84  110.58 5217.62  110.74 5230.74  110.92 5273.37  110.91
 5286.49   110.6 5319.29  110.85 5325.85   110.7 5361.92  110.84 5414.39  110.71
 5427.51   110.5 5457.02  110.77 5463.58  110.59 5522.61  110.83 5535.73  111.08
 5548.85  110.57 5561.97  110.93 5584.93  111.07 5594.76  110.71 5601.32  107.68
 5607.88  106.38 5617.72  108.93 5624.28  109.84 5634.12  109.94 5680.03  109.55
 5788.25  109.67 5811.21  109.63 5880.08  109.69  5893.2  109.58 5925.99  109.68
 5939.11  109.86 5955.51  109.71 5985.02  109.72 6001.42  109.93 6027.66  109.98
 6044.05  109.78 6086.69  109.94  6132.6  109.73  6244.1  109.81 6352.32  109.79
 6368.72     110 6411.36  109.93 6427.75  110.07 6496.62  109.94 6509.74  110.04
 6552.37  109.95 6565.49  110.12 6578.61  109.95 6601.57     110 6621.24  109.79
 6693.39     110 6722.91  109.81 6752.42     110 6768.82  109.92 6814.73  110.36
 6831.13  111.34 6860.65  111.68 6890.16  111.15 6903.28  111.56 6929.51  111.45
 6942.63  111.57 6959.04  111.33 6962.32  111.56 6985.28  111.25 6995.13  111.57
 7037.78  111.68 7047.62  111.45 7057.46  110.77 7083.71  109.93 7096.83  110.22
 7116.51  110.29 7162.44  109.96 7175.57  110.29 7205.09  110.42 7218.22  110.28
 7313.36  110.34 7333.04  110.17 7342.89  110.35 7378.98  110.22 7438.03   110.3
 7451.15  110.08 7467.56  110.23 7480.68   110.1 7497.08  110.39 7529.89  110.14
 7543.01  110.32 7572.54  110.23  7579.1  110.04 7595.51  110.25 7602.07  110.08
 7641.44  110.08 7674.24  110.26 7687.37  110.12 7746.42  110.35 7769.39  110.27
 7867.81  110.17 7917.02  110.24 7966.23   110.4 7979.35  110.22 8025.29   110.4
 8044.97  110.24 8071.22  110.27 8081.06  110.49  8090.9  110.24 8126.99  110.37
 8133.55  111.46 8143.39  111.93 8153.23  110.99 8186.04  111.16 8218.85  111.02
 8228.69  111.22 8264.78  111.04 8277.91  111.16 8317.28  111.13 8333.68  111.43
 8356.65  111.16 8392.74  111.14  8399.3  111.34 8418.98  111.07 8445.23   111.2
 8478.04  110.96 8504.28  111.04 8527.25  110.94 8566.62  111.15 8579.74  111.03
 8602.71  111.13 8684.73  111.18 8717.54  111.04 8786.44  111.14 8796.28  110.91
 8825.81  110.89 8865.18  111.06 8875.02   110.8  8947.2  110.87 8989.85  110.76
 9029.22  110.94 9065.31  110.81 9091.55  111.04 9121.08  110.86 9150.61  110.98
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 9167.01  110.86  9203.1  110.99 9226.07  110.79  9255.6  110.94 9265.44  110.83
 9317.93  110.92 9334.34  111.05 9344.18  110.84 9360.58  110.98  9426.2   110.9
 9478.69  110.93  9495.1  110.84 9557.43  110.96    9564  110.79  9580.4     111
 9626.33  110.88 9662.42     111 9668.98  110.86 9698.51  111.03  9734.6  110.71
 9757.57  110.89 9770.69  111.34 9783.81  112.83 9796.94  112.63 9813.34  109.29
 9823.18  109.28 9829.75  109.98 9836.31  112.02 9852.71  112.51  9872.4  111.33
  9888.8  109.38 9892.08  109.35  9905.2  110.52 9918.33  113.06 9931.45  112.68
    9945  108.35 9954.42  105.34  9957.7  104.76  9995.7  101.93 10014.7   101.7
 10016.7  100.74 10025.7    99.4 10032.7   96.42 10038.7    94.5 10054.7    91.7
 10070.7    90.6 10103.7    89.1 10119.7    88.2 10136.7    87.9 10152.7    87.1
 10184.7    86.8 10200.7    86.2 10216.7      8610216.88  104.7610223.45   105.5
10230.01  108.7410236.57  113.8510239.85  114.6510246.41  114.4310256.25  114.74
 10266.1  114.6310275.94  110.7910285.78  110.0710295.62  109.9310308.75  110.84
10325.15  110.0410341.56  109.97 10367.8  110.2110400.61  110.9210403.89  111.41
10410.45  113.6910413.73   114.110430.14  113.0610443.26  113.6510449.82  113.32
10476.07  113.6410508.88  113.0310525.28  113.2910544.97  113.1210571.21  113.19
10581.06  112.76 10590.9  113.4110600.74  113.0810613.87  113.5610643.39  113.45
10649.96  113.2710689.33  113.6310699.17  113.17 10728.7   113.510738.54  113.38
 10761.5   114.210771.35   113.810781.19  113.8310787.75  111.8510800.87  113.24
   10814   113.310833.68  112.2810859.93  112.3610869.77  114.1110876.33  116.38
 10882.9  117.2410896.02  121.7510909.14  124.1410925.55  122.9910928.83  122.49
10941.95  116.3710945.23  115.6610955.07  114.8510961.64  111.93 10968.2  113.76
10981.32  113.5311010.85  112.3411020.69  112.2511030.53  112.87 11053.5  117.84
11060.06  118.4811079.75  118.7611099.43  118.6211112.55  117.2211125.68  116.73
11148.64  116.56

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066  9957.7    .02510256.25    .06610909.14    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          994510256.25          1056.67 1804.67    1796             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10256.2511148.64  114.84       T
Left Levee      Station=    6.56      Elevation=  132.12
Right Levee     Station=10909.14      Elevation=  124.14
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0  1118.3  108.73

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            129.03    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.066      0.027     0.069
  W.S. Elev (ft)            128.99    Reach Len. (ft)          1056.67    1804.67    1796.00
  Crit W.S. (ft)            114.93    Flow Area (sq ft)       186286.80   10407.51   11901.47
  E.G. Slope (ft/ft)      0.000041    Area (sq ft)            186286.80   10407.51   13387.69
  Q Total (cfs)           235000.00     Flow (cfs)             189750.10   36140.63    9109.25
  Top Width (ft)          11126.15    Top Width (ft)           9922.51     311.25     892.39
  Vel Total (ft/s)            1.13    Avg. Vel. (ft/s)            1.02       3.47       0.77
  Max Chl Dpth (ft)          42.99    Hydr. Depth (ft)           18.77      33.44      13.34
  Conv. Total (cfs)       36662320.0     Conv. (cfs)            29602890.0   5638294.0   1421132.0
  Length Wtd. (ft)          1241.95    Wetted Per. (ft)         9934.16     334.72     911.29
  Min Ch El (ft)              86.00    Shear (lb/sq ft)            0.05       0.08       0.03
  Alpha                        2.14    Stream Power (lb/ft s)      0.05       0.28       0.03
  Frctn Loss (ft)              0.05    Cum Volume (acre-ft)    209803.30   75942.71   239771.60
  C & E Loss (ft)              0.00    Cum SA (acres)           24257.02    3046.28   27131.35


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 173.33*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  131.92    10.8  131.65    16.2   130.6    32.4  125.69    43.2  122.67
    59.4  119.55    64.8  119.01  114.94  116.39  132.18  116.02   183.9  115.91
   202.5  116.09   207.9  115.45  216.01  111.27  221.41   109.4  226.81  109.26
   232.2  111.58     243  111.17  267.31  110.96  305.11  111.01  315.91  111.12
   337.5  110.96  372.61  111.04   383.4  110.96  407.71  111.16   437.4  111.04
  450.91  110.59  456.31  110.08  464.41  108.38  477.91  108.03  491.41  107.96
  517.22  107.17  540.22  104.94  557.46  103.89  563.21  104.06  580.44  105.63
  632.16  105.21  787.33  105.05  827.57   105.1  839.72  105.25  847.81  105.79
  864.01  105.19  877.52  106.24  885.62  105.64  896.41  105.91  904.51  107.75
  920.72  108.86  934.22  111.83  942.32  112.74  947.71  112.54  955.81  110.18
  963.92  108.63  976.99  107.94 1007.12  107.56 1031.42  107.71 1066.52  107.65
 1085.42  107.78 1107.02  107.66 1147.52  107.82 1163.72  107.67 1182.62  107.85
 1196.12  107.72 1242.02  107.83 1293.33  107.71 1317.62  107.81 1328.42  107.46
 1341.93  107.53 1366.22  107.18 1387.83  107.29 1409.42  107.19 1436.43  107.31
 1444.53  107.21 1490.43  107.33 1539.03  107.24 1557.92  107.39 1584.93  107.21
 1595.73  107.31 1644.33  107.36 1695.35  107.29 1744.23  107.58 1763.13  107.39
 1776.63  107.55 1819.83   107.5 1833.27   107.4 1850.51  107.66 1879.23  107.49
  1896.5  107.64 1907.99   108.5 1925.23  109.31 1935.93  110.23 1948.22  110.93
 2011.43  111.19 2045.92  109.58 2089.84  109.59 2108.73  109.46 2116.83  108.63
 2127.63  105.94 2133.04  105.57 2138.44  106.35 2146.53   109.3 2151.93  109.58
 2160.03  109.27 2192.44  109.02 2224.83  108.97 2273.44  109.11 2308.53  108.99
 2365.24  109.13 2408.43  109.05 2448.93  109.17 2482.69  109.09 2534.41  109.19
 2565.04  109.09 2600.14  109.13 2608.24  109.27 2640.64  109.08 2667.64  109.18
 2762.14   109.1 2794.54  109.11 2813.44  109.52 2826.94  109.52 2832.34  108.84
 2840.44  106.55 2848.54  106.31 2862.04  109.04 2891.74   109.1 2907.94  108.96
 2945.74  108.92 2972.74  109.13 2986.24  108.99 2999.74  109.14 3042.94  109.04
 3080.74  109.16 3099.64  108.84 3115.84  108.91 3134.74  109.42 3142.84  109.87
 3172.54  110.14 3199.54     110 3213.04  110.18 3237.34  110.24 3248.14  110.03
 3285.94  110.21 3299.45   110.1 3329.14  110.22 3402.04  110.13 3429.04   110.2
 3466.84  110.03 3485.75  110.17 3523.54  110.01 3596.45  110.25 3612.64  110.15
 3620.75  109.87 3631.55  110.34 3661.24  110.16 3699.05  110.36 3704.45  110.18
 3731.45  110.23 3747.01  110.07 3769.25  110.39 3787.25  110.43    3793  110.24
 3810.24  108.63 3827.48  108.45 3833.22  108.63 3856.21  110.37 3912.36  110.16
  3976.9  110.24 4023.06  110.12 4033.85  110.23 4060.86  110.06 4139.16     110
 4155.36  110.13 4171.56  110.03 4195.86  110.11 4201.26  109.96 4295.76  110.06
 4333.22   110.2 4352.46  109.94 4379.47  110.16 4457.76  110.07 4468.56  109.94
 4492.86  110.12 4498.26  109.99 4546.86  110.14 4557.66  110.31 4568.47  109.97
 4598.17  110.29 4606.26  110.06 4611.67  108.05 4617.07  107.19 4625.17  108.91
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 4630.57  109.52 4638.67   109.6 4676.47   109.4 4841.17  109.46 4851.98  109.37
 4889.77  109.59 4927.57  109.49 4962.68  109.65 4976.17  109.51 5011.28  109.62
 5049.08  109.49 5120.55  109.56 5195.27  109.52 5229.98  109.57 5243.48  109.73
 5275.73   109.6 5292.08  109.78 5348.78  109.64 5435.19  109.65 5476.87  109.53
 5510.79  109.71 5535.09  109.62 5572.89  109.68 5610.69  110.04 5626.29  110.65
 5660.77  109.36 5672.26   109.3 5695.26  110.74 5715.99     111  5751.1  110.75
 5759.21  110.98 5794.33  111.17 5832.14     110 5859.15  110.23 5896.96  110.03
 5907.77  110.25 6045.53  110.34 6075.24  110.23 6123.86  110.26 6134.66  110.13
 6158.98  110.17 6172.48  110.36 6199.49  110.16 6210.29  110.27 6240.01  110.07
 6291.33  110.15 6318.34  110.29 6333.17  110.23 6377.76   110.3 6477.71   110.2
 6558.74  110.44 6569.54  110.34 6607.36  110.47 6661.38  110.32 6691.09  110.39
  6696.5  111.12  6704.6  111.44  6712.7  110.81 6739.71  110.93 6766.72  110.85
 6774.83  110.98 6804.54  110.87 6847.76  110.91 6861.27  111.09 6880.18  110.91
  6931.5  110.86 6953.11  110.96 6980.12  110.83 7020.64  110.82 7053.05  110.94
 7063.85  110.85 7143.47  110.98 7183.67  110.83 7234.03  110.93 7252.61  110.75
 7298.86  110.89 7306.96  110.71 7366.39  110.76  7401.5  110.71 7433.92  110.81
 7463.63   110.7 7485.23  110.87 7547.36  110.74 7577.07  110.84 7595.99  110.67
 7706.73  110.81 7817.48  110.68 7861.49  110.73 7907.44  110.55 7936.17   110.8
 7960.64  110.71 7984.95   110.8 8014.67  110.59 8033.58  110.72 8044.38  111.02
 8055.18  112.02 8065.99  111.89  8079.5  109.67  8087.6  109.66 8093.01  110.13
 8098.41  111.49 8111.91  111.82 8128.12  111.04 8141.62  109.77 8155.13  110.55
 8165.94  112.26 8176.28  111.96 8195.78106.7035 8209.88105.0564 8226.94   103.2
 8241.92  102.75  8250.6  100.79 8260.85   96.48 8273.47   93.23 8293.34   90.22
 8324.72   86.48 8350.74    84.6 8375.97      84 8388.59   83.29 8404.54   82.77
 8405.17   95.33 8412.77   96.44 8416.89   96.53 8428.19   97.81 8451.18  102.81
 8458.05  104.51 8474.17  109.19 8485.66  110.66 8505.14111.0707 8524.24   111.3
 8532.34  113.75 8543.13  114.45 8548.37   114.3 8556.23  113.25 8560.16  113.32
 8568.01   112.2 8582.85  112.21 8600.75  110.18 8620.39  108.99 8642.65  109.24
 8660.99  109.21 8687.17  109.95 8735.63  109.61 8740.86  109.79 8767.05  109.77
 8784.07  109.51 8837.76  109.84 8862.64  110.17 8883.59  110.09 8929.42   109.5
 8945.14  109.63 8962.16   109.7  8981.8  109.52 8998.83  109.12 9031.56   109.1
 9049.89  109.38 9086.56  109.62 9120.61   109.7 9138.39  109.87 9164.84  111.24
 9184.77  111.71 9192.62  113.06 9200.48  113.79  9203.1  113.45 9214.88   113.9
 9222.74  113.85 9248.93  113.04 9268.57  113.42 9276.43  113.11 9293.46   113.7
 9303.94  113.85 9310.49  113.39 9323.58  113.05 9372.04  112.72 9421.81  112.81
 9445.39  112.65 9462.42  112.25 9475.52  112.26 9480.76  112.55 9488.62  113.72
  9500.4   112.4 9504.33  112.98 9514.81   112.8 9529.22  113.47 9572.44  113.35
 9575.06  113.55 9594.71  113.33 9602.56  112.96  9647.1   113.1 9656.27  113.76
  9660.2  113.05 9670.67  113.64 9677.22  112.82  9700.8  112.68 9746.64  112.78
 9763.67  112.67 9791.17  112.79 9830.46   112.7  9848.8  112.48 9892.39  112.85
 9910.35  112.91 9935.24  112.69 9965.36  112.9910029.53  112.9310062.27  112.81
10096.32  112.82 10130.5  112.6210205.02  112.4710222.05  113.32   10243  112.88
10254.79  113.2210289.24  113.18 10324.2  112.89 10392.3   113.110401.47  113.01
10428.97  113.27 10432.9   113.1 10486.6  113.0510548.15  113.4210563.87  113.67
10617.01113.4746 10659.6  113.5110686.05  112.1710711.86  112.4810734.12  113.01
10755.08  113.0610768.17  113.38 10772.1  112.9110778.65  114.1710787.82  114.12
10790.44  113.5310802.22  113.2410804.84  113.7510821.87  114.5510850.68  114.88
 10880.8  115.0810888.66  114.9810904.38  115.4710927.95  115.4210947.59  115.06
10952.83   115.310963.31     11510969.86  114.3310977.07  114.2611016.74  115.07
11037.44116.243911043.19  116.5711060.22  116.8611069.68  116.7911128.33  120.55
11149.28  121.2911157.14  122.5111162.38  124.7111168.92  124.4611175.47  125.22
 11192.1  123.7911203.19  119.7911214.27  118.8511219.82  116.9311225.36  118.13
11253.28   117.1 11269.7  116.8311278.01  117.2811297.41  120.4811302.95  120.89
11319.58  121.12 11336.2  120.9611347.29  119.9311358.38  119.5411377.77  119.62

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 8241.92    .025 8458.05    .06611162.38    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8195.78 8543.13          1056.67 1804.67    1796             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 8543.1311377.77  114.45       T
Left Levee      Station=       0      Elevation=  131.92
Right Levee     Station=11173.29      Elevation=125.2567
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1925.23  109.31

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 172.67*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  131.79    8.48  131.73   13.54  131.11   22.57  129.08   33.93  125.87
   46.65  122.87   63.62   120.3   90.28  116.81  103.82  115.97  159.05  116.15
  163.29  115.82  173.89   112.8  178.14  112.73  182.37  113.89  209.94  113.57
  248.11  113.66  302.42  113.54  343.54  113.62  358.38  113.23  364.75  112.38
   397.2  111.71  406.22  111.02  424.29  106.55  437.83  104.47  442.34  104.81
  455.88  107.93   496.5   107.1  618.37  106.77  649.97  106.87  665.87  107.46
   678.6  106.92   689.2  107.45  704.04  107.37  710.41  108.33  718.89  108.67
   726.7  109.48  735.72  111.16  744.75  110.64  757.06  107.26  767.33  105.97
   789.9  105.44  810.08  105.52  913.99   105.5  975.49  105.57 1034.86  105.56
 1073.03  105.25 1134.53  105.26  1223.6  105.35 1331.53  105.31 1363.13  105.75
 1384.76  105.54 1417.29  105.74 1439.86  105.55  1453.4  106.07 1466.94  105.75
 1489.52  105.94 1498.54  107.56 1512.08  108.99 1530.13  112.26 1539.16  112.56
 1579.78  112.78 1606.87  109.63 1624.92  109.67 1638.46  109.36  1656.2   109.3
 1662.56  108.88 1671.05  107.53 1679.53  107.74 1685.89   109.2 1747.39  109.04
 1785.56  109.13 1813.13  109.08 1913.79   109.2 1949.91  109.11 1990.53  109.26
 2014.59  109.14 2048.52  109.26 2073.96  109.16 2139.48  109.26 2194.84  109.19
 2220.28  109.43 2230.89  107.95 2237.25  107.84 2247.85  109.16 2313.59  109.12
 2334.79  109.21 2389.93  109.19 2419.62  109.25 2447.19   109.1 2468.39  109.61
 2502.32  109.77 2542.62  109.78  2551.1  109.67 2580.79  109.77 2693.18  109.75
  2771.4   109.6 2824.66  109.75 2843.74  109.57 2852.22  109.81 2875.55  109.68
 2920.35  109.78 2942.91  109.51 2947.42  109.75 2974.52  109.93 2979.03  109.54
 2992.57  106.33 3006.11  106.07 3010.62  106.43 3028.67  109.84 3046.73  109.56
 3109.92  109.38 3123.46  109.55 3159.72  109.35 3195.69   109.3 3250.91  109.36
 3263.63  109.45 3299.68  109.34 3349.15  109.32 3403.32   109.5 3418.43  109.28
 3439.64  109.46 3509.62  109.38 3571.11  109.46 3588.08  109.36 3617.77  109.41
 3626.25     108 3636.86   109.2 3643.22  109.27 3732.82   109.2 3782.47  109.29
 3818.58  109.15 3840.44  109.32 3870.13  109.25 3965.56  109.25 4021.69  109.32
 4080.37  109.24 4120.99  109.47 4143.57  109.26 4156.41  109.49 4200.94  109.33
 4268.81  109.31 4301.55  109.19 4328.18  109.41 4391.82  109.49  4418.9  109.92
 4436.95  107.82 4445.98   107.3 4455.01  107.43 4473.07  109.98 4486.61  110.44
 4516.93  110.26 4557.24  110.67 4580.58  110.07 4601.79  110.18 4631.49   110.1
 4639.98  110.21 4748.17  110.32 4818.18  110.18 4847.88  110.34 4900.91   110.1
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 4962.44  110.32 5001.16  110.22 5104.98  110.24 5151.25  110.49 5189.44  110.54
 5231.86  110.39  5255.2  110.41  5265.8  110.94 5272.17  110.63 5320.96  110.75
 5388.85  110.76 5444.01  110.64 5499.17  110.76  5574.4  110.65 5610.49  110.78
 5642.07  110.62  5651.1  110.75 5732.54  110.72 5759.37  110.58 5838.61  110.68
 5858.62  110.58 5903.74  110.73 5917.11   110.6 5944.34  110.74  5965.9  110.56
 6052.88  110.65 6139.87  110.51 6174.43  110.51 6210.52  110.17 6233.09  110.68
 6294.74  110.47 6318.07   110.7 6326.56  111.21 6335.05  111.15 6345.65  110.04
 6356.26  110.28 6360.51  110.96 6371.11  111.13 6383.84  110.76 6394.45  110.15
 6405.05  110.58 6413.54  111.46 6421.11  111.23 6436.26  108.16  6446.5106.4612
 6462.07104.1118 6469.15  103.79  6475.5  102.18    6483   98.47 6492.23   94.77
 6506.78   90.27 6522.56   86.17 6538.35   83.25 6554.13   81.61 6569.92   81.08
 6585.71   79.54 6592.37   79.54 6593.45   85.9 6599.43    86.5 6606.49   87.87
 6613.55   87.92 6627.66   89.34  6655.9      94 6662.96   95.53 6684.13   98.76
 6711.77  104.53 6719.42  105.86 6739.18  107.06 6750.48  107.39 6788.07107.9003
 6797.62  108.03 6799.93  108.49  6811.5  112.85 6830.02  114.17  6839.2  113.88
 6852.96   111.8 6859.84  111.95 6873.61  109.72 6880.49   109.6 6889.66  110.23
 6912.61  108.99 6930.96  107.47  6953.9  106.95  6992.9  107.53 7004.37  108.05
 7036.49  108.34 7052.55  108.98 7082.37  109.91 7121.37   109.6 7167.26  108.72
 7176.43  108.99 7192.49  108.76 7222.32  108.85  7229.2  108.59 7252.14  108.54
 7263.61   108.8 7302.61  109.27 7332.43  109.82 7346.19  109.67 7389.79  110.35
 7403.55   110.1 7426.49  110.21 7506.79  108.94 7527.43  109.55 7534.32  109.15
 7564.14  109.25  7580.2  108.84 7598.55  108.86 7628.38  107.99 7642.14  108.09
 7651.32  107.77 7685.73  107.78 7690.32  108.04 7706.38  107.98 7717.85  108.25
 7738.49  108.35 7756.85  108.25 7782.08  108.52 7862.38  108.48 7880.73  108.29
 7885.32  108.53 7912.85  108.79 7926.61   108.7 7940.38   108.9 7954.14  109.42
 7967.91  112.25 7981.67  113.83 7986.26   113.2 8006.91  114.27  8011.5  113.97
 8020.67  114.31 8066.56  112.98 8078.02  113.26  8087.2   113.1 8100.97  113.52
 8114.74  112.79 8144.56   113.8 8156.04  113.44 8162.92  114.14  8174.4  113.29
 8190.46   112.9    8218  112.48 8254.71  112.13 8270.77   112.2 8282.25  111.97
 8337.32  112.08 8369.44  112.01 8401.57  111.56 8410.75  111.73 8440.58  111.01
 8463.53   111.1 8472.71  111.69 8486.48  114.07 8493.36  113.65 8507.13  111.48
 8514.01  112.66 8532.37  112.36 8541.55  112.65 8557.61  113.76 8633.33  113.64
 8637.92  114.01  8649.4   113.7 8672.35  113.49 8686.11  112.72 8702.18  112.88
 8713.65   112.7 8754.95  112.79 8764.13  112.96  8780.2  114.28 8787.08  112.89
 8796.26   113.2 8800.85  114.11 8805.44  114.07 8816.91  112.45 8832.98  112.27
 8858.22  112.23 8869.69  112.46 8890.34  112.33 8938.53  112.41 8968.37  112.19
 9002.78  112.22 9016.54  112.41 9041.79  112.26 9085.38  112.41  9117.5  112.15
 9140.45  112.13 9156.51  112.39  9163.4  112.18 9197.81  112.29 9225.34  112.56
 9252.88  112.55 9268.94  112.26 9294.18  112.55 9305.66   112.4 9321.71   112.6
 9337.78  112.34 9427.26  112.29 9434.15  112.35 9491.51  112.12 9551.16  112.19
 9567.23  112.05 9654.41   111.9 9675.06  111.66 9707.18  111.53 9727.84  111.81
  9741.6  111.51 9755.37  112.56 9771.43  113.17 9780.61  112.84 9798.96  112.68
 9808.14  112.24 9828.79  112.88 9872.39  112.62 9895.33  112.75 9932.04   112.7
  9950.4  112.55 9958.65   112.710046.77  112.8310051.36  112.6710069.71  112.86
10085.78  112.6410133.96  113.0910140.84  112.7410161.49  112.7810177.55  112.58
10214.27  112.6110250.98  112.9110299.16  112.7710324.88113.042510342.76  112.93
 10363.4  113.0310370.29  113.2910379.47  112.8910386.35  113.16 10409.3  112.93
10425.35  113.0910473.54  113.1510494.19     11310505.66  113.2210538.02  113.18
 10574.5  112.5210590.56  112.5810629.56  112.4410668.57   112.910705.28  112.85
10728.23  113.4810735.11  112.5310746.58  115.0510762.64  114.9510767.23  113.75
10774.12  113.3210787.88  113.3210792.47  114.3710810.82  115.33 10822.3  116.19
10842.95  116.7110872.78  117.2110891.13  117.31 10904.9  117.7310925.55  117.88
10939.31  117.6610966.85  118.6311008.15  118.5211033.39117.984711042.57  117.79
11051.75  118.27 11070.1  117.6611081.57   116.311122.88  116.0911136.64  116.19
11163.71  116.0311187.12  116.1711221.54  116.9411228.42  116.6711239.89  116.78
11249.07  116.3711265.13  116.3911297.25  117.4211329.38  118.0611372.97  119.39
11395.91  119.6311409.68   121.711416.57   125.311418.86  125.8711430.33  125.07
11437.22  126.3311441.81   126.311455.38   125.111464.42   123.211473.47  122.84
   11478  121.9411482.52   122.511505.31  121.47 11518.7  121.4211525.48  121.68
11541.32  123.1211564.57  123.5111572.98   123.311591.07  122.34 11606.9  122.67

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 6462.07    .025 6711.77    .06610966.85    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6436.26 6830.02          1056.67 1804.67    1796             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 6830.02 11606.9  114.17       T
Left Levee      Station=       0      Elevation=  131.79
Right Levee     Station=11437.43      Elevation=126.3733
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1530.13  112.26

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 172

INPUT
Description: RGV-03, New Cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  131.67    9.84   131.9    16.4  131.27   22.96   129.6   45.93  122.45
   65.61  117.23   75.45  115.93  104.97  116.21  170.58  116.16  196.82  116.26
  219.79  116.11  252.59   116.2  262.43  116.44  288.67   115.9  295.23  114.87
  308.36  108.17   318.2  105.04  321.48  105.55  331.32  110.24  360.84  108.99
  449.41   108.5  472.38  108.65  482.22   109.3  488.78  108.63  505.18  108.68
  528.14  109.17   534.7   110.1  541.26  108.87  547.82  106.49  557.67  104.01
  574.07  103.32  967.71  103.32  990.68  103.93 1007.08  103.67 1030.04  103.96
 1046.44   103.7 1056.28  104.48 1066.12     104 1082.53  104.24 1089.09  106.62
 1098.93  108.67 1112.05  113.58 1118.61  114.13 1148.13  114.38 1167.82  109.68
 1180.94  109.73 1190.78  109.17 1243.27  109.08 1390.88  109.25 1417.13  109.12
 1446.65  109.32 1472.89  109.11 1486.01  109.26 1535.22  109.22  1554.9  109.39
 1581.15  109.23 1627.07  109.38 1636.91  109.24 1676.28  109.34 1718.92  109.25
 1748.45  109.41 1771.41  109.25 1804.21  109.41 1853.42  109.31 1925.59  109.37
 2014.16  109.19 2073.21  109.28 2102.73  109.14 2122.41  109.32 2138.81  108.96
 2142.09   109.3 2161.78  109.43 2165.06  108.85  2174.9  104.04 2184.74  103.69
 2188.02  104.22 2201.14  109.31 2214.26  108.87 2260.19  108.62 2270.03  108.86
 2289.71   108.6 2322.52  108.56    2375  108.78 2434.05  108.63 2473.42  108.79
 2479.98  108.57 2502.94   108.8 2519.34  108.67 2552.15  108.82  2627.6  108.74
 2666.96  109.11 2712.89  108.98 2748.97   109.1 2775.22  108.91 2788.34  109.05
 2857.23  108.96 2922.83  109.09 2965.48  108.96    2995  109.21 3011.41  108.92
 3017.97  109.21 3070.45  108.94 3116.38  108.97 3126.22  108.84 3155.74  109.26
 3191.83  109.16 3208.23  109.53 3211.51   109.2 3224.63   105.9 3231.19  105.25
 3237.75  105.57 3250.88  109.22 3260.72  109.89  3280.4  109.74 3300.08   109.9
  3313.2  110.32 3332.89   110.1  3447.7  110.32 3490.35  110.16 3519.87  110.33
 3555.95   110.1    3615   110.4 3634.68  110.18 3710.13  110.26  3749.5  110.58
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  3782.3  110.63 3808.55  110.42 3897.12  110.56 3913.52  110.42 3959.45  110.43
 3995.53  110.63 4051.29  110.41 4077.52  110.59 4100.47   110.4 4107.03  110.59
 4139.82  110.45 4146.37  110.64 4185.72  110.46 4231.62  110.63 4257.85  110.46
 4290.64  110.64 4300.48   110.4 4320.15  110.64 4329.99  110.44 4402.12  110.48
 4487.37  110.29  4513.6  109.79    4530  110.56 4552.95  110.32  4638.2  110.46
 4661.15  110.66 4674.26  110.24 4690.66  105.36 4697.21  104.76 4697.21  104.67
 4701.21  103.29 4710.21   96.81 4720.21   90.31 4730.21   84.81 4740.21   80.91
 4750.21   78.91 4760.21   78.31 4770.21   76.31 4780.21   76.31 4790.21   77.31
 4800.21   79.31 4810.21   79.31 4830.21   81.31 4870.21   87.31 4880.21   89.31
 4910.21   93.01 4930.21   96.31 4940.21   98.31 4960.21  101.71 4988.21  103.29
 5004.21  103.81    5071  104.76 5074.28  105.45 5087.39  111.12 5090.67  111.95
  5116.9  113.88 5130.02  113.45 5143.13  111.01 5149.69  110.35 5159.53  110.58
  5179.2  107.25 5189.04  107.07 5202.15  108.02 5234.94  106.53 5251.33  105.16
 5261.17  104.75 5293.96  104.61 5310.35  104.99 5320.19  105.56  5349.7  106.03
 5366.09  106.86    5412  107.46 5434.95  108.45 5461.18  109.17 5477.57  109.88
 5533.31  109.37 5589.05  108.14 5598.89  107.82    5612  108.18 5634.95  107.76
 5677.58  107.93 5687.42  107.56  5720.2  107.56  5736.6     108 5792.34  108.83
 5815.29  109.46 5834.96  109.71 5854.63  109.49 5867.75  110.05 5877.59  109.92
 5916.93  110.52  5936.6  110.16 5949.72  110.48 5969.39  110.33  6061.2   108.7
 6074.31  108.79 6084.15  108.38 6113.66  109.28  6123.5  108.68 6166.12  108.81
 6189.07  108.18  6215.3   108.2 6257.93  106.87  6277.6  106.99 6290.72   106.5
 6320.23  106.59  6339.9  106.46 6346.46  106.85 6369.41  106.73  6385.8  107.11
 6415.31  107.23 6441.54  107.06  6448.1  107.34 6477.61  107.42 6500.56  107.22
  6510.4  107.38 6562.86  107.32 6575.97  107.03 6592.37  107.13  6618.6  106.53
 6625.15  106.78 6648.11  106.45  6664.5  106.49 6684.17  106.14 6703.85  106.32
 6723.52  107.14 6736.63  109.66 6743.19  111.44 6753.03  112.97 6762.86  113.87
 6769.42  112.95 6798.93  114.65 6805.49  114.22  6818.6  114.76 6851.39  113.74
 6867.79  113.41 6874.34   113.7 6884.18  112.91 6900.57  113.29 6913.69  113.03
 6933.36  113.61  6943.2  112.74 6953.04  112.48 6995.67  113.89 7012.07  113.35
 7021.91  114.43 7038.31   113.2 7061.26  112.67 7100.62  112.04 7153.09  111.49
 7176.05  111.57 7192.45  111.22 7228.52  111.18 7271.16  111.34 7317.07  111.21
 7362.99  110.54 7376.11  110.81 7418.74  109.77 7451.54  109.94 7464.66  110.84
 7477.78  113.59 7484.34  114.42 7494.17   113.8 7504.01  111.87 7513.85  110.57
 7523.69  112.35 7540.09  112.34 7549.93  111.92 7563.05  112.37    7586  114.05
 7628.64  114.07 7654.88  113.95 7677.83  114.09 7694.23  113.92 7700.79  114.48
 7717.19     114 7749.99  113.66 7769.66  112.49 7792.62   112.7 7809.02  112.42
 7868.05  112.56 7881.17  112.81 7904.13  114.81 7913.97  112.72 7927.08  113.19
 7933.64  114.56  7940.2  114.51  7956.6  112.08 7979.56  111.82 7995.96  112.03
 8015.64  111.78 8032.03  112.13 8061.55  111.93 8130.42  112.04 8136.98  111.85
 8173.06   111.7 8222.25  111.74 8241.92  112.02    8278  111.79 8317.35  112.09
  8340.3  112.11 8386.21  111.83 8402.61  111.98 8419.01  111.74 8441.96  112.05
  8451.8   111.7 8500.99  111.74 8540.34  112.21 8553.46  112.08 8579.69  112.26
 8602.65  111.84 8638.72   112.2 8655.12  111.95 8678.07  112.21 8701.03  111.78
 8828.92  111.67 8838.76  111.76 8920.74  111.44 8937.13  111.62 8953.53  111.46
    9006  111.56 9028.96  111.36 9078.14  111.35 9153.57  111.18 9183.08  110.81
 9199.48  110.89 9228.99   110.6 9258.51     111 9271.62   110.4 9278.18  110.54
 9297.86  112.11 9320.81  113.01 9333.93  112.51 9360.16  112.27 9373.28   111.6
 9402.79  112.55  9465.1  112.12 9497.89  112.33 9550.36  112.37  9576.6  112.21
 9586.44  112.47 9629.07  112.45 9714.33  112.59 9720.89  112.35 9747.12  112.62
 9770.08  112.28 9786.47  112.62 9802.87  112.59 9838.94  112.91 9848.78  112.38
 9878.29  112.43 9901.25  112.13 9953.72  112.21 9973.39  112.54 9983.23  112.38
10006.19  112.6410075.05  112.3110107.84  112.6810137.36  112.4310166.87  112.54
10176.71   112.910189.83  112.2810199.66  112.6710232.46  112.3210255.41  112.61
10301.32  112.7510311.16  112.5210324.28  112.8310353.79   112.610370.19  112.92
10435.77  112.8310468.57  112.6410491.52   112.910547.27  112.3910557.11  112.85
10563.67   112.510603.02  112.7910622.69  112.5910655.49  112.6510688.28  113.59
10698.12  112.1610714.51  115.9310737.47  115.7810744.03  113.9810753.87  113.34
10773.54  113.39 10780.1  114.9910806.33   116.510822.73  117.8310852.24  118.68
10894.88  119.5410921.11  119.7610940.79  120.44 10970.3  120.6710989.97  120.34
11012.93  121.3611029.33  121.7911088.35  121.6211137.54  120.5111150.66  121.23
11176.89  120.3111186.73  118.7311193.29  118.2811252.32  117.5911271.99  117.57
11331.02  116.6911344.14  116.6311393.33  117.1211403.17  116.6411419.56   116.7
11432.68  116.0111455.63  115.7611478.59  115.9711501.54  116.5211527.78  116.79
11547.46  116.6911576.97  117.0811590.09  117.6211609.76   117.911642.55  117.96
11655.67  119.5411662.23   120.911672.07  126.2111675.35  127.0311691.74  125.68
11701.58  127.4911708.14  127.38 11714.7  126.2811737.65  126.9911757.33  125.84
11777.01  126.1511786.84  125.6811803.24  125.9111822.92  125.1111836.03  125.73

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4697.21    .025    5071    .06611029.33    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4697.21  5116.9             2737    1911  1305.5             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  5116.911836.03  113.88       T
Left Levee      Station=    9.84      Elevation=   131.9
Right Levee     Station=11701.58      Elevation=  127.49
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1098.93  108.67

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            128.84    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                 0.066      0.026      0.067
  W.S. Elev (ft)            128.77    Reach Len. (ft)          2737.00    1911.00    1305.50
  Crit W.S. (ft)            115.89    Flow Area (sq ft)       88163.43   14572.88   93695.95
  E.G. Slope (ft/ft)      0.000044    Area (sq ft)            88163.43   14572.88   109756.20
  Q Total (cfs)           235000.00    Flow (cfs)              93652.37   60162.10   81185.55
  Top Width (ft)          11810.39    Top Width (ft)           4671.57     419.69    6719.13
  Vel Total (ft/s)            1.20    Avg. Vel. (ft/s)            1.06       4.13       0.87
  Max Chl Dpth (ft)          52.46    Hydr. Depth (ft)           18.87      34.72      13.94
  Conv. Total (cfs)       35257630.0    Conv. (cfs)             14050900.0   9026268.0   12180470.0
  Length Wtd. (ft)         1933.81    Wetted Per. (ft)         4681.04     430.04    6729.68
  Min Ch El (ft)             76.31    Shear (lb/sq ft)            0.05       0.09       0.04
  Alpha                       3.54    Stream Power (lb/ft s)      0.06       0.39       0.03
  Frctn Loss (ft)             0.12    Cum Volume (acre-ft)    199903.40   74459.67   232245.40
  C & E Loss (ft)             0.01    Cum SA (acres)          23726.16    3000.43   26660.61


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 171.90*

INPUT
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Description: RGV-03,
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	126.32	10.79	126.47	26.98	128.22	44.96	130.95	53.95	131.54
61.79	130.4	75.51	126.83	87.27	124.17	93.15	123.42	104.04	123.33
154.09	120.58	194.16	118.89	204.88	118.87	220.56	118.36	224.48	117.79
232.32	114.32	238.2	112.75	246.04	115.4	263.68	114.74	314.3	114.04
340.13	114.25	363.65	114.68	367.57	115.07	371.49	114.37	381.29	111.71
391.09	111.14	404.43	110.84	434.48	110.78	504.57	110.93	626.3	110.81
640.03	111.07	673.35	110.7	679.23	111.05	685.11	110.77	694.91	110.97
704.71	113.26	712.55	115.63	716.47	115.87	734.11	115.8	745.88	113.33
759.6	112.92	774.94	112.74	814.98	111.51	845.03	110.98	912.48	110.85
925.35	110.69	939.65	110.8753	977.17	110.92	992.85	110.79	1020.29	110.87
1106.54	110.65	1126.14	110.72	1186.41	110.66	1236.62	110.27	1316.27	110.13
1326.07	109.94	1339.8	110.16	1347.63	107.46	1355.47	107.55	1363.31	110.08
1371.15	109.86	1398.6	109.72	1435.84	109.71	1467.2	109.83	1502.48	109.77
1526.01	109.94	1573.05	110.13	1598.13	110.08	1618.14	110.2	1648.34	110.57
1688.49	110.17	1738.7	110.42	1755.35	110.24	1837.67	109.62	1847.47	109.28
1899.38	108.55	1916.08	108.17	1955.28	108.1	1965.08	108.3	1974.88	106.49
1982.72	106.33	1990.56	108.13	1996.44	108.44	2008.2	108.33	2027.8	108.56
2050	108.4	2151.29	108.5	2172.85	108.38	2208.14	108.52	2219.9	108.39
2260.85	108.35	2308.1	108.55	2323.79	108.44	2413.95	108.51	2435.51	108.64
2468.83	108.59	2502.14	108.69	2542.01	108.54	2562.1	108.64	2617.73	108.3
2672.57	108.54	2702.68	109.02	2745.07	109.1	2754.87	109.63	2772.98	109.8
2819.53	109.83	2833.24	109.92	2843.94	109.42	2854.31	105.8776	2858.99	104.57
2870.29	99.6	2874.36	96.80185	2887.86	88.24	2897.11	83.64	2906.36	80.46
2915.6	78.82	2924.85	78.16	2934.1	76.31	2944.1	76.31	2952.6	77.16
2961.1	78.71	2980.53	79.95	3004.82	82.88	3020.6	85.28	3029.1	86.81
3054.6	90.26	3065.53	92.22	3097.1	97.11	3138.39	101.09	3162.68	102.97
3202.41	104.23	3207.99	105.4	3227.5	104.38	3247.01	104.69	3256.57	104.6443
3272.1	104.57	3288.83	104.88	3297.21	105.66	3300.6	106.455	3308.34	108.27
3330.64	111.94	3344.58	112.38	3352.94	112.97	3366.72	112.63	3380.49	111.26
3387.38	110.84	3397.71	110.83	3418.36	109.31	3428.69	109.03	3442.46	109.69
3462.5	108.91	3468.77	108.91	3504.43	107.56	3538.86	107.48	3556.41	107.56
3566.41	107.98	3578.32	107.91	3590.85	108.41	3600.24	108.23	3614.6	108.53
3644.06	108.78	3653.45	108.67	3669.11	109.25	3678.49	109.26	3725.45	110.21
3775.54	110.16	3794.32	110.34	3816.23	110.18	3838.14	110.24	3850.67	109.7
3872.57	110.05	3896.92	109.72	3916.4	109.82	3957.1	109.43	3997.79	109.15
4025.96	109.3	4047.87	108.99	4072.92	109.1	4094.83	108.98	4107.35	108.64
4127.59	108.56	4148.05	109.14	4157.44	108.87	4173.08	109.36	4204.39	109.74
4213.78	109.72	4226.31	110.17	4267	110.42	4279.52	110.61	4344.5	110.42
4358.26	110.58	4373.43	110.41	4392.21	110.89	4409.91	110.61	4429.77	110.79
4470.47	110.47	4478.76	110.23	4506.31	110.31	4536.21	109.67	4551.07	109.55
4571.72	109.68	4585.5	109.43	4616.49	109.64	4637.14	109.64	4648.9	109.85
4664.54	109.41	4677.07	107.13	4695.85	109.32	4708.37	109.01	4720.9	107.07
4727.15	107.59	4752.2	107.28	4777.24	108.38	4792.89	108.36	4802.28	109.45
4824.2	109.82	4855.49	109.92	4874.28	109.57	4902.24	109.61	4927.49	109.23
4936.66	109.36	4958.8	109.27	4971.31	109.47	4986.97	109.17	5019.3	109.09
5039.96	109.39	5053.72	110.59	5060.61	111.52	5070.94	112.34	5081.26	112.76
5088.15	112.25	5119.14	113.07	5126.03	112.92	5137.23	113.43	5146.62	113.18
5191.45	112.59	5208.66	112.53	5225.87	112.69	5243.66	112.33	5260.3	112.76
5280.96	112.14	5296.87	112.69	5325.72	113.11	5342.94	112.69	5353.28	113.52
5368.87	113.4	5384.52	112.95	5406.43	113.01	5425.21	112.54	5437.74	112.72
5462.77	112.24	5478.43	112.24	5494.08	111.45	5509.74	109.76	5522.25	109.45
5534.77	109.5	5556.69	109.29	5584.86	109.64	5628.69	110.62	5663.12	111.15
5694.43	111.19	5711.42	111.04	5747.64	111.39	5769.96	111.28	5791.46	111.49
5803.99	112.1	5818.18	112.17	5838.85	113.42	5849.17	113.16	5869.83	111.65
5880.17	112.59	5897.39	112.59	5907.72	112.37	5921.49	112.58	5945.59	113.45
5969.89	113.56	6013.71	113.17	6026.23	113.27	6059.24	112.95	6066.13	113.19
6113.88	112.63	6138.44	111.85	6148.32	111.77	6179.77	111.98	6210.92	112.46
6223.44	112.77	6232.83	112.32	6239.09	112.63	6255.53	112.2	6279.64	113.08
6289.97	112.01	6303.74	112.2	6310.63	112.86	6317.52	112.82	6334.74	111.55
6358.85	111.28	6376.07	111.35	6396.73	111.19	6413.94	111.33	6444.94	111.08
6483.26	111.07	6511.42	111.2	6524.14	111.01	6562.03	110.93	6580.29	111.04
6595.95	111.62	6602.21	111.42	6630.38	111.86	6639.77	112.19	6658.55	111.7
6672.22	111.66	6737.64	111.81	6820.28	111.6	6844.38	111.71	6862.02	111.47
6906.37	111.51	6930.88	111.66	6989.01	111.61	7013.11	111.38	7043.58	111.61
7068.21	111.47	7092.31	111.57	7116.42	111.31	7212.61	111.07	7250.71	111.09
7275.22	111.45	7290.86	111.5	7309.65	111.23	7364.33	111.37	7412.94	111.27
7425.47	111.37	7497.47	111.26	7535.03	111.13	7591.6	111.14	7622.59	110.89
7639.81	110.95	7670.79	110.83	7701.79	111.04	7722.45	110.87	7743.11	111.72
7767.21	112.17	7780.98	111.89	7808.53	111.83	7822.3	111.49	7853.29	111.94
7879.36	111.74	7901.27	111.82	7918.72	111.69	7970.13	111.85	8035.8	111.76
8046.13	111.89	8076.57	111.8	8132.91	111.83	8154.82	111.75	8180.42	111.83
8187.31	111.71	8214.85	111.78	8238.96	111.61	8256.17	111.86	8276.9	111.82
8311.27	111.93	8321.6	111.66	8336.38	111.78	8398.99	111.49	8452.44	111.64
8462.78	111.55	8492.89	111.75	8511.67	112.04	8524.2	111.98	8533.58	112.33
8558.63	112.59	8593.62	112.55	8611.84	112.29	8646.27	112.2	8665.94	112.61
8679.71	112.26	8690.03	112.42	8724.48	112.35	8733.92	112.58	8765.22	112.67
8807.11	112.55	8840.35	112.63	8851.88	112.53	8896.7	112.68	8912.35	112.58
8956.17	112.74	8971.83	112.6	8996.5	112.71	9043.82	112.32	9065.37	112.57
9075.12	112.27	9100.16	112.59	9140.86	112.5	9156.51	112.14	9169.03	113.44
9178.42	114.06	9197.21	114.19	9213.44	112.74	9230.65	114.64	9254.75	115.43
9271.98	114.22	9292.63	114.3	9299.52	115.19	9322.42	116.71	9344.28	118.62
9419.46	120.9	9447.58	121.24	9475.8	121.97	9525.88	122.43	9561.22	122.97
9591.62	123.31	9621.96	123.1679	9641.71	122.75	9657.36	122.74	9674.84	122.35
9688.62	122.48	9716.16	121.66	9726.5	120.54	9735.61	120	9795.37	119.11
9829.52	118.95	9851.42	118.58	9892.11	118.12	9926.55	118.43	9943.43	118.44
9953.77	118.17	9970.97	118.23	9986.02	11810	11006.06	118.41	10045.49	119.44
10073.66	118.97	10079.92	119.21	10098.71	119.11	10123.75	119.37	10130.01	120.18
10139.4	120.46	10151.92	119.41	10176.96	119.12	10186.35	119.43	10205.12	119.53
10218.9	120.87	10225.79	122.19	10236.12	126.01	10239.56	126.64	10256.77	126.18
10267.73	127.67	10273.99	127.65	10281.17	126.82	10290.73	126.76	10302.7	127.06
10320.91	127.14	10352.2	126.27	10374.46	126.48	10393.59	125.82	10412.73	124.49
10419.9	124.41	10427.08	124.93	10441.43	123.49	10462.96	123.43	10477.31	123.84

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.081	53.95	.066	2874.36	.015	3097.1	.066	3352.94	.067

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2833.24	3352.94	2737	1911	1305.5	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	2833.24	109.92	T

Left Levee Station= 53.95 Elevation= 131.54
Right Levee Station=10270.71 Elevation= 127.7
Blocked Obstructions num= 1

Sta L	Sta R	Elev
3359.72	9404.47	113.15

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 171.8

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	120.98	19.61	121.23	26.15	121.71	39.23	123.71	49.03	124.66
68.65	128.06	81.72	130.04	98.06	131.18	107.87	131.22	114.41	130.55
130.75	124.98	143.83	121.61	156.9	120.42	163.44	120.67	183.05	119.55
199.4	120.19	212.47	118.36	222.28	118.24	245.16	118.55	287.66	118.28
304	117.54	310.54	117.85	333.42	116.35	346.49	113.9	356.3	112.77
372.68	112.59	382.52	112.23	389.07	112.65	405.46	112.34	418.57	112.36
438.24	112.06	467.74	111.97	484.13	111.3	503.8	110.97	533.3	110.82
572.64	110.92	592.3	111.45	602.14	111.38	618.53	112.07	631.64	111.25
648.03	111.85	667.7	110.69	677.53	110.39	687.36	109.16	700.48	108.15
710.31	106.98	726.7	107.1	749.65	106.67	798.81	106.67	818.48	106.45
857.82	106.48	893.88	106.84	910.26	106.56	916.82	106.73	933.21	106.15
952.88	106.61	962.71	107.65	972.55	108.04	985.66	109.26	1005.33	109.18
1015.16	108.56	1021.72	105.16	1028.99	103.29	1037.99	96.81	1047.99	90.31
1057.99	84.81	1067.99	80.91	1077.99	78.91	1087.99	78.31	1097.99	76.31
1107.99	76.31	1117.99	77.31	1127.99	79.31	1137.99	79.31	1157.99	81.31
1187.99	85.71	1197.99	87.31	1207.99	89.31	1217.99	90.71	1237.99	93.01
1257.99	96.31	1267.99	98.31	1287.99	101.71	1315.99	103.29	1331.99	103.81
1405.33	104.76	1411.89	105.02	1418.45	107.2	1428.29	106.47	1441.41	104.82
1447.97	104.61	1464.36	105.21	1480.76	105.05	1493.88	104.68	1503.72	105.26
1513.56	105.09	1520.12	105.77	1529.95	108.13	1536.51	108.54	1543.07	108.21
1552.91	109	1562.75	111.35	1579.15	111.39	1588.99	112.07	1598.82	111.69
1605.38	111.85	1634.9	111.06	1654.58	111.47	1670.97	110.89	1680.81	111.42
1703.77	110.67	1710.33	110.94	1720.17	110.61	1739.84	110.73	1746.4	110.37
1769.36	110.52	1802.15	110.12	1811.99	110.42	1825.11	110.07	1838.23	110.88
1848.07	110.29	1877.58	110.1	1893.98	110.34	1903.82	110	1920.22	110.79
1930.05	110.42	1979.25	110.8	1992.36	110.45	2031.72	110.83	2051.4	111.39
2074.35	111.53	2084.19	112.06	2097.31	112.11	2110.43	111.32	2133.38	111.92
2166.18	111.61	2179.3	111.8	2208.81	111.17	2221.93	111.3	2248.17	110.94
2264.56	110.44	2294.08	110.29	2317.03	109.35	2343.27	109.08	2359.67	108.32
2366.23	108.4	2379.35	107.58	2405.58	107.65	2421.98	108.32	2431.82	107.73
2448.21	108.49	2474.45	108.63	2481.01	109.16	2490.85	109.28	2503.97	109.88
2513.8	109.92	2546.6	110.82	2559.72	111.43	2599.07	111.94	2631.87	112.16
2648.26	112.5	2658.1	112.29	2677.78	112.71	2687.62	112.42	2717.13	112.84
2743.37	112.24	2759.77	112.55	2766.32	112.27	2792.56	112.48	2828.64	112.02
2854.87	112.37	2881.11	112.35	2920.46	112.77	2946.7	112.87	2963.09	112.07
2976.21	107.34	2995.89	111.48	3002.45	111.61	3009.01	110.82	3022.13	106.93
3028.68	108.02	3054.92	107.22	3081.16	109.36	3090.99	108.96	3097.55	109.39
3107.39	111.66	3120.51	111.81	3130.35	112.26	3163.14	112.5	3182.82	111.89
3205.78	112.15	3238.57	111.89	3271.37	112.07	3284.48	112.46	3300.88	112.01
3314	112.07	3369.75	111.51	3392.71	111.75	3415.66	111.42	3435.34	111.41
3448.46	111.66	3458.3	112.2	3468.14	111.8	3494.37	111.99	3504.21	111.77
3523.89	111.76	3537.01	112.32	3553.4	112.06	3569.8	111.51	3592.76	112.05
3605.87	111.69	3625.55	112.4	3661.63	112.32	3671.46	111.91	3700.98	113.49
3717.38	113	3740.33	113.54	3760.01	112.88	3773.13	113.42	3799.36	112.7
3815.76	112.86	3832.16	111.4	3848.56	107.96	3861.67	107.47	3874.79	107.79
3881.35	107.49	3897.75	107.39	3914.15	107.96	3927.26	108.05	3937.1	108.64
3953.5	108.96	3973.18	109.93	4009.25	111.08	4042.05	111.61	4068.28	111.52
4081.4	111.72	4097.8	112.5	4110.92	112.8	4133.87	112.79	4143.71	113.1
4156.83	114.27	4192.9	112.41	4238.81	112.86	4294.56	112.76	4330.64	113.05
4376.55	112.37	4389.67	112.55	4429.02	111.89	4451.98	112	4481.49	111.57
4488.05	111.21	4504.45	111.27	4517.57	110.97	4530.69	111.02	4583.16	112.42
4596.27	113.02	4606.11	112.1	4612.67	112.71	4622.51	111.76	4635.63	111.46
4714.33	111.02	4740.57	110.72	4806.16	110.5	4822.56	110.25	4868.47	110.15
4897.98	110.37	4907.82	110.17	4963.57	110.17	4970.13	110.37	4986.53	111.52
4993.09	111.1	5006.2	111.6	5022.6	111.76	5032.44	112.4	5039	111.89
5052.12	111.53	5193.13	111.5	5235.77	111.44	5265.28	111.24	5337.43	111.3
5347.27	111.17	5393.18	110.97	5429.25	110.91	5455.49	111.09	5465.33	110.88
5485	111.02	5540.75	110.81	5566.99	110.61	5580.11	110.71	5622.74	110.58
5632.58	110.43	5655.53	110.62	5671.93	110.51	5691.61	110.85	5698.17	111.2
5714.56	111.36	5730.96	110.69	5734.24	110.89	5776.87	111.14	5842.46	111.03
5855.58	111.21	5871.98	111.04	5904.77	111.19	5921.17	110.94	5931.01	111.17
5970.36	110.96	5990.04	111.21	5996.6	111.03	6042.51	111.14	6062.19	110.96
6104.82	111.08	6131.05	111	6199.92	111.39	6232.72	111.26	6265.51	111.44
6285.19	111.21	6308.14	111.37	6331.1	111.11	6354.06	111.41	6373.73	111.25
6386.85	111.38	6426.2	111.36	6449.16	111.17	6455.72	111.3	6531.15	111.31
6537.71	111.15	6596.74	111.15	6619.69	110.96	6649.21	111.09	6698.4	110.87
6731.19	111.14	6747.59	111.02	6767.27	111.15	6777.11	110.94	6803.34	110.94
6809.9	111.15	6829.58	110.92	6859.09	111.07	6875.49	110.81	6901.72	110.98
6908.28	110.8	6950.92	110.69	6957.47	110.93	6973.87	110.89	6993.55	111.55
7006.67	111.5	7016.5	112.24	7029.62	112.33	7042.74	112.87	7088.65	112.3
7098.49	112.04	7134.56	111.9	7150.96	112.35	7190.32	112.11	7196.87	112.36
7216.55	112.39	7226.39	112.73	7252.62	112.45	7259.18	112.68	7278.86	112.46
7298.54	112.64	7324.77	112.31	7337.89	112.57	7367.41	112.3	7396.92	112.48
7413.32	112.29	7459.23	112.75	7475.63	112.56	7528.1	112.47	7551.05	112.16
7567.45	112.44	7583.85	112.02	7610.08	112.49	7633.04	112.23	7652.72	112.39
7669.11	111.66	7682.23	114.22	7692.07	115.2	7711.75	114.95	7721.59	113.52
7734.7	113.16	7751.1	113.41	7760.94	114.58	7767.5	114.66	7780.62	115.86
7790.45	115.08	7803.57	114.99	7823.25	115.5	7842.93	117.18	7849.48	118.18
7862.6	119.29	7924.91	121.43	7944.59	122.27	7987.22	122.92	8003.62	123.44
8026.57	123.67	8042.97	124.15	8056.09	124.27	8072.49	124.05	8095.44	124.16
8124.96	124.92	8151.19	124.92	8164.31	124.36	8177.43	124.28	8193.83	124.6
8216.78	124.09	8239.74	123.26	8256.13	123	8275.81	121.74	8318.44	120.9
8347.95	120.49	8374.19	120.53	8397.14	120.09	8439.77	119.61	8475.85	119.9
8502.08	119.69	8521.76	119.74	8538.15	120.01	8547.99	120.59	8564.39	121.02
8570.95	121.61	8580.78	121.73	8600.46	122.62	8613.58	121.8	8629.97	121.25
8636.53	121.67	8656.21	121.5	8682.44	121.82	8689	123.36	8698.84	123.72
8708.68	122.14	8711.96	121.18	8738.19	120.32	8748.03	120.94	8754.59	120.73
8767.7	121.1	8784.1	122.35	8800.5	125.89	8807.05	126.62	8816.89	126.85
8826.73	126.5	8833.29	127.86	8839.85	127.91	8849.69	127.01	8856.24	127.46
8862.8	127.11	8879.2	127.49	8898.88	127.37	8938.23	126.71	8964.46	126.7
8977.58	126.89	9003.81	125.79	9030.05	123.18	9039.88	122.94	9049.72	124
9062.84	122.56	9069.4	121.49	9089.07	122.07	9098.91	121.56	9118.59	121.94

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.081	107.87	.066	1028.99	.015	1480.76	.066	1588.99	.067

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1005.33	1588.99	1869.27	1625	951.28	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	1005.33	109.18	T

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Left Levee      Station=107.8701      Elevation=  131.22
Right Levee     Station= 8839.85      Elevation=  127.91
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1588.99 9118.59  112.07

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            128.56    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.13    Wt. n-Val.                 0.066      0.030      0.067
  W.S. Elev (ft)            128.43    Reach Len. (ft)          1869.27    1625.00     951.28
  Crit W.S. (ft)            116.04    Flow Area (sq ft)       13948.97   18148.98   108311.40
  E.G. Slope (ft/ft)      0.000089    Area (sq ft)            14630.09   18148.98   108311.40
  Q Total (cfs)           235000.00    Flow (cfs)              18605.06   82434.13   133960.80
  Top Width (ft)           8997.97    Top Width (ft)            884.71     583.66    7529.60
  Vel Total (ft/s)            1.67    Avg. Vel. (ft/s)            1.33       4.54       1.24
  Max Chl Dpth (ft)          52.12    Hydr. Depth (ft)           15.77      31.10      14.38
  Conv. Total (cfs)       24902750.0    Conv. (cfs)             1971563.0   8735473.0   14195710.0
  Length Wtd. (ft)         1249.08    Wetted Per. (ft)          886.78     594.55    7539.30
  Min Ch El (ft)             76.31    Shear (lb/sq ft)            0.09       0.17       0.08
  Alpha                       2.95    Stream Power (lb/ft s)      0.12       0.77       0.10
  Frctn Loss (ft)             0.10    Cum Volume (acre-ft)    193561.90   73000.90   225956.00
  C & E Loss (ft)             0.00    Cum SA (acres)          23377.88    2955.62   26233.57


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 171.48*

INPUT
Description: RGV-04,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  121.53   20.46  122.12   30.69  121.82   46.53  122.57   64.79  124.25
   68.21  124.84   75.02  127.02   85.25  129.43  102.37  129.85  109.01  129.29
  138.92  122.94   152.2  121.42  158.85  121.08  178.78  119.29   195.4  118.89
  208.68  117.59  218.65   117.3  285.11  117.02  301.71  116.59  308.36  116.72
  331.62  115.92  336.48115.4662  354.87   114.1  371.52  113.99  381.52  113.67
  392.43  113.68  431.11  112.08  453.67  111.48  468.14  111.34   484.8  110.87
  504.79  110.63  534.24  110.51  574.76  110.58  594.74  110.78  604.74  110.71
   621.4  111.09  634.73  110.74  651.39  111.04  681.37  110.31  691.36  109.72
   704.7  109.25  714.69  108.66  731.35   108.7  769.53  108.44  782.42  108.57
  824.63  108.59  843.66  108.77   875.9   108.7  895.25  108.27  917.92  108.24
  927.49   108.4  941.25  108.17  961.24   108.4  981.23   109.1  994.56  109.77
 1014.55     110  1022.8  107.59  1026.7   106.9 1034.62104.3512 1043.79  102.81
 1058.8697.51893 1070.29   92.64 1091.99    82.2 1100.52   78.73 1109.76   76.53
 1116.71   76.14 1129.07   75.01 1134.07   75.01 1141.88   75.72 1149.69   76.93
 1157.49   77.36 1173.11    79.1 1204.34   83.35 1212.15   84.63 1235.57   87.39
 1260.59   91.39 1274.61   94.27 1291.18   96.46 1308.96   97.92 1337.07    99.6
 1352.36  100.37 1371.35  101.61 1376.47   102.9  1387.7102.5931  1394.4  102.41
 1412.32   103.2 1417.82103.2358 1450.73  103.45 1455.85  103.75 1463.53  105.06
 1477.49  105.52  1477.7  106.69 1481.45  107.04 1491.38  109.17 1501.94  109.45
 1509.62  109.97 1541.37  109.89 1552.54  109.58 1576.65  109.55  1583.7  109.12
 1590.76  108.06 1616.91  107.51 1622.51  107.62 1633.08  108.73 1650.62  108.96
 1664.83  108.71 1675.41   108.2 1682.47  107.51 1707.15  107.44 1718.06  107.79
 1730.32  107.71 1742.58  108.05 1751.78  107.75 1794.69   107.7 1803.89  107.61
 1819.21  108.14 1837.66  108.07 1869.41  108.68 1886.64  108.61 1897.63  108.84
 1911.74  109.46 1941.82  110.22 1963.28  110.22 1972.47  110.54 1985.81  110.63
    1997  109.95 2018.45  109.69 2049.11  109.12 2061.37  109.08 2088.95  108.63
 2141.06  108.61 2179.81  109.32 2186.86  109.04 2214.63  108.86 2229.17  108.43
 2248.35  108.25 2272.87  108.53 2288.19  108.91 2297.39  108.64 2312.71   108.9
 2337.24  108.89 2343.37  109.16 2364.83  109.56 2404.67  109.58 2416.94   109.8
 2454.83  109.86 2483.05  110.31 2493.61  110.63 2504.19  110.45 2511.25  110.63
 2521.83  110.47 2528.88  110.88 2539.46   110.1 2564.06  110.11 2588.59  109.79
 2603.92  110.02 2610.04  109.86 2634.56  109.92 2668.29   109.7 2705.17  110.05
 2726.33  109.86 2743.96  109.97 2778.63  109.85 2793.95  109.41 2806.21  107.02
 2824.61  109.15 2830.74  109.42 2836.87  109.17 2849.13  107.18 2855.26  107.39
 2863.84  106.44 2904.31  108.13 2919.63  108.03 2928.82  109.02 2941.09  109.01
 2980.93  109.45 2999.33  109.08 3026.04   109.1 3043.66  109.24 3057.77  108.96
 3082.09  109.04 3094.34  109.24 3131.81  109.01 3152.97     109 3181.17  108.78
 3195.28  109.43 3209.39  108.89 3235.35  108.95 3256.81  109.63 3269.33  109.49
 3279.91  110.03 3290.52  110.96 3308.11  111.18 3322.21  110.97 3330.38  111.33
    3361  111.02 3382.48  111.23 3394.74  111.04 3413.13  111.36 3446.85  111.43
 3456.04  111.24 3483.63  111.94 3498.96  111.61 3520.41  111.82 3540.82  111.49
 3551.07  112.01 3561.98  111.99 3576.08  111.43 3590.92  111.72 3606.24  110.96
 3621.57  109.22 3667.55  108.92 3678.34  109.24 3695.13  109.18 3717.12  109.62
  3727.7  109.49 3738.27  110.17 3752.38  110.52 3777.07  110.73 3794.69  110.53
 3805.27  110.76 3826.94  110.56  3839.2  110.69 3854.53  111.11 3879.31  111.34
 3897.44  111.28  3909.7  111.86 3918.09  111.75 3943.42     111 3986.33  111.12
  4013.3  110.97 4020.35  111.08 4048.56  110.91 4069.71  111.04 4083.82   110.8
 4115.07  110.52 4129.65  110.71 4164.11  110.29 4200.17  110.27 4228.38  109.94
 4267.16  109.79 4320.43  110.65 4329.63  110.22 4335.76  110.54 4344.96  110.09
 4471.67   109.3 4492.83  109.39 4524.57  109.06 4552.77  109.17  4570.4  109.09
 4584.51  109.37 4595.08  109.16 4609.19  109.19 4619.76  108.86 4637.39  109.21
 4663.74  108.97 4669.87  109.03  4685.2  109.75 4691.33  109.52 4703.58  109.73
 4718.91  109.67 4728.11  109.98  4746.7  109.68 4778.43   109.7 4796.06  109.48
 4848.95  109.42 4859.53  109.54 4912.42  109.38 4972.36  109.31 4979.41  109.18
 4997.04  109.38 5022.37  109.33 5053.45   109.4 5081.67  109.27 5102.83   109.5
 5141.61   109.5 5152.19  109.69 5162.77  109.58 5205.07  109.69 5227.73  109.55
 5254.44  109.73  5289.7  109.51 5310.49  109.84 5325.82  109.61 5342.58  109.57
 5360.22  110.24 5380.99  109.76 5448.37  110.04 5462.47  109.93 5476.57  110.06
  5512.8  109.74 5550.62  109.98 5558.77  109.86 5578.83  109.97 5631.71  109.81
 5663.45  110.02 5684.61  109.84 5712.81  109.83 5726.92  109.97 5744.55  109.86
 5755.13     110 5779.81   109.6 5797.44  109.64 5804.49  109.88 5839.75  110.39
 5864.43   110.2 5885.59  110.55 5892.64  110.39 5906.74  110.57 5934.95   110.3
 5952.58   109.5 5963.16  110.34 5981.77  110.17  6023.1   110.2 6037.21  109.99
 6072.46  110.09 6086.57  109.83 6100.67  109.97 6118.31  109.86 6195.87  109.84
 6220.55  109.53 6234.66  109.66 6248.77  109.45 6266.39  110.48 6276.97  109.67
 6305.18  109.75 6322.81  109.59 6333.39  109.95 6343.96   110.6 6368.65   111.2
 6383.31   111.3 6396.86  111.82 6407.43  113.33 6421.53  112.92 6435.64  113.25
 6439.16  112.46 6446.22  111.87 6460.32   111.9 6474.43  112.17 6501.09111.8525
 6520.26  111.78 6561.09  112.84 6573.36  112.74 6582.54  112.94 6594.81  112.76
 6607.07  112.87 6622.51  112.64 6640.14  112.64 6657.77  112.94 6675.41  112.84
 6703.61  113.02 6721.24  113.36 6731.82  113.74 6760.03  113.56 6767.08  113.28
 6791.76  113.53 6809.37  114.04 6834.07  113.99 6855.23  114.13 6865.81  113.98
 6876.39  114.36 6897.54  114.32 6908.11  113.93 6929.27   113.7 6943.38  113.34
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 6953.44  113.36 6999.79  113.99 7024.48  113.91 7042.11  114.11 7080.89  113.98
  7097.5  114.28 7112.83  114.23 7137.34  114.54  7158.8  114.45  7177.2  114.66
 7192.52   114.4 7204.78  115.84 7213.98  116.51 7232.37  116.64 7253.67  115.89
 7269.15  116.04 7278.35  116.65 7296.74  117.12 7305.93   116.5 7320.66  116.13
 7327.71  116.25 7338.28   115.6 7348.86   116.1 7359.44  117.31 7373.37  117.67
 7398.23  117.89 7415.85  118.39 7426.43  119.04 7433.49  118.72 7447.59  119.58
 7458.17  118.94 7468.75  119.74 7479.33  119.97 7500.48  119.41 7514.58  119.39
 7528.69  119.13 7539.27  119.69 7567.47  119.57 7578.05  119.76 7595.68  119.65
 7620.37   120.5  7643.1  120.13 7655.62  119.61 7682.96  119.83 7697.93  119.75
 7708.51  119.43 7725.87  119.22 7741.19  119.38 7759.58  118.96 7768.45  119.08
 7786.08  118.85 7803.71  118.88 7824.87  118.74 7851.53  118.98 7870.71  118.83
 7877.76  118.98 7888.34  118.74 7902.45  119.16  7909.5  119.72 7923.59  119.63
 7946.55  119.96 7972.96     120 7994.11  121.43 8015.27  121.85 8035.44  123.09
 8044.63  123.24 8063.02  123.92 8075.28  123.77  8090.6  123.88 8096.73  124.24
 8115.13  124.72 8139.64  125.72 8145.78  126.67 8154.97   127.1 8167.24  126.16
 8191.75  126.39 8200.95  126.98 8234.66  128.04 8256.11  130.48 8265.31  130.96
 8274.51  130.99 8280.64   131.8 8286.77  131.96 8291.98  131.51  8307.6  131.76
 8338.85  131.37 8359.69  131.46 8373.57   130.9 8387.46  129.54 8392.67   129.4
 8397.88   129.9  8408.3   128.6 8418.71  128.84 8423.92  128.56 8434.34   128.7

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .081  354.87    .066 1091.99    .015 1481.45    .066 1633.08    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1034.62 1412.32          1869.27    1625  951.28             .1       .3
Left Levee      Station=102.3651      Elevation= 129.845
Right Levee     Station= 8286.77      Elevation= 131.965
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1508.89 6362.59  110.06

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 171.15

INPUT
Description: RGV-04, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.07    6.45  122.55   19.36  122.87   29.04  120.99    35.5  120.47
   61.31  120.51   64.54  121.14   70.99  124.41   80.67  128.25   96.86  128.47
  113.23  127.41  126.33   125.7  132.88  124.43  162.36  120.37  172.18  119.24
  188.56  117.75  211.48  116.45  234.41  115.86  260.61  115.72  276.98  115.79
  316.28  115.52  371.96  115.38  391.61  114.78  430.91     112  453.84  110.95
  493.14  110.32  535.71  110.19  581.56  110.24  611.04  110.01  637.24  110.22
  683.09  110.23  712.57  110.36  742.04  110.28  764.97  110.41  774.79  110.21
  787.89  110.48  814.09  110.45  850.12  111.07  882.88   110.8  902.54  109.75
  928.75  109.94   935.3  110.18  968.07  110.21   977.9  110.05 1017.21  110.39
 1023.77  110.82 1033.59  106.43 1040.15  104.76 1053.15  102.52 1060.15  102.28
 1079.15   99.92 1090.15   96.32 1092.15   95.08 1101.15   91.62 1126.15   77.92
 1137.15   74.42 1148.15   73.82 1160.15   73.72 1171.15   74.52 1182.15   76.19
 1203.15   78.63 1229.15   81.24 1251.15   84.12 1273.15   90.02 1290.15    92.7
 1306.15   94.92 1317.15   96.22 1330.15   98.13 1351.15  100.42 1363.15  101.42
 1376.15  102.12 1391.15  101.72 1407.15  102.45  1407.3  104.76 1413.86  105.52
 1417.14  106.98 1430.26  107.88 1459.79  108.41 1486.04  107.64  1492.6  107.85
 1499.16  107.26 1505.72  104.98    1509  104.46 1535.25  104.33 1545.09  106.84
 1568.06  107.33 1574.62  106.99 1584.46   105.9 1591.02  104.55 1613.98  104.73
 1630.39  105.41 1650.07  105.18  1679.6  105.31    1696  105.05 1715.69  105.46
 1735.37  105.65  1764.9   106.6 1778.02  106.67 1791.14  107.12 1804.27  108.21
 1817.39  108.89 1827.23  109.08 1853.48   108.9 1873.16  109.21 1899.41  107.62
 1915.81  107.02  1951.9  106.15 1981.43  106.05 2007.67  106.41 2033.92  107.41
  2053.6  108.83 2060.16  108.59    2070   108.8 2099.51   108.5 2109.35  108.64
 2129.03  109.35  2165.1  109.56  2181.5  109.21 2201.18  109.14 2227.41  109.25
 2260.21  108.39 2279.89  108.07  2309.4  107.78 2335.64  108.46 2345.47   108.9
 2355.31  108.51 2361.87  108.92 2371.71  108.35 2378.27   109.1 2388.11  107.73
 2404.51  107.34  2420.9  107.46 2427.46  107.26 2447.14   107.5 2470.09  107.35
 2525.85   107.4 2542.24  107.74 2561.92  107.26 2578.32  107.29 2597.99  106.88
 2650.47  106.63 2663.58  107.54  2676.7  107.42 2683.26  106.58 2689.82  105.15
 2706.22  107.03 2735.73  106.85 2752.13  106.33 2778.37  106.02 2794.76  106.42
 2840.68  106.09 2857.07  106.52 2870.19  105.99 2912.82  106.03 2922.66  106.29
 2939.06  106.06 2958.74  106.27 2984.97  105.98 2998.09  107.11 3011.21  106.24
 3037.45  106.52  3060.4  107.21 3066.96  107.16  3076.8  108.15 3086.64  109.92
 3103.03   110.6 3116.15  109.99 3122.71  110.33 3152.23  110.52 3158.79  110.76
  3171.9  110.42 3207.98   110.3 3237.49  110.59 3270.29  110.37 3273.57  110.17
 3289.96  110.29  3299.8  110.08 3312.92  110.28 3319.48  110.01 3326.04  110.52
 3339.16  110.89 3352.27  110.15 3362.11   110.6 3398.19  110.46 3404.75  110.78
 3417.86  110.31 3430.98   110.3 3447.38  110.68 3463.78   110.3 3483.45  110.34
 3493.29   109.6 3503.13  110.41 3516.25  110.63 3532.65  110.21 3539.21  110.28
  3555.6  109.58 3565.44  109.93    3572  109.66 3591.68  109.57 3604.79  109.81
 3624.47  109.56 3634.31  109.88 3644.15  109.51 3660.55  109.39 3670.38   109.7
  3683.5  109.48 3703.18  109.67 3709.74  109.43 3739.25  109.37 3758.93  109.13
 3765.49  109.37 3791.73  108.97  3811.4  109.05 3824.52  108.73 3857.31  108.67
 3867.15  108.91 3916.35  108.58 3932.74  108.76  3939.3  108.59 3952.42  108.88
 3958.98  108.64 3981.94  108.69 3995.05  108.33 4027.85  108.54 4044.25  108.28
 4073.76  108.46 4093.44  108.45 4132.79  108.21 4139.35  107.98 4149.19  108.19
 4165.59  108.18 4185.26  107.94 4204.94   108.2 4221.34  108.08 4234.46  107.74
 4241.02  108.03 4260.69  108.13 4277.09  108.01 4290.21  108.52 4300.05  108.01
 4313.17  108.16    4323  107.55  4339.4  108.26 4368.92  107.68 4382.03     108
 4401.71  107.85 4421.39  107.45 4434.51  108.07 4441.07  107.84 4470.58  107.88
 4486.98  107.44  4500.1  107.56 4506.66  107.31 4536.17  107.33 4546.01  107.58
 4568.97  107.41 4585.36  107.54  4595.2  107.31 4624.72  107.47 4650.95  107.35
 4657.51   107.1 4673.91  107.48 4683.75  107.36 4726.38  107.77 4752.62   107.6
  4772.3  108.06 4808.37  108.06 4818.21  108.36 4828.05  108.18  4867.4  108.59
 4873.96   108.4 4903.48  108.59 4913.32   108.8 4946.11  108.58 4965.79  109.06
  4995.3  108.32 5005.14  108.51  5011.7  109.18 5018.26   108.8 5034.66  108.83
 5060.89  108.66 5093.69  108.98 5106.81  108.78 5119.92  109.07  5139.6  108.55
 5152.72  108.42 5165.84  108.66 5178.96  108.63 5188.79  108.89 5208.47  108.63
 5215.03  108.83 5241.27   108.8 5264.22  108.59 5290.46  108.72 5293.74  108.93
 5313.42  108.67 5326.53  108.84 5339.65  108.63 5352.77  108.87 5369.17  108.69
 5379.01  108.99 5401.96  108.05 5418.36  108.02 5424.92  108.45 5447.88  108.98
 5457.71  109.48 5470.83  109.44 5480.67  109.06 5500.35  109.73 5506.91   109.5
 5520.02  109.87 5546.26  109.41  5556.1  108.18 5562.66  107.75  5572.5  109.28
 5598.73  108.99 5628.25  109.04 5641.37  108.67 5654.48  108.94 5674.16  108.88
 5687.28  108.36  5700.4  108.64  5716.8  108.41 5729.91  108.68 5743.03  108.54
 5772.55  108.63 5779.11  108.35 5788.94  108.59  5811.9  108.05 5825.02  108.25
 5838.14  107.86 5847.98  109.47 5854.53  109.99 5864.37  108.44 5880.77  108.61
 5890.61  108.45 5897.17  107.95 5907.01  108.09 5916.85  108.86 5926.68  110.08
 5949.64  111.46 5966.04  111.69 5975.88  112.58 5985.71  115.74 5998.83  114.84
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 6011.95  115.44 6015.23  113.91 6021.79  112.86 6034.91  112.93 6048.03  113.37
 6061.14  113.32 6070.98  112.97 6080.82  113.16 6090.66  112.86 6123.45  114.15
 6136.57  114.12 6166.09  112.96 6185.76  112.61 6202.16  112.85 6218.56   113.8
 6234.96  113.71 6251.35  113.99 6261.19  113.83 6277.59  114.46 6287.43  115.28
 6313.67  114.74 6320.22  114.18 6333.34  114.13 6343.18  114.47 6353.02  115.31
 6375.98  115.63 6382.53  115.45 6402.21  115.74 6412.05  115.59 6421.89  116.29
 6431.73  115.89 6441.57  116.22  6451.4  115.54 6471.08  114.97  6484.2  114.27
 6526.83  114.97 6536.67  115.27 6559.63  115.29 6576.03  115.71 6585.86  115.56
  6612.1  115.79  6644.9   116.5 6684.25  116.66  6723.6  117.25 6733.44  117.78
 6749.84   118.1 6762.96  119.02  6772.8  118.61 6805.59  118.76 6835.11  117.21
 6841.67  117.25  6851.5  115.54 6861.34  115.58 6871.18  116.71 6877.74  116.19
 6907.26  115.58 6923.65  115.93 6933.49  116.84 6940.05  115.92 6953.17  116.99
 6963.01  115.47 6966.29  115.51 6972.85   116.9 6982.69  117.19 7002.36  115.53
 7015.48  115.24  7028.6  114.53 7038.44  115.32 7048.28  114.91 7064.67  115.06
 7074.51  115.43 7090.91  115.01 7100.75  115.63 7113.87  116.08 7120.42  115.62
 7130.26  115.54 7146.66  114.87 7149.94  115.15 7163.06  114.93 7186.01  115.25
 7195.85  114.93 7212.25  115.19 7218.81  115.64 7238.49  115.94  7251.6   116.6
    7268  116.52  7284.4  116.92 7304.08  116.95 7317.19  117.36 7346.71  117.53
 7353.27  117.92 7363.11  117.57 7376.23  118.58 7382.79  119.79 7389.34  120.03
  7395.9  119.55 7402.46  119.85 7441.82   120.3 7451.65  121.43 7461.49  123.03
 7481.17  123.07 7497.57  124.51 7520.52  125.01 7533.64  125.55 7563.16  127.15
 7599.23  129.79 7645.15  132.45 7664.82  133.75 7677.94   134.1 7691.06  133.45
 7697.62  133.56 7710.74  134.93 7733.69  136.02 7743.53  136.02 7750.09  135.45

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 1060.15    .025 1330.15    .085 5985.71     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1053.15 1407.15           859.81    1625 1934.01            .1       .3
Left Levee      Station=   96.86      Elevation=  128.47
Right Levee     Station= 7733.69      Elevation=  136.02

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            128.36    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.20    Wt. n-Val.                0.066      0.027     0.081
  W.S. Elev (ft)            128.15    Reach Len. (ft)          859.81    1625.00    1934.01
  Crit W.S. (ft)            114.61    Flow Area (sq ft)       14743.62   13727.39   109699.80
  E.G. Slope (ft/ft)      0.000091    Area (sq ft)            14743.62   13727.39   109699.80
  Q Total (cfs)           235000.00     Flow (cfs)             19670.86   81141.32   134187.80
  Top Width (ft)            7475.09    Top Width (ft)           951.38     354.00     6169.70
  Vel Total (ft/s)            1.70    Avg. Vel. (ft/s)           1.33       5.91       1.22
  Max Chl Dpth (ft)          54.43    Hydr. Depth (ft)          15.50      38.78      17.78
  Conv. Total (cfs)       24610200.0    Conv. (cfs)            2060016.0   8497463.0   14052720.0
  Length Wtd. (ft)          1695.17    Wetted Per. (ft)          953.63     361.97    6178.76
  Min Ch El (ft)              73.72    Shear (lb/sq ft)            0.09       0.22       0.10
  Alpha                        4.52    Stream Power (lb/ft s)      0.12       1.28       0.12
  Frctn Loss (ft)             0.18    Cum Volume (acre-ft)    192296.90   71873.50   221156.20
  C & E Loss (ft)             0.11    Cum SA (acres)          23298.96    2924.04   25934.95


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 170.83*

INPUT
Description: RGV-04,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  123.08    6.74  123.51   13.48  121.88   28.28  120.65   34.58  120.38
   47.17  120.39   59.71  121.75   62.86  122.53   70.76  125.78   78.57  127.93
   94.34  127.85   96.46  127.47   109.2  123.49  115.57  122.18  126.18  122.42
  170.77  120.58  179.26  120.62  185.63  119.84  208.98  119.04  232.33  118.04
  276.92   115.3  308.76  113.99  319.38  113.87  359.71   114.4  370.33  114.13
  380.94  112.57  389.43  112.36   395.8  113.04  408.54  112.88  436.14  113.41
  444.63  113.23  467.98  113.75  474.35  113.51  499.83  114.02  527.42  113.01
  535.92  113.33  544.41  111.93  557.15  111.63  565.64  111.72  584.75  110.62
  597.48   110.3  620.84  110.83  637.82  112.08  654.81  111.94  669.66  110.72
  680.28  110.41  705.75  110.88  758.82  110.25  767.32  110.44  775.81  109.91
  790.67  109.88  809.78  108.94  824.64  108.77  837.38  108.39  854.36  108.95
  890.45  108.78  907.43  108.46  937.15  108.49  966.88   108.8  979.61  108.65
   988.1  108.92 1002.97  108.85 1019.95  108.98 1028.44  109.59 1032.69  109.43
 1045.42  109.95 1064.53  109.44 1075.14  109.73 1079.39  110.22 1094.25  109.77
 1106.98  110.64  1126.1  109.97 1136.71  109.98  1145.2  110.41 1153.69  110.14
  1164.3  110.72 1170.67  110.56 1181.29  110.81 1194.03  110.65 1204.64  110.85
 1211.01  110.45 1234.36  110.63 1240.73  110.52 1253.47  110.84 1272.57  110.63
 1283.19  110.82 1300.17  110.47 1308.67  111.14 1319.28  110.84 1346.88  110.52
 1357.49  111.05  1376.6  110.75 1389.33  111.03 1399.95  110.82 1408.44  111.16
 1425.42  110.68  1431.8   111.1 1438.17  110.76 1444.54  111.01 1463.64  110.75
 1470.01  111.08 1482.74  110.47 1516.71  110.73  1525.2  111.12 1548.55  110.61
 1557.05  110.98 1569.79  110.68 1588.89  110.91 1616.49  110.48 1637.72  110.54
 1648.33     110  1682.3  110.06 1699.28  109.65 1718.39  109.98 1739.62  110.06
 1748.11  110.35 1754.48  109.88 1773.59  109.53 1790.57  109.53 1796.94  109.17
 1820.29  109.08 1826.66  110.18 1835.15  109.62 1850.01  109.88 1856.38  110.44
 1862.75  109.87 1873.36  109.61 1890.34  110.12 1896.72  110.53 1909.46  110.34
 1924.31  110.95 1934.93     111 1949.79  110.63 1962.53  111.15  1968.9  110.99
 1977.38  109.87    1988   110.3 2002.86  109.92 2011.35  110.73 2024.09  110.85
 2028.34  111.42 2041.07  111.23 2049.57  110.14 2066.55   109.5 2083.53  109.84
 2087.78  109.66 2094.15  111.38  2098.4  111.83 2109.01  112.02 2119.62  112.63
 2125.99  113.48 2130.24   113.2  2142.2  109.01 2154.17  105.72    2170103.3103
 2182.44102.0568 2186.17  101.84 2200.77   99.62 2218.16   97.75 2235.62   94.95
 2238.79   94.12 2253.08   91.41 2281.06   84.46 2295.65   80.35 2310.23   78.19
 2324.85   76.64 2332.15   76.38 2346.75   74.84 2359.03   77.26 2371.32   81.19
 2383.61   86.03 2395.89   90.26 2397.12   92.11 2423.47    94.1 2441.4397.01582
 2465.0799.22183 2490.07  101.32 2507.77  102.52 2528.85  103.44 2534.19  103.41
 2542.25  104.62 2554.99   105.8 2555.11  106.95 2563.41  108.13 2574.47  108.66
 2594.31  108.95 2620.76  108.41 2627.37  107.01 2645.01  107.01 2651.62   108.3
 2667.05   108.5 2678.07  107.75 2682.48  107.06  2697.9   107.1 2708.93  107.41
 2722.15  107.28 2741.99  107.33    2753  107.19 2779.46  107.49 2799.29  108.04
 2816.92  108.23 2825.75  108.75 2841.17  109.15 2858.81  109.02 2872.03  109.14
 2889.66  108.31 2924.93  107.55 2944.77  107.49  2962.4  107.66 2980.03  108.16
 2993.25  108.92  3024.1  108.94 3041.22109.4494 3068.17  109.91 3092.41  109.98
 3110.03  110.26 3132.06  110.21 3165.11  110.56 3189.35  111.09 3206.97  110.87
 3211.38  111.27 3217.99  110.61 3229.01  110.43 3257.65  110.53 3310.53  110.48
 3321.54  110.62 3334.76  110.35    3359  110.11 3394.26  109.99 3403.06  110.49
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3411.88	110.45	3420.69	109.32	3431.71	110.27	3451.54	110.13	3462.56	109.8
3480.18	109.63	3491.2	109.82	3522.05	109.75	3533.06	110.06	3541.87	109.82
3577.12	109.86	3588.14	109.6	3618.99	109.36	3627.8	109.94	3636.62	109.53
3654.25	109.56	3674.07	109.81	3687.29	111.2	3698.3	111.54	3711.53	111.38
3731.36	111.43	3768.81	111.23	3788.64	111.34	3843.72	110.94	3856.95	111.37
3865.75	110.99	3872.37	111.22	3909.82	111.01	3929.65	111.14	3953.89	110.89
3960.5	110.5	3975.92	110.98	3991.35	110.8	4002.36	110.45	4008.97	110.62
4026.6	110.43	4035.41	110.55	4061.85	110.4	4073.71	110.54	4080.11	111.18
4105.92	110.74	4138.96	110.39	4174.22	110.61	4201.85	110.16	4221.07	110.34
4244.73	110.14	4260.14	110.49	4278.74	112.32	4291.56	112.37	4297.95	112.03
4317.19	111.94	4336.4	111.01	4368.44	110.58	4381.25	111.1	4394.55	110.95
4425.39	111.35	4438.61	111.68	4458.44	111.61	4462.85	111.8	4487.09	112.08
4495.9	112.43	4511.33	112.39	4517.93	112.13	4528.95	112.56	4548.78	112.4
4557.59	112.61	4584.03	112.4	4597.25	112.75	4617.08	113.03	4628.1	112.95
4661.15	113.24	4667.76	113.42	4700.8	113.56	4720.64	113.86	4742.67	113.85
4765.69	114.2	4784.9	114.63	4806.57	114.54	4819.79	114.84	4883.68	115.16
4893.83	115.03	4914.53	115.26	4936.56	115	4949.78	115.15	4964.3	114.67
4976.22	114.85	4980.63	115.25	5013.67	114.9	5053.33	114.93	5075.37	114.55
5092.44	114.66	5105.26	115.47	5118.07	116.69	5130.89	117	5150.28	116.87
5170.11	116.96	5183.33	116.74	5227.4	116.94	5242.82	116.48	5280.27	117.33
5295.7	116.58	5322.14	117.69	5339.77	118.57	5350.78	118.21	5357.39	119.14
5380.78	119.03	5394.85	119.78	5403.66	119.81	5434.51	119.55	5502.81	120.26
5518.23	120.05	5535.86	120.22	5546.87	121.61	5553.48	121.04	5564.5	121.12
5582.13	120.86	5595.35	122.22	5610.77	123.51	5621.79	123.67	5628.4	124.18
5635.01	125.86	5643.82	125.54	5652.63	125.98	5659.25	124.79	5668.06	124.95
5685.68	125.64	5705.52	125.81	5713.94	126.21	5727.54	126.48	5736.36	126.42
5756.19	125.86	5769.41	125.71	5780.43	125.98	5791.44	126.65	5820.08	126.91
5837.71	127.83	5853.91	127.6682	5859.74	127.61	5875.17	128.03	5881.78	128.49
5897.2	128.76	5921.44	128.69	5928.05	128.95	5941.27	128.66	5947.88	128.27
5969.91	128.01	5995.85	128.56	6020.59	128.53	6031.61	128.74	6055.84	128.56
6077.88	128.7	6104.31	128.64	6130.75	128.88	6148.38	129.4	6157.19	129.91
6163.8	129.73	6185.83	129.77	6205.67	129.18	6210.07	129.25	6216.68	128.47
6223.29	128.56	6229.9	129.13	6234.31	128.82	6254.14	128.3	6265.15	128.24
6271.76	128.56	6276.17	128.1	6284.98	128.63	6291.59	127.87	6298.21	128.6
6304.82	128.84	6318.03	128.16	6335.66	127.61	6342.27	128.05	6348.88	127.88
6366.51	128.25	6377.52	128.11	6392.95	128.67	6414.98	128.08	6441.42	128.43
6448.03	128.36	6463.58	129.02	6485.48	129.56	6507.52	129.66	6520.74	129.56
6529.55	129.77	6560.4	129.91	6569.21	130.42	6573.62	131.03	6604.52	131.41
6613.28	131.7	6626.49	133.23	6639.72	133.42	6650.73	134.47	6674.97	135.12
6694.8	135.9	6719.03	137.19	6771.91	139.22	6785.14	138.99	6793.95	139.73
6809.37	140.44	6844.14	140.12	6850.77	138.41	6859.04	137.74	6867.33	138.86
6873.95	138.99	6880.58	137.1	6893.83	136.13	6902.11	135.8	6917.02	135.88
6933.58	135.37	6940.21	133.97	6955.12	133.82	6963.4	134.2	6979.97	134.44
6984.93	134.15	7006.47	134.1	7018.06	133.59	7024.69	132.95	7031.31	133.38
7041.25	132.88	7046.22	133.5	7049.54	133.01	7059.47	133.09	7071.07	133.72
7085.97	135.39	7104.2	135.22	7112.48	133.92	7115.79	134.38	7124.08	134.45

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.186	2125.99	.066	2182.44	.015	2534.19	.066	4438.61	.076

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2154.17 2542.25 859.81 1625 1934.01 .1 .3
Left Levee Station= 78.6 Elevation= 127.93
Right Levee Station= 6811.06 Elevation= 140.515
Blocked Obstructions num= 1

Sta L	Sta R	Elev
2574.87	5737.23	108.61

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 170.5

INPUT
Description: RGV-04, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	124.1	6.56	124.45	13.12	121.03	16.4	120.32	45.91	120.28
59.03	123.19	68.87	126.49	75.43	127.61	81.98	127.66	91.82	127.24
95.1	126.53	104.94	122.53	114.78	118.94	124.62	116.51	141.01	117.3
157.41	116.8	170.53	116.82	180.36	116.5	209.88	116.49	216.44	117.13
223	117.18	232.83	116.01	255.79	115.76	268.91	115.88	285.3	115.44
304.98	115.34	318.1	114.48	327.94	114.34	373.85	112.06	380.41	112.04
403.36	111.12	416.48	110.96	423.04	110.57	439.44	110.61	482.07	112.1
501.74	112.51	518.14	112.09	534.54	109.09	541.1	108.53	547.65	108.77
557.49	110.22	560.77	109.9	577.17	109.92	596.85	110.67	619.8	111.06
632.92	110.71	642.76	111.25	652.59	111.17	668.99	111.76	678.83	111.27
688.67	111.44	701.79	112	708.34	111.81	718.18	112.28	734.58	111.33
744.42	111.16	760.81	110.34	773.93	111.02	787.05	108.24	793.61	107.88
806.73	107.69	819.84	107.89	826.4	107.23	849.36	105.73	869.03	105.1
885.43	105.75	895.27	105.7	905.11	106.2	924.78	107.91	931.34	108.71
944.46	108.8	957.58	108.45	967.41	107.07	980.53	106.03	996.93	105.42
1019.88	105.82	1036.28	106.47	1042.84	106.11	1059.24	106.14	1069.07	106.66
1075.63	106.25	1105.15	106.1	1118.26	106.27	1131.38	106.92	1134.66	106.46
1144.5	106.13	1157.62	106.1	1167.45	106.56	1196.97	105.29	1219.92	105.42
1239.6	104.97	1249.44	105.34	1265.83	106.44	1275.67	106.38	1321.58	106.69
1347.82	106.18	1367.49	106.24	1374.05	106.55	1393.73	106.46	1406.84	106.87
1429.8	106.92	1439.64	107.28	1459.31	107.01	1472.43	107.55	1495.39	107.44
1511.78	107.96	1521.62	107.72	1528.18	108.59	1534.74	108.94	1541.3	108.63
1560.97	109.69	1590.49	108.69	1606.88	109.26	1613.44	110.24	1623.28	110.26
1636.4	109.34	1642.96	109.62	1649.51	110.6	1656.07	111.07	1672.47	110.51
1685.59	109.72	1695.42	109.97	1701.98	109.73	1715.1	110.58	1728.22	110.04
1744.61	111.21	1754.45	110.92	1770.85	111.46	1790.53	111.19	1806.92	111.62
1816.76	110.85	1852.83	111.21	1862.67	110.97	1882.35	111.57	1902.02	111.45
1911.86	111.08	1928.26	111.42	1941.37	110.93	1954.49	110.72	1961.05	111.07
1967.61	112.06	1974.17	112.15	1984.01	111.45	1993.84	111.55	2006.96	111.03
2026.64	110.82	2043.03	111.87	2059.43	111.32	2062.71	111.58	2072.55	111.28
2092.22	111.81	2108.62	111.37	2115.18	111.43	2121.74	112.03	2138.13	111.64
2147.97	111.04	2157.81	111.86	2167.65	111.17	2177.49	111.67	2193.88	111.15
2207	111.17	2216.84	111.82	2223.4	111.01	2236.51	110.63	2243.07	111.17
2249.63	110.77	2266.03	110.83	2279.14	111.19	2288.98	111.16	2302.1	111.93
2318.5	111.19	2328.33	111.36	2338.17	110.85	2351.29	111.57	2370.97	111.02
2400.48	111.55	2423.43	110.8	2443.11	110.48	2459.51	110.71	2469.34	110.43
2475.9	110.62	2492.3	109.54	2498.86	109.85	2511.98	109.46	2544.77	109.58
2551.33	108.97	2571	108.62	2577.56	108.83	2593.96	108.75	2600.52	109.12
2623.47	109.11	2626.75	109.47	2633.31	109.13	2646.43	109.64	2656.27	108.71
2672.66	108.66	2685.78	108.09	2698.9	107.99	2712.01	108.15	2721.85	107.46
2734.97	107.25	2744.81	107.51	2757.92	107.35	2767.76	109.71	2774.32	109.8
2780.88	108.79	2803.84	109.67	2813.67	110.94	2823.51	109.97	2839.91	109.43

2853.03	110.14	2866.14	110.4	2875.98	111.2	2895.66	110.77	2918.61	111.91
2935.01	111.83	2948.13	111.16	2957.96	111.07	2977.64	112.11	2987.48	111.79
2994.04	110.37	3000.59	109.55	3016.99	110.39	3030.11	110.15	3039.95	109.63
3053.06	111.27	3059.62	111.65	3072.74	111.6	3079.3	112.78	3089.14	112.29
3098.97	112.36	3105.53	111.52	3112.09	110.15	3131.77	109.29	3138.33	108.81
3148.16	108.84	3164.56	109.41	3171.12	109.05	3180.96	112.45	3187.52	113.34
3203.91	113.68	3220.31	114.76	3230.15	116.26	3236.71	115.58	3243.26	113.8
3253.1	110.56	3259.66	109.41	3269.5	106.35	3276.06	104.85	3279.34	104.76
3293.34	102.96	3303.34	101.96	3313.34	101.36	3333.34	97.96	3363.34	94.96
3373.34	94.36	3423.34	89.36	3433.34	87.96	3443.34	86.96	3453.34	85.36
3463.34	83.36	3473.34	82.96	3493.34	80.96	3503.34	79.36	3513.34	78.96
3533.34	75.96	3543.34	79.46	3553.34	85.36	3563.34	93.36	3573.34	100.36
3574.34	103.91	3682.63	104.76	3685.9	104.87	3692.46	107.47	3702.29	109.13
3718.68	109.45	3751.45	109.59	3758.01	109.77	3787.5	109.41	3820.28	109.29
3836.67	109.53	3843.22	109.32	3882.55	108.97	3928.43	108.9	3954.65	109.51
3990.71	111.15	4003.82	112.02	4013.65	113.01	4020.2	113.34	4036.59	113.26
4046.42	113.49	4085.75	113.63	4131.64	113.25	4144.75	113.47	4164.41	113.52
4170.97	113.28	4197.19	113.2	4210.3	113.64	4226.69	113.67	4246.35	112.68
4262.74	112.82	4275.85	112.46	4292.24	112.49	4364.35	111.87	4393.85	111.81
4433.18	111.34	4479.06	111.27	4485.62	111.65	4488.89	112.67	4511.84	111.59
4521.67	111.67	4538.06	112.21	4551.17	111.65	4561	111.87	4574.11	111.69
4580.67	112.3	4583.95	113.17	4590.5	115.98	4597.06	116.17	4600.33	115.73
4610.17	115.37	4620	113.68	4629.83	112.87	4636.39	112.76	4642.94	113.9
4656.05	113.95	4669.16	115.08	4679	115.32	4705.22	116.51	4734.72	117.27
4747.83	117.36	4767.49	118.39	4787.16	119.2	4800.27	119.51	4813.38	120.15
4839.6	120.97	4849.43	121.55	4855.98	121.39	4875.65	121.79	4892.04	121.89
4905.15	121.61	4914.98	121.74	4934.65	121.22	4941.2	120.83	4954.31	121.6
4964.14	121.18	4993.64	120.68	5006.75	120.69	5013.31	122.16	5019.86	124.56
5026.42	125.19	5042.81	125.11	5052.64	124.81	5062.47	124.96	5082.14	124.86
5101.81	125.42	5108.36	123.94	5121.47	124.82	5134.58	128.06	5141.14	128.99
5154.25	129.05	5164.08	131.07	5173.91	130.39	5190.3	131.12	5213.24	131.89
5229.63	132.11	5242.74	133.65	5259.13	133.62	5272.24	135.61	5278.79	135.66
5305.01	137.2	5311.57	138.15	5324.68	139.07	5334.51	138.71	5354.18	138.81
5367.29	139.71	5377.12	139.9	5396.79	140.78	5403.34	141.48	5423.01	142.02
5432.84	141.72	5442.67	140.97	5449.23	141.1	5459.06	142.11	5468.89	142.21
5475.45	141.78	5488.56	141.77	5511.5	140.87	5534.45	140.44	5554.11	140.86
5567.22	140.77	5586.89	141.61	5600	141.1	5609.83	140.29	5622.94	140.27
5632.77	140.79	5642.61	140.69	5665.55	141.25	5681.94	141.25	5698.32	141.64
5708.16	142.39	5724.54	142.59	5737.66	142.16	5767.15	142.28	5780.26	142.67
5786.82	143.29	5796.65	143.59	5806.48	144.74	5845.82	144.56	5855.65	144.2
5875.31	144.46	5888.43	145.01	5904.81	144.51	5944.15	144.28	5947.42	143.8
5957.26	140.87	5967.09	139.5	5973.64	139.53	5983.48	141.1	5990.03	141.8
6003.14	142.06	6006.42	141.61	6016.25	138.29	6042.47	136.38	6058.86	135.73
6068.69	136.02	6088.36	135.93	6114.58	135.33	6121.13	134.94	6134.24	132.15
6150.63	131.89	6163.74	131.88	6180.13	132.65	6212.91	133.16	6222.74	132.6
6242.4	132.48	6265.35	132.54	6275.18	131.71	6288.29	131.54	6294.85	130.61
6301.4	130.27	6314.51	131.14	6321.07	131.1	6327.62	130.21	6334.18	130.16
6344.01	131.4	6350.57	130.43	6370.23	130.61	6380.06	131.57	6393.17	131.89
6406.28	133.64	6422.67	135.26	6435.78	135.17	6448.89	134.82	6458.73	134.95
6468.56	133.65	6475.11	132.37	6481.67	133.3	6494.78	132.96	6498.06	133.45

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.186	3236.71	.066	3293.34	.015	3574.34	.066	4003.82	.076

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
3276.06 3574.34 1270.17 1075 1060.89 .1 .3
Left Levee Station= 81.98 Elevation= 127.66
Right Levee Station= 5888.43 Elevation= 145.01
Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	1744.61	111.21

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	127.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.38	Wt. n-Val.	0.181	0.015	0.070
W.S. Elev (ft)	124.17	Reach Len. (ft)	1270.17	1075.00	1060.89
Crit W.S. (ft)	118.83	Flow Area (sq ft)	40558.21	10126.92	16039.57
E.G. Slope (ft/ft)	0.000295	Area (sq ft)	40558.21	10126.92	16039.57
Q Total (cfs)	235000.00	Flow (cfs)	31157.57	173602.90	30239.56
Top Width (ft)	4922.35	Top Width (ft)	3175.16	298.28	1448.92
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)	0.77	17.14	1.89
Max Chl Dpth (ft)	48.21	Hydr. Depth (ft)	12.77	33.95	11.07
Conv. Total (cfs)	13683450.0	Conv. (cfs)	1814225.0	10108450.0	1760772.0
Length Wtd. (ft)	1100.88	Wetted Per. (ft)	3181.37	310.01	1451.81
Min Ch El (ft)	75.96	Shear (lb/sq ft)	0.23	0.60	0.20
Alpha	17.55	Stream Power (lb/ft s)	0.18	10.31	0.38
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	191133.20	70933.10	216387.60
C & E Loss (ft)	0.17	Cum SA (acres)	23217.66	2897.40	25621.04

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 170.38*

INPUT
Description: RGV-04,
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	120.59	5.12	120.77	10.23	119.07	18.27	118.73	22.83	119.18
31.97	121.09	35.8	121.52	46.8124.4496		53.71	126.29	58.83	126.9
63.94	126.98	73.64	126.62	77.23	125.9	87.21	121.74	97.18	118.21
105.99	116.23	122.15	115.73	133.75	115.17	147.05	116.54	176.97	116.26
190.07	116.25	203.01	116.59	212.7	116	223.51	116.11	248.28	116.12
264.45	115.9	276.7	115.96	283.86	114.74	296.65	112.16	306.5	111.03
313.28	110.52	336.54	109.76	351.77	109.61	359.82	109.85	366.47	109.61
400.29	109.04	426.31	109.41	432.95	109.63	452.9	109.84	472.85	110.35
494.07	110.32	510.25	108.79	516.72	108.47	523.18	108.59	532.88	109.29
536.11	109.07	549.31	109.02	571.7	109.52	592.54	109.58	607.27	109.3
616.97	109.65	642.84	110.08	659.03	109.88	669	110.22	681.65	110.14
691.35	110.38	702.24	109.96	712.21	109.82	718.86	109.28	733.39	108.73
746.33	108.7	752.11	107.91	758.75	107.64	768.73	108.83	792	108.8
798.65	107.8	808.62	106.95	815.27	106.97	825.24	107.64	831.9	107.78
840.12	107.47	848.52	107.6	865.14	107	878.44	108.07	891.74	108.65

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  901.57  108.33  915.01  107.18  927.44  106.73  937.14  106.06  966.25  105.08
   981.5  105.29 1005.06  105.98 1011.53  105.86  1037.4  106.25 1054.64  105.72
 1071.26  105.73 1085.91  106.03 1098.85  106.49 1102.08  106.28 1124.72  106.03
 1134.42  106.21 1163.53  105.83 1177.65  106.09 1197.59  106.09 1205.57  105.93
 1231.44  106.69 1264.08  106.23 1290.68  106.18  1312.3  105.87 1331.69  106.06
 1343.87  106.32 1357.57   106.1 1377.11  106.24 1387.09  106.54 1402.85  106.71
 1422.25  106.45  1443.6  107.02 1450.26  106.73 1460.22  106.72 1473.99  107.06
  1483.7  106.92 1496.64  107.49  1503.1  107.32 1513.42  107.66 1551.62  107.23
 1567.78   107.5 1574.25  108.09 1583.95  108.08 1596.89  107.66 1603.36  107.81
 1616.29  108.57  1645.4  108.06 1661.57  108.29 1674.51  108.83 1687.44  108.53
 1703.61  109.11 1719.54  108.86 1726.18  109.19 1748.89  109.44 1765.06   109.9
 1774.76  109.55    1796  109.53 1812.62  109.86 1825.91  109.39 1835.88  109.56
 1849.19  109.26 1869.13  109.58 1885.75  110.04 1902.38  108.84 1910.59  108.71
 1923.53  109.09  1939.7  108.76  1949.4  108.89 1962.34  108.64 1981.74  108.61
 1997.91  109.08 2014.08  108.63 2027.02  108.58 2046.42  108.88 2062.59  108.69
 2075.53  109.03 2091.69  108.83  2101.4  108.54  2111.1  109.01 2120.81  108.87
 2130.51     109 2141.74  108.29 2151.72  108.08 2159.61  108.19 2169.32  108.79
 2178.31  108.25 2188.72  108.02 2195.19  108.24 2201.65  107.99 2221.53  108.04
 2238.16  108.46  2253.4  109.09 2269.57  108.89 2279.27     109 2288.97  108.79
 2301.91   109.3 2321.32  109.14 2337.88  109.46 2350.42  109.51 2377.78  109.13
 2392.46  109.08 2411.03  109.33  2424.8   109.3 2440.97  108.92 2447.44  109.14
 2464.22  108.98 2487.49  109.54 2500.78  109.37 2517.41  108.89 2525.06  109.13
 2541.23  109.11  2547.7  109.34 2570.33  109.56 2592.98  109.63 2602.68   109.1
 2617.14  108.81 2650.39  108.59 2657.65  108.77 2667.01  108.61 2683.63  107.96
 2702.93  106.84 2712.63  107.94  2719.1  107.92 2725.57  107.36 2748.21  108.04
 2757.91  108.81 2767.61  108.55 2783.78  108.45 2796.67  108.85 2809.96  108.76
 2819.36  109.11 2838.76  108.76  2861.4  109.41 2877.57  109.36  2900.2  108.57
  2906.3  108.52 2929.32  109.06 2942.25  108.17 2958.42  108.66 2981.06  108.26
 2993.99   109.1  3013.4  109.51 3019.87  110.25 3035.72  110.27 3052.21  108.63
 3078.08  107.93 3092.14  107.99 3110.42  109.39 3120.12  111.39 3126.59  111.86
 3142.76   112.1 3158.93  112.87 3168.64  113.68  3175.1  113.39 3195.85  108.99
 3208.05  105.28 3211.71  104.79  3217.3  103.07 3227.83101.6244 3237.44   99.66
 3244.38   98.54 3259.81   95.11 3271.99 93.3989 3287.78   91.49 3301.21   90.32
 3321.34   87.96 3343.83   85.71 3370.95   82.21    3380   80.87 3389.04   80.46
 3407.12    79.3 3416.16   78.48  3425.2   78.26 3443.28   76.71 3453.02   79.72
 3462.77   84.06 3472.51   89.51 3482.25   94.58 3482.58 95.2469 3483.23   96.56
 3489.4797.93324 3499.77   100.2 3510.04  103.45 3539.86  104.56 3549.94  105.97
 3566.74  108.06 3573.46  108.07 3591.93  108.61 3598.32  109.99  3607.9  110.85
 3623.87  111.14 3635.77  110.94 3647.67  111.27 3689.33   111.2 3701.22  110.28
 3707.17  110.09 3713.12   110.4 3722.05  110.29 3733.95  110.51 3754.94  110.55
  3763.7   110.4 3790.48  110.43 3811.26   110.2 3817.19  110.32    3835  110.16
  3843.9  110.31 3861.71  110.31 3873.57  110.61 3903.26   110.8 3912.18111.0645
  3918.1  111.24  3944.8   112.5 3953.72  113.25 3968.55  112.95 3980.42  113.46
 3995.27  113.71 4021.97  113.65 4036.81  114.29 4042.75  114.07  4075.4  113.89
 4116.96  113.95 4155.72  113.48 4173.62  113.66 4194.48  113.35 4210.05   112.8
 4228.26  112.84 4245.17  112.51 4272.01  112.27  4322.7  111.96 4352.52  111.56
 4373.39  111.49 4382.34  111.62  4388.3  111.18 4394.26  111.29  4417.6  111.02
 4433.03  111.02 4441.97  110.79 4459.86  110.03 4468.57  109.93 4475.85  110.17
 4479.49  110.71 4492.66  110.41 4504.59  110.64 4513.53  110.54 4516.52  110.92
 4525.46  112.93 4537.38  113.09 4546.33     112 4555.28  111.94 4581.44  112.54
 4592.36  114.47 4597.02  114.93 4602.99   117.1 4608.95  118.36 4614.22  118.33
 4636.06   116.9 4643.34  116.69 4650.62  117.14 4665.18  116.91 4679.75  117.13
 4689.01117.0701 4701.38  116.99 4719.81  117.28 4737.16   117.3    4764   117.8
 4778.91  119.41 4784.87  119.86 4817.67  120.47 4839.96  120.97 4869.09  121.34
 4880.01  121.61 4887.28  121.48 4916.06  121.63 4941.91  121.09 4966.75  120.94
 4972.72  121.59 4984.65  123.86 5011.48  124.55 5035.34  123.85 5044.28  124.63
 5054.77  127.09 5062.06  129.17 5069.34  131.72  5074.1   132.7 5080.06  133.18
 5089.01  132.78 5094.97  132.86  5106.9  133.51 5116.67  133.69 5138.52  133.77
 5157.59  133.97 5160.37  134.22 5167.65  133.73 5182.21   134.6 5196.78  136.23
 5204.06  136.84 5218.63  137.15 5229.55  138.16 5240.47  137.98 5261.95  138.67
 5284.16  139.06 5302.37  139.16 5316.93  139.97 5335.14  139.99  5349.7  140.95
 5356.98  140.99 5386.11  141.76 5393.39  142.26 5407.96  142.78 5422.97  142.52
 5440.73  142.62 5455.29     143 5473.66  143.21 5488.06  143.63 5503.47  144.34
 5517.19  144.34 5539.25  144.15 5546.32  143.94 5557.14  144.44 5568.16  144.23
 5578.02  143.68 5590.01  143.63 5607.83  143.17 5640.99  142.73 5662.83  142.83
 5677.39  142.71 5699.24  143.09 5713.81  142.74 5724.73  142.29 5739.29  142.24
 5750.21  142.47 5761.14  142.34 5786.62  142.34 5804.83  142.12 5823.03   142.2
 5833.96  142.57 5852.16   142.6 5866.73  142.37 5899.49  142.21 5914.05  142.31
 5926.88   142.7  5938.8  143.79 5950.73  143.74  5956.7  143.33 5962.66  141.98
  5971.6   143.5 5986.51   143.6 5995.46  144.06 6007.39  144.27 6019.65  144.25
 6034.22  144.73 6070.77  144.05 6079.37  142.23 6085.82  141.46 6090.12  141.44
 6100.87  142.68 6109.47  142.89 6118.07  140.41 6137.65  137.27 6144.54  136.87
 6158.34  137.59 6172.13  137.47 6186.87  136.56 6195.47  135.58 6214.82  136.82
 6241.07  139.15    6246139.0946 6253.53  139.01 6281.48  139.13 6287.93  138.75
 6296.53  138.71 6305.13  138.06 6313.73  138.49 6326.63  137.96 6333.08  138.52
 6337.38  137.99 6350.28  138.07 6356.73  138.55 6365.33   138.7 6384.68  140.28
 6392.78  140.36 6408.33   141.3 6419.08  140.46 6423.38     141 6434.13  141.16

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .186 3208.05    .066 3237.44    .015 3499.77    .066  3944.8    .076

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3211.71 3539.86          1270.17    1075 1060.89             .1       .3
Left Levee      Station=  63.935      Elevation= 126.975
Right Levee     Station= 6034.22      Elevation=  144.73
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1885.75  109.01

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 170.26

INPUT
Description: RGV-04, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  117.08   13.11  117.14   16.39  118.06   22.95  121.89   36.06  126.03
   45.89  126.29   55.73     126      59  125.41   68.84  121.18   78.67  117.71
    88.5  115.71   98.34  114.85  108.17  113.46  114.73  113.39  118.01  114.33
  127.84  116.27  144.23  116.35  157.34  116.03  196.68  115.98  203.23  116.33
  216.35  116.41  239.29   116.3  255.68  116.55  275.35  109.84  285.18   107.7
  291.74  107.04  314.68   106.7  331.07  107.21  337.63  107.73  344.19  107.52
  354.02  107.62  367.13  107.38  376.96  107.49  390.08  107.99  403.19  107.87
  409.74  108.06   416.3  107.82  429.41  107.78  449.08   108.3  455.64  108.26
   475.3  108.66  494.97  108.36   504.8  108.48  514.64  108.13  524.47  108.12
  531.03  108.38  553.97  108.36  567.09  108.13  573.64  107.81  586.75  107.93
  603.14   108.4  612.98  108.23  622.81  108.67  632.65  108.38  642.48   108.7
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  652.31  108.37  658.87   108.6  675.26  108.28  685.09  108.39  691.65  107.48
  701.48  107.38  724.43  106.04  730.98  106.93  737.54  109.28  740.82  109.82
  750.65  110.02  763.76  109.75  770.32   108.4  780.15  107.37  786.71  107.85
  796.54   109.7   803.1   110.2  809.66  109.86  819.49  109.77  835.88  108.29
  848.99  109.69   862.1  109.68  885.05  105.58  898.16  104.97  917.83  105.16
   937.5   104.7  950.61  104.89  957.16   105.2  986.67  105.73   996.5  106.01
 1003.06  105.94 1022.72  105.24 1039.11  105.36 1062.06  106.03 1075.17  106.15
 1101.39  105.86 1121.06  106.37 1130.89  106.38 1144.01  106.81 1153.84  106.76
 1163.67  107.03 1176.79  106.81  1189.9  107.23 1203.01  106.69 1216.12  106.47
 1229.23  105.92 1245.62   105.7 1255.46  105.75 1265.29  105.51 1281.68  105.59
  1307.9  106.12 1330.85  105.49 1340.68   105.6 1350.52  106.18 1370.18  106.13
 1386.57  105.87 1406.24  106.53  1412.8  105.98 1422.63  105.93 1432.46  106.19
 1465.24  106.01 1475.08  106.12 1481.63  105.56 1491.47  105.45 1507.86  105.78
  1530.8  105.74 1537.36  106.04 1543.91   105.9 1576.69  106.08 1602.92  106.33
 1616.03  106.77 1635.69   107.1 1658.64  106.92 1668.47  107.15 1678.31  106.59
 1684.86  107.03 1691.42  106.93 1704.53   107.6 1727.48  108.32  1753.7  107.99
 1763.53  108.52 1770.09  108.56  1783.2  107.63 1793.03  107.67 1806.15  107.01
 1819.26  107.58 1825.81  108.07  1842.2   108.7 1858.59  106.83  1871.7  106.62
 1874.98  106.25 1888.09  105.85 1901.21  106.23 1920.87  106.26 1940.54  106.43
 1950.37  106.37 1963.49  105.97 1983.15  105.87 2019.21  106.03 2061.82  106.03
 2071.66  106.56 2078.21  106.59 2088.05   106.1  2094.6  105.27 2104.44     105
 2117.55  105.35 2127.38  106.32 2130.66  105.56 2156.89  105.16 2163.44  105.36
 2173.28  105.15 2189.67  105.75 2196.22  106.28 2206.05  106.25 2212.61  106.53
 2238.83   106.7 2245.39  106.95 2278.17  107.33    2288  107.59 2294.56  107.43
 2320.78  107.64 2327.34  107.54 2353.56  107.79 2360.12  108.02 2379.79  107.97
  2392.9  108.41 2412.57  108.49 2435.51  109.52 2442.07  109.31 2448.62  109.79
 2455.18  109.25 2465.01  109.13 2471.57  109.43 2484.68  109.42 2507.63  109.74
 2520.74  110.11 2533.85  109.52 2543.68  109.69 2563.35  108.96 2583.02  109.35
 2596.13  109.11 2612.52  109.74 2628.91  108.59 2632.19  107.94  2645.3  106.38
 2671.53  105.91 2701.03  106.62 2710.86  107.11 2733.81  107.59 2740.36  107.56
 2753.47   107.1 2773.14  106.94 2789.53  106.59 2805.92  106.94 2819.01  106.92
 2835.37  106.56 2848.46  105.65 2858.27  105.56 2877.91  106.73 2897.54  106.94
 2930.26  106.87 2946.62  107.05 2959.71   107.7 2976.07  108.21 2982.62  107.27
 3005.52   106.9 3021.88   107.1  3031.7  106.98 3041.51  108.18 3048.06   109.6
 3057.87  110.31 3084.05  110.54  3090.6   110.9  3113.5  111.19 3126.59  109.82
  3136.4  107.58 3142.95  105.04 3146.22  104.76 3151.22   101.9 3162.22  100.17
 3169.22    97.5 3189.22   91.77 3203.22   89.29 3214.22   87.83 3226.22   86.57
 3244.22   84.07 3258.22    82.8 3269.22   81.45 3281.22   79.67 3300.22   78.07
 3317.22   77.67 3353.22   77.47 3366.22   80.92 3389.22   87.97 3398.22   91.79
 3408.22   96.35 3415.22  100.57 3418.22  102.77 3447.26  104.76 3450.53  105.33
 3457.07   107.5 3473.43  111.54 3476.71  111.98 3479.98   111.5 3493.07  112.22
 3506.15  112.56 3522.51  112.56 3529.06  112.83 3542.15  112.38 3555.24  112.99
 3561.78   112.8 3568.32  113.04 3581.41  112.72 3601.05  112.86 3614.13  111.16
 3620.68  110.79 3627.22  111.44 3637.04  111.24 3650.13  111.73 3682.85  111.49
  3712.3  111.76 3735.15  111.43 3741.68  111.69 3761.26  111.38 3771.05   111.7
 3784.11  111.79 3790.64  111.61 3803.69  111.97 3836.34  111.38 3852.66  111.66
 3865.71   112.3 3872.24  112.23 3882.03  112.61 3891.83   113.4 3908.15   112.6
 3914.68   112.8  3921.2  113.58 3937.53  113.91 3947.32  113.94  3966.9   113.7
 3973.43  113.89 3983.22  114.99 3989.75   114.6 4025.66  114.48 4038.71  114.53
 4071.37  114.38 4094.33  114.01 4107.44  114.03    4114  113.76 4133.68  113.67
  4146.8  113.33 4156.63  113.32 4173.03  112.93 4202.55  112.84 4212.38  112.55
  4225.5   112.5  4241.9  112.14 4297.65  111.91 4307.49  111.61  4320.6  111.59
 4330.44  111.28  4353.4  111.17 4363.24  111.52 4369.79   110.7 4376.35  110.98
 4412.43  110.59 4418.99  110.72 4428.82  110.27  4448.5  108.78 4458.34  108.59
 4478.01  108.85 4484.57   108.7 4491.13  108.97 4497.69  109.67 4507.53  109.42
 4510.81  110.15 4520.65  113.91 4523.92  114.24 4533.76   114.1  4543.6  112.26
 4553.44  112.09 4566.56  112.83 4579.67  112.75 4596.07  112.99 4599.35  113.75
 4605.91  118.43 4612.47  121.17 4628.87  121.49 4648.54  120.68 4678.06  119.76
 4701.01  118.66 4714.13  118.23 4727.25  118.19 4753.48  117.69    4783  118.25
 4799.39  120.91 4805.95  121.52 4842.02  121.59 4855.14  121.87 4881.38  121.67
 4907.61  121.72 4933.85  121.35 4950.24  121.44 4966.64  120.68  4989.6  120.46
 5005.99  120.48 5012.55  121.91 5025.67  126.75 5028.95  126.42 5045.35  127.26
 5055.18  127.98 5061.74  127.55 5071.58  127.39 5081.42  126.95  5084.7  127.21
 5091.26  128.58  5101.1  132.92 5120.77  139.53 5124.05  140.43 5130.61  141.19
 5140.45  140.42 5147.01  140.62 5160.12   142.2 5183.08  142.65 5206.04  142.72
 5215.87  142.59 5222.43   143.5 5228.99  143.54 5235.55  144.16 5245.39  144.45
 5255.23  144.27 5288.02  145.43 5297.86  145.17 5304.42  145.55 5314.25  145.61
 5330.65  146.12 5356.89  146.24 5360.17  146.14 5409.36  146.37 5422.48  146.26
 5442.15  146.36 5465.11   146.3 5494.62  146.52 5507.74  146.32 5533.97  146.47
 5543.81  146.28 5563.49  146.23 5576.61   146.4 5596.28  146.99 5612.68  146.63
 5629.08  146.89 5635.63  147.32 5642.19  146.78 5655.31  146.78 5661.87  146.58
 5678.27  145.58 5697.94  145.45 5711.06  145.19  5720.9  145.27 5786.49  144.66
 5806.16  144.64  5832.4  144.33 5871.75  144.13 5888.15  143.85 5937.34  142.77
 5963.57  142.75 5989.81  142.52 5993.09  142.61 6052.12  141.89 6061.95  141.95
 6075.07   143.3 6081.63  142.79 6088.19  142.77 6094.75  141.98 6098.03  140.07
 6101.31   139.3 6111.14  142.37 6120.98  142.35 6127.54  142.64 6137.38  143.85
  6150.5  144.22 6163.61  144.04 6180.01  144.45 6186.57  144.41 6206.25  143.33
 6216.08  143.74 6219.36  142.78  6229.2  138.31 6232.48  137.92 6239.04   139.2
  6245.6  139.25 6252.16  138.12 6255.44  138.56    6262  140.87 6268.55  142.35
 6278.39  145.29 6304.63  145.88 6317.74  145.81  6324.3  145.55 6337.42  145.52
 6343.98  145.12 6350.54  145.54  6357.1  147.51 6363.66  148.65 6370.21  148.87

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   45.89     .12 3203.22    .025 3398.22     .12 4605.91     .06
 6180.01    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3113.5 3529.06         1559.58    2150 1999.52             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  3113.5  111.19       T
 3529.06 6370.21  112.83       T
Left Levee      Station=   45.89      Elevation=  126.29
Right Levee     Station= 6180.01      Elevation=  144.45
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1144.01  106.81

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            125.76    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.30    Wt. n-Val.                 0.120      0.083      0.111
  W.S. Elev (ft)            125.45    Reach Len. (ft)          1559.58    2150.00    1999.52
  Crit W.S. (ft)            116.54    Flow Area (sq ft)       42496.54   13086.14   15302.36
  E.G. Slope (ft/ft)      0.001370    Area (sq ft)            53544.89   13086.14   16262.23
  Q Total (cfs)           235000.00    Flow (cfs)             112520.70   84723.97   37755.31
  Top Width (ft)           4963.40    Top Width (ft)           3054.75     415.56    1493.10
  Vel Total (ft/s)            3.32    Avg. Vel. (ft/s)            2.65       6.47       2.47
  Max Chl Dpth (ft)          47.98    Hydr. Depth (ft)           13.91      31.49      10.25
  Conv. Total (cfs)       6347933.0     Conv. (cfs)             3039464.0   2288605.0   1019865.0
  Length Wtd. (ft)           1962.77    Wetted Per. (ft)         3061.33     425.68    1498.01
```

Min Ch El (ft)	77.47	Shear (lb/sq ft)	1.19	2.63	0.87
Alpha	1.77	Stream Power (lb/ft s)	3.14	17.03	2.16
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	188426.40	70370.01	215623.20
C & E Loss (ft)	0.24	Cum SA (acres)	23035.55	2880.49	25549.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 170.02

INPUT
Description: RGV-04, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 454

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	117.82	6.56	118.15	16.39	119.31	19.67	118.94	26.23	117.17
52.46	117.05	59.02	117.3	62.3	117.91	68.86	121.62	85.25	126.02
88.53	126.34	98.37	126.34	108.2	125.83	111.48	125.17	121.32	122.02
127.88	120.16	140.99	116.07	147.55	115.21	157.39	115.18	170.5	113.76
177.06	112.51	183.62	110.76	190.18	109.55	196.73	108.88	216.41	107.92
229.52	107.89	236.08	108.87	249.2	108.9	255.75	109.16	265.59	109
275.43	107.86	281.98	107.5	288.54	107.58	304.94	109.89	318.05	109.9
341	107.65	354.12	105.47	357.4	105.25	445.93	105.25	452.49	105.42
468.88	106.25	488.55	105.4	501.67	105.88	508.23	105.61	547.57	105.68
554.13	105.5	570.53	105.41	577.08	105.66	596.76	105.92	606.59	105.6
626.27	105.75	632.82	105.53	649.22	105.51	659.06	106.11	675.45	106.5
685.29	107.23	695.12	107.05	704.96	107.45	724.63	107.24	754.14	107.33
763.98	108.18	773.82	108.47	786.93	107.82	803.33	107.34	823	106.63
829.56	106.73	839.39	107.23	852.51	106.38	862.35	106.17	878.74	106.26
891.86	107.29	904.97	107.15	914.81	107.32	924.64	107.74	931.2	107.32
941.04	107.2	957.43	107.53	963.99	107.95	970.55	108.02	990.22	107.47
1006.62	106.55	1023.01	106.81	1039.41	108.27	1055.8	108.1	1068.91	108.61
1075.47	108.46	1091.87	109	1101.7	108.29	1114.82	108.35	1147.61	109.21
1157.44	108.8	1170.56	109.62	1180.4	109.39	1190.23	110.07	1203.35	111.3
1213.18	112.04	1219.74	111.86	1232.86	112.02	1239.42	112.51	1252.53	112.41
1255.81	112.19	1272.2	112.64	1282.04	112.41	1295.16	112.72	1308.27	112.53
1311.55	111.92	1318.11	111.44	1337.78	110.63	1344.34	110.85	1347.62	110.31
1367.29	105.16	1373.85	104.79	1374	103.64	1379	89.64	1709	89.64
1714	103.64	2039.45	104.79	2046.01	104.97	2065.69	106.64	2078.8	106.94
2098.47	104.96	2101.75	104.76	2999.81	104.76	3003.07	104.94	3019.36	106.75
3029.13	107.01	3035.64	106.8	3045.42	107.06	3058.44	107.79	3064.96	108.48
3074.73	107.17	3077.99	107.26	3084.5	108.49	3094.27	111.17	3097.53	111.78
3104.04	112.08	3123.59	112.26	3143.13	112.12	3152.9	112.23	3175.7	111.86
3188.73	112.17	3195.25	111.38	3205.04	110.76	3214.87	111.55	3227.99	110.09
3231.27	110.35	3237.83	111.71	3247.66	111.57	3260.78	111.78	3280.45	111.37
3293.56	109.77	3303.4	111.23	3313.24	111.57	3323.07	111.28	3332.91	110.51
3346.02	108.83	3349.3	108.62	3372.25	109.31	3388.65	106.84	3395.21	105.46
3401.76	104.54	3414.88	104.35	3424.72	106.1	3434.55	107.47	3447.67	107.79
3454.22	108.36	3467.34	105.76	3477.18	105.04	3480.45	104.57	3487.01	104.33
3503.41	104.39	3509.96	104.79	3536.19	105.22	3552.59	105.81	3562.42	106
3582.1	104.74	3598.49	104.63	3611.6	105.09	3618.16	105.13	3628	105.72
3634.56	106.43	3644.39	106.9	3647.67	106.83	3667.34	108.35	3683.74	108.93
3700.13	109.2	3709.97	108.64	3716.52	108.65	3723.08	108.14	3729.64	108.09
3739.48	105.65	3746.03	105.14	3755.87	104.92	3765.71	104.4	3788.66	106.1
3795.21	107.48	3805.05	107.21	3808.33	107.5	3818.17	109.63	3834.56	112.28
3841.12	112.47	3864.07	112.5	3906.69	113.15	3926.37	113.01	3949.32	113.18
3965.71	112.88	3972.27	113.16	3985.38	112.84	4008.33	113.15	4018.17	112.87
4028.01	110.89	4034.56	110.39	4044.4	110.96	4047.68	110.4	4060.79	110.06
4073.91	110.12	4087.02	109.64	4096.86	108.68	4106.7	108.47	4119.81	107.13
4123.09	107.29	4142.76	109.32	4149.32	109.53	4155.88	109.31	4165.71	109.51
4178.83	109.44	4191.94	109.06	4201.78	109.41	4221.45	109.41	4228.01	108.57
4234.57	108.79	4241.12	109.8	4247.68	110.28	4257.52	109.78	4264.07	108.19
4267.35	107.82	4277.19	107.91	4287.02	108.25	4293.58	108.93	4303.42	109.09
4316.53	109.55	4326.37	108.85	4332.92	109.14	4342.76	109.19	4349.32	109
4365.71	108.02	4375.54	108.25	4385.38	108.09	4395.22	108.41	4401.77	109.3
4411.61	108.2	4421.44	108.38	4431.28	108.19	4437.84	107.67	4450.95	107.46
4457.51	107.57	4464.06	108.03	4470.62	107.9	4480.46	108.06	4483.74	107.87
4490.29	109.07	4493.57	109.13	4503.41	108.56	4509.96	107.94	4523.08	107.86
4539.47	108.16	4552.58	107.7	4568.98	108.06	4578.81	107.35	4601.76	107.38
4624.71	107.69	4641.1	107.64	4657.5	108.12	4677.17	107.88	4696.84	108.26
4706.68	108.22	4723.07	108.58	4746.02	108.45	4759.13	108.72	4768.97	108.59
4778.8	108.21	4791.92	108.64	4818.15	108.08	4854.21	108.12	4867.32	108.37
4877.16	108.18	4893.55	108.27	4903.39	108.61	4916.5	108.79	4932.89	108.65
4968.96	107.49	4982.07	108.24	4995.19	108.79	5005.02	108	5021.41	107.53
5027.97	107.63	5044.36	107.22	5073.87	107.46	5083.71	107.74	5100.1	107
5116.49	107.31	5132.88	107.18	5146	107.45	5172.23	107.69	5178.78	108.05
5205.01	108.31	5224.68	108.93	5244.35	109.21	5250.91	109.07	5273.86	109.34
5286.97	109.77	5293.53	108.75	5296.81	109.27	5303.37	114.5	5306.65	116.05
5309.92	116.4	5316.48	115.37	5326.32	115.39	5329.6	114.81	5332.87	113.22
5336.15	112.44	5345.99	111.87	5355.82	111.94	5362.38	112.83	5375.49	113.29
5385.33	113.26	5395.17	112.83	5398.44	113.24	5408.28	118.04	5418.12	124.77
5421.39	125.71	5427.95	125.58	5434.51	123.07	5441.06	122.77	5454.18	122.65
5467.29	122.78	5470.57	122.49	5477.13	122.8	5483.69	125.15	5486.96	125.86
5493.52	125.9	5500.08	125.46	5509.91	125.33	5536.14	125.27	5542.7	125.34
5552.53	125.91	5559.09	125.87	5562.37	124.92	5568.93	121.87	5572.21	121.42
5578.76	121.31	5588.6	121.6	5601.71	121.57	5647.61	122.29	5660.73	122.96
5683.68	123.69	5690.23	124.17	5696.79	123.92	5709.9	124.31	5729.58	125.82
5739.41	126.07	5745.97	125.37	5749.25	124.12	5752.52	124.31	5755.8	125.51
5765.64	126.97	5775.47	126.78	5785.31	127.01	5798.42	127.57	5811.54	127.81
5834.49	127.77	5844.32	128.23	5857.44	129.64	5863.99	130.7	5877.11	131.25
5886.94	132.03	5896.78	131.6	5906.62	131.77	5926.29	131.68	5936.12	132.13
5942.68	131.85	5959.07	131.95	5972.19	132.22	6011.53	132.76	6014.81	132.99
6024.64	132.97	6031.2	132.66	6054.15	132.73	6070.54	132.92	6083.66	133.45
6093.49	134.93	6103.33	134.8	6113.16	134.16	6126.28	134.91	6139.39	133.02
6142.67	133.51	6149.23	137.1	6155.78	137.92	6165.62	137.95	6185.29	138.46
6211.52	138.6	6241.02	138.95	6267.25	138.94	6280.37	138.81	6290.2	138.91
6322.99	138.75	6355.77	138.97	6372.17	138.52	6385.28	138.38	6395.12	136.69
6401.67	137.57	6414.79	138.85	6431.18	139.02	6447.57	138.66	6463.96	138.06
6503.31	137.83	6513.14	137.88	6519.7	138.24	6532.81	137.71	6555.76	137.23
6575.43	136.92	6588.55	136.93	6595.11	136.75	6624.61	136.33	6663.95	136.15
6677.07	135.98	6706.58	135.95	6739.36	136.56	6765.59	136.57	6785.26	137.2

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 6801.65   137.5 6811.49  138.02 6821.32  138.22 6831.16  138.19 6837.72  137.89
 6850.83  137.96 6860.67  138.47 6873.78  138.09 6896.73   138.1 6919.68  138.26
 6932.79  139.13 6968.86  138.99 6991.81  139.03 7001.64  138.25 7014.76  138.07
 7021.31  138.24 7031.15  136.59 7034.43  136.48 7040.98  137.23 7057.38  136.86
 7060.66  137.85 7067.21  141.58 7070.49  142.39 7080.33  142.71

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .177 1373.85    .066    1374    .015    1714    .066 2039.45    .131

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1373.85    1714           2106.1  389.75  107.13            .1       .3
Left Levee      Station=   98.37      Elevation=  126.34
Right Levee     Station= 7080.33      Elevation=  142.71
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3162.36 5718.88  112.11

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            124.50    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               2.70    Wt. n-Val.                 0.177      0.015      0.113
  W.S. Elev (ft)            121.80    Reach Len. (ft)          2106.10     389.75     107.13
  Crit W.S. (ft)            112.24    Flow Area (sq ft)       17060.83   10867.48   45513.29
  E.G. Slope (ft/ft)      0.000272    Area (sq ft)            17060.83   10867.48   45513.29
  Q Total (cfs)           235000.00     Flow (cfs)             13439.85   168731.70   52828.44
  Top Width (ft)           5338.71    Top Width (ft)           1251.76     340.15    3746.80
  Vel Total (ft/s)            3.20    Avg. Vel. (ft/s)            0.79      15.53       1.16
  Max Chl Dpth (ft)          32.16    Hydr. Depth (ft)           13.63      31.95      12.15
  Conv. Total (cfs)       14262020.0     Conv. (cfs)             815656.9   10240240.0   3206129.0
  Length Wtd. (ft)          429.31    Wetted Per. (ft)         1255.37     360.89    3752.14
  Min Ch El (ft)             89.64    Shear (lb/sq ft)            0.23       0.51       0.21
  Alpha                      16.94    Stream Power (lb/ft s)      0.18       7.92       0.24
  Frctn Loss (ft)             0.10    Cum Volume (acre-ft)    187162.40   69778.87   214205.40
  C & E Loss (ft)             0.23    Cum SA (acres)          22958.46    2861.84   25428.93


Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 169.9

INPUT
Description: RGV-04, New Cross-section, End wall, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.85    9.71  122.92   29.12  123.26   38.83  123.31   48.54     123
   58.24  121.51   77.88  116.92   84.44  114.53   94.29  110.25  100.85  107.08
  104.13  106.49  117.25  106.73  130.37  106.45  140.22  105.04  150.06  104.46
   159.9  104.49  173.02  104.04  189.43  104.06  199.27  104.19  209.11  104.05
  248.48  104.14  268.16  104.03  323.93  104.14  350.18  103.95  366.58  104.11
  376.43     104  382.99  104.11  405.95  104.13  425.64  104.01  455.16  104.11
  484.69  104.06  504.37  103.87  520.78   103.8  537.18  104.03  560.15     104
  573.27  104.09  583.11  104.32  596.23  104.27  625.76  104.73  642.16  104.54
  665.13  104.83  694.65  104.91  711.06  104.81  734.02  104.92  753.71  105.19
  756.99   105.1  776.67  105.22  796.36  105.09   806.2  105.24  819.32  105.14
  839.01  105.32  865.25  105.31  875.09  105.47  904.62  105.33  953.83  105.35
  986.64  105.27  999.76  105.41 1019.44  105.37 1055.53  105.15  1078.5  105.21
 1091.62     105 1098.18  105.18  1111.3  105.05 1124.43  105.08 1134.27  104.94
 1160.51  104.94 1176.92  104.74 1183.48  104.77 1199.88  104.53 1209.72  104.08
 1216.29  104.02 1229.41  104.19 1249.09  104.86  1265.5   105.1 1275.34  105.42
 1285.18  105.51 1301.58  105.36 1311.43  104.98 1331.11  104.94 1337.67  105.32
 1357.35  105.92  1367.2  106.12 1373.76  105.46 1386.88  104.76 1387.48  103.64
 1392.48   89.64 1722.48   89.64 1727.48  103.64 2938.65  104.76 2941.93  104.81
 2948.49  105.77 2964.89  107.79 2971.44  107.39 2974.72  107.62 2981.28  109.27
 2984.56   110.6 2987.84  111.26  2994.4  110.62 3000.96  110.45 3010.79  108.99
 3014.07   108.9 3020.63  107.86 3023.91  107.97 3033.75  107.03 3037.03  107.24
 3043.59  108.44 3046.87  108.56  3056.7  108.07 3063.26  109.44  3073.1  109.96
 3082.94   107.7 3086.22  107.76 3092.78  108.84 3102.61  110.74 3109.17  111.37
 3115.73  111.52 3125.57  112.12  3135.4  111.27 3145.24  111.64 3155.08  111.58
 3161.64  111.23 3171.48  111.33 3178.03  111.61 3184.59  111.27 3194.43  109.65
 3197.71  109.72 3204.27  110.96 3207.55  111.29 3220.66   111.9 3233.78  111.36
 3250.18  110.37 3256.74  110.12 3276.41  110.08 3282.97  110.34 3302.64     110
 3319.04  109.87 3341.99  108.39 3345.27  108.28 3351.83  108.94 3358.39  108.87
 3364.95   107.9 3371.51  108.63 3381.35  106.93 3384.62  106.88  3387.9  107.52
 3394.46  109.61 3407.58  110.55 3414.14  110.71 3430.53  110.64 3437.09  110.41
 3446.93  110.36 3469.88  109.97 3476.44  109.74 3492.84  109.75 3505.96  109.13
 3515.79  108.26 3528.91  107.82 3542.03  107.74 3548.58     107 3555.14  105.37
  3561.7   105.2 3571.54     106 3581.38  106.07 3591.21  106.33 3617.45  105.75
 3633.84  104.58  3656.8  104.65 3686.31  104.43 3715.82  104.62  3719.1  104.77
 3728.94   106.2  3735.5  107.82 3738.78  108.09  3751.9  107.82 3765.01  107.86
 3771.57  107.64 3781.41  106.34 3787.97  106.29  3797.8  105.19 3810.92  104.45
 3827.32  104.58 3837.16  104.47 3843.71  104.58 3850.27  105.23 3860.11  107.25
 3866.67  108.03 3873.23  107.98 3883.06  109.58 3889.62  110.37 3896.18  111.73
 3899.46  112.15  3909.3  112.53 3925.69  111.68 3935.53  111.06 3942.09  110.91
 3948.65  111.06 3968.32  111.06 3984.72  110.59 4010.95  109.62 4027.35  109.21
 4040.47  109.57 4053.58  109.19 4073.26  109.55  4083.1  110.31 4089.65  110.06
 4092.93   109.3 4096.21  107.93 4102.77  109.43 4106.05  109.58 4115.89  108.96
 4125.73  107.52 4135.56  108.15 4142.12  108.24 4155.24  109.26 4168.36   108.9
 4184.75  108.24 4191.31  109.23 4197.87  108.66 4201.15  108.66 4214.27  109.46
 4224.11  109.14 4233.95  108.45 4240.51  108.67 4247.07  108.32 4253.63   109.2
 4260.18  108.54 4270.02  110.39 4276.58  110.52 4286.42  109.74 4302.82  108.96
 4315.94  108.85 4325.78  108.16 4342.17  108.12 4348.73  107.84 4361.85  108.06
 4371.69   107.8 4381.53  108.05 4391.37  108.06 4401.21  108.39 4407.77  107.65
  4417.6  107.61 4427.44     108    4434  107.96 4440.56  107.62 4453.68  107.94
 4460.24  107.79  4483.2  107.69 4486.48   107.5 4502.87  107.46 4509.43  107.63
 4522.55  107.34 4529.11  107.48 4538.95   107.3 4548.79  107.37 4558.63  107.26
  4594.7  107.71  4611.1  108.18 4617.66     108  4643.9  108.24 4663.57  108.25
 4670.13  108.45 4673.41  108.29 4686.53  108.22 4706.21  108.35 4716.05  108.54
 4729.17  108.15 4739.01   108.3 4745.56  108.06  4755.4   108.3 4765.24  107.83
 4778.36  107.81 4791.48  107.98 4817.72  107.85 4837.39   108.4 4866.91  108.82
 4876.75  108.67 4880.03  108.82 4893.15  108.43 4899.71  108.79 4912.82  108.36
 4919.38  107.32 4925.94  107.25 4935.78  107.57 4945.62  107.42 4962.02  107.95
 4968.58  108.44 4978.42  108.42 4988.25  108.66 4994.81  108.08 5007.93   108.7
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 5017.77  108.54 5034.17  108.63 5047.29  109.08 5060.41  109.08 5066.96  108.89
  5093.2  109.26 5112.88  109.26 5135.84  109.51 5145.67  109.29 5165.35  109.76
 5168.63  109.59 5175.19  108.51 5178.47   110.3 5181.75   113.1 5185.03   114.9
 5188.31  115.69 5191.59  115.66 5198.15  114.69 5204.71  114.58 5207.99  114.98
 5211.27  114.76 5217.83  112.15 5221.11   111.9  5237.5   111.9 5247.34  112.77
  5253.9  112.97 5267.02  112.71 5276.86   111.8 5280.14  112.38  5286.7  118.16
 5289.98  119.26 5293.26  119.47 5309.65   119.1 5312.93  118.59 5319.49  118.67
 5345.73  118.67 5358.85  118.54 5365.41  119.08 5375.25  119.13 5385.08  118.64
  5398.2   118.6 5404.76  118.76    5431  118.64 5437.56  119.32 5444.12  119.34
 5453.96   119.7  5463.8   120.4 5486.75  121.47 5496.59  121.55 5512.99  122.18
 5519.55  122.83 5532.67  123.64 5545.79  123.88 5552.34  124.28 5565.46  124.29
 5568.74  123.44 5572.02  121.75  5575.3  121.53 5585.14  124.96  5591.7  125.96
 5598.26  126.48  5608.1  126.91 5640.89  127.87 5650.73   127.9 5670.41  127.62
 5693.37  127.83 5699.93  128.24 5709.76  127.89 5749.12  127.97 5762.24  128.28
 5788.48  128.41 5795.03  128.63 5804.87  128.55 5814.71  129.01 5827.83  130.21
 5837.67  130.72 5854.07     132 5863.91  133.85 5877.02  133.97 5893.42  133.91
 5903.26  134.23  5929.5  133.81 5936.06  133.86 5959.01   133.6 5975.41   133.2
 5988.53  133.13 5998.37  133.28 6004.93  133.11 6021.33  133.46 6031.17  133.33
 6044.28  133.46 6060.68   133.9 6070.52  134.33 6080.36  134.36 6086.92  134.18
 6100.04  134.34 6109.88  134.01 6113.15  134.65 6119.71  136.78 6129.55  137.96
 6136.11  138.19 6159.07  138.39 6178.75  138.35 6188.59  138.16 6195.14  137.61
  6201.7  135.68 6204.98  135.64 6211.54  136.76 6237.78  136.19 6257.46  135.46
 6264.02  135.44 6286.97  136.21 6296.81  135.81 6306.65  135.89 6316.49  136.19
 6323.05  136.09 6342.73  136.16  6362.4  135.88 6372.24   135.5  6395.2  135.24
 6418.16  135.45 6424.72  135.59 6431.28  135.47 6441.11  135.73 6457.51  135.73
 6470.63  135.57 6487.03  135.83 6490.31     136 6513.27  136.08 6529.66  136.26
 6532.94  136.06 6542.78  136.05 6565.74  136.27 6605.09  136.51 6628.05  136.55
 6647.73   136.5 6667.41  136.86 6673.97  137.46 6687.08  137.45 6690.36   137.3
 6706.76  137.25 6719.88  137.39 6726.44  137.83 6742.84  137.93 6759.23  138.27
 6769.07  138.17 6775.63  137.83 6805.15  137.78 6814.99  139.04 6824.83   139.4
 6834.67   138.7  6860.9  138.32 6864.18   138.1  6877.3  138.12 6887.14  136.79
 6896.98  136.36 6903.54  136.57  6910.1  135.87 6913.38  135.99 6919.93  136.77
 6926.49  136.98 6933.05  136.48 6936.33  135.73 6939.61  135.98 6946.17  137.39
 6949.45  137.55 6959.29  137.35 6972.41  139.01 6995.37  139.79 6998.65  140.03

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .188 1311.43    .066 1387.48    .015 1727.48    .066 2938.65    .187

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1367.2 1727.48          2629.05  610.25  109.21             .1       .3
Left Levee      Station=   38.83      Elevation=  123.31
Right Levee     Station= 6824.83      Elevation=   139.4
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 1295.88  105.92 2987.95 5489.96  111.28

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            124.16    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               1.93    Wt. n-Val.                 0.173      0.015      0.093
  W.S. Elev (ft)            122.23    Reach Len. (ft)          2629.05     610.25     109.21
  Crit W.S. (ft)            114.16    Flow Area (sq ft)       20967.38   11355.51   48118.00
  E.G. Slope (ft/ft)      0.000210    Area (sq ft)            20967.38   11355.51   48118.00
  Q Total (cfs)           235000.00     Flow (cfs)             16495.30   155323.20   63181.53
  Top Width (ft)           5466.26    Top Width (ft)          1313.68     360.28    3792.30
  Vel Total (ft/s)            2.92    Avg. Vel. (ft/s)           0.79      13.68       1.31
  Max Chl Dpth (ft)          32.59    Hydr. Depth (ft)          15.96      31.52      12.69
  Conv. Total (cfs)       16226470.0    Conv. (cfs)            1138981.0   10724880.0   4362608.0
  Length Wtd. (ft)          612.96    Wetted Per. (ft)         1316.93     380.73    3798.09
  Min Ch El (ft)             89.64    Shear (lb/sq ft)           0.21       0.39       0.17
  Alpha                      14.55    Stream Power (lb/ft s)     0.16       5.34       0.22
  Frctn Loss (ft)             0.20    Cum Volume (acre-ft)    186243.10   69679.45   214090.20
  C & E Loss (ft)             0.39    Cum SA (acres)          22896.44    2858.71   25419.66


Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 169.83

INPUT
Description: Added blocked obstruction not in original,  Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     452
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  126.62    6.55  126.77    13.1  126.69   19.64  126.94   22.92  126.39
   36.01  121.92   42.56  118.93   52.38  115.35   55.66   114.3   62.21  112.92
   68.75  112.04    75.3  111.73   81.85  111.95   94.94  111.79  117.86  111.64
  130.96  111.81  157.15  111.64  183.34  110.85  202.99  110.46  216.08  110.34
  235.72  110.37  245.55  110.27  271.74  110.69  304.48  110.62  317.57   110.7
  333.94   110.6  340.49  110.47  353.59  110.45  386.33  110.68  412.52  111.22
  425.61  111.38  441.98  111.04  455.08  110.94  474.72  110.93     478   111.2
  484.54  112.21  491.09  112.56  497.64  112.64   540.2  112.43  550.02  112.25
  559.85  111.16  592.59  111.47  599.13  111.24  608.96  111.16   615.5  111.28
  625.33  111.07  635.15  111.15  648.24  111.02  661.34   111.1  667.89  111.51
  674.43   111.7  680.98   111.6  694.08  110.99   703.9  110.98  720.27  111.45
  749.74  111.24  769.38  111.55  789.02  111.43  795.57  111.46  811.94  111.28
  825.04  110.89  847.96  111.29  864.33  111.03  893.79  110.94  900.34  111.18
  910.16  112.11  926.53   113.1  933.08  113.11  939.63  112.88  946.17  112.29
  952.72  111.95  962.54  111.78  972.37  111.93  975.64   111.8  982.19  109.97
  985.46  108.55  988.74  106.44  992.01  104.76     994  100.84    1244  100.84
 1412.25  104.76  1415.5  104.92 1418.74  106.62 1421.99  108.99 1425.23  109.63
 1431.72  110.26  1444.7  110.17 1447.94   109.8 1457.68  107.31 1460.92  106.89
 1467.41  107.63 1473.93  109.15  1477.2  109.59 1483.74  109.82 1496.82  109.78
 1506.64  110.05 1516.45  109.87 1522.99  108.93 1536.07  108.73 1549.16  108.94
 1558.97  108.96 1568.78  109.48  1578.6  109.66 1581.87  110.05 1588.41  110.29
 1594.95  111.06 1604.76  111.17 1621.12  110.34 1630.93  110.94 1637.47  110.76
 1644.02  110.83 1650.56  110.64 1660.37  110.82 1670.18  109.92 1683.27  110.47
 1693.08  110.73 1702.89   110.6 1709.44  110.72 1729.06  110.51 1751.96  109.49
 1761.77   108.8 1768.31  107.66 1778.13  107.77 1794.48  109.86 1804.29  110.06
 1810.84  110.47 1827.19   110.6    1837  110.01 1843.55  109.77  1859.9  109.74
 1872.99  109.11  1882.8  109.17 1889.34  109.86  1905.7  110.34 1925.32  110.44
 1931.86  110.08 1938.41  108.75 1941.68   108.4 1948.22  108.42 1954.76  107.96
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  1961.3  107.79 1967.84  107.86 1980.93  108.46 1990.74  108.32 2003.82   107.2
 2013.64  105.96 2020.18  104.69 2023.45  104.48 2033.26  104.53  2062.7  104.37
  2085.6  104.49 2098.68  104.41 2121.58  104.45 2131.39  105.03 2137.93  104.81
 2147.75  104.97 2154.29  104.91  2164.1   104.6 2170.64  104.89 2173.91  105.54
 2180.45  107.78    2187  108.02 2193.54   107.9 2203.35  107.97 2209.89  107.81
 2216.43  107.89 2222.98  107.32 2232.79   107.6 2245.87  107.27 2262.23  107.27
 2268.77  106.92 2288.39  106.81 2298.21  106.61 2311.29   106.7 2314.56  106.91
 2334.19  107.55 2340.73  107.55 2353.81  108.06  2366.9  107.94 2373.44  108.14
 2383.25  108.69 2399.61  108.23 2409.42  108.34  2422.5   107.7 2432.31  107.99
 2451.94  108.42 2458.48  108.48 2471.57  108.29 2484.65  108.43 2491.19  108.75
    2501  108.75 2507.55  108.91 2517.36  108.71 2530.44  108.79 2533.71  108.52
 2543.55  108.88 2553.39  108.71 2573.07  108.53 2592.74  108.78 2605.86  109.45
 2612.42  108.92 2625.54  108.92 2628.82  108.81 2648.49  108.82 2655.05   108.5
 2658.33  108.59 2668.17  109.33 2674.73  109.09 2681.29  109.13 2687.84  109.68
 2697.68  109.45 2707.52   108.2  2710.8  108.02 2717.36  108.41 2723.92  109.19
 2730.48  108.47 2740.32  108.39 2756.71  107.59 2763.27  107.58 2773.11  107.26
 2786.23  107.44 2792.79  107.35 2796.07  107.59  2805.9  107.66 2812.46  107.55
 2819.02  107.23 2832.14   107.1 2848.54  107.43 2858.37  107.03 2887.89  107.06
 2901.01  107.19 2920.68  107.15 2927.24  107.38 2937.08  107.17 2956.76  107.48
 2966.59  107.45 2979.71  107.67 2986.27   107.6 2996.11  107.72 3009.23  108.06
 3019.06  108.03  3028.9  108.36 3042.02  108.12  3061.7  108.42 3071.54  108.25
 3078.09  108.34 3087.93  108.17 3094.49  108.34 3101.05  108.15 3107.61  108.26
 3124.01  108.23 3133.84  107.96 3143.68  108.11 3163.36   107.9 3169.92     108
 3176.48  107.89 3186.31  108.04 3196.15  107.59 3212.55  107.11 3219.11  108.42
 3232.23  108.17 3245.34  108.08  3251.9  108.33 3265.02  108.56 3281.42  108.72
 3287.98   108.7 3301.09  108.34 3307.65  107.93 3314.21  107.96 3320.77  108.26
 3333.89  108.04 3369.96  108.59 3376.52   108.5 3399.48  108.67 3409.31  108.94
 3435.55  109.05 3461.78  109.33 3468.34  109.33 3481.46  109.55 3488.02  109.52
 3510.98  109.73 3520.81  109.93 3524.09  108.94 3527.37  108.81 3533.93  112.58
 3537.21  113.83 3543.77  115.37 3547.05   115.7 3553.61  114.71 3560.17  114.56
 3566.73   114.7 3573.28  112.52 3576.56  111.99 3592.96  111.87 3596.24  112.49
  3602.8  112.72 3609.36  112.51 3625.75  112.67 3632.31  112.18 3635.59  112.52
 3642.15  116.95 3645.43  118.26 3648.71  118.62 3665.11  118.88 3671.67  118.57
 3694.62   118.3 3707.74  118.39 3717.58  118.82  3730.7     119 3750.37  119.07
 3766.77  119.31 3773.33  119.24 3779.89  119.53 3789.72  119.55 3802.84  120.43
 3819.24  120.54  3825.8  120.41 3832.36  118.77 3835.64  118.63 3838.92  119.08
 3848.75  121.02 3858.59  121.62 3865.15  121.71 3874.99  122.33 3878.27  122.37
 3891.39     123  3904.5  123.45 3914.34  123.64 3924.18  123.63 3930.74  123.88
 3953.69  124.37 3960.25  124.39 3966.81  124.85 3973.37  124.35 3979.93  124.34
 3986.49  125.13 3996.33  126.92 3999.61  127.31 4009.44  127.63 4035.68  127.72
 4042.24  127.85 4065.19  127.84 4078.31  127.91 4091.43  128.17 4114.39  128.34
 4117.67  128.45 4124.22  128.03 4137.34  127.82  4143.9  128.04 4157.02  128.22
 4163.58  128.47 4173.42   128.5 4186.53  128.85 4196.37  128.76 4209.49  128.85
 4216.05  128.75 4245.56  128.83 4258.68   129.1  4271.8  130.13 4281.64  130.13
  4288.2  130.57 4294.76  131.84 4298.03   132.1 4311.15  132.52 4324.27  133.36
 4343.95  133.52 4353.79  133.23 4363.62  133.14 4373.46   133.3 4386.58  133.02
  4399.7  133.07 4406.26   132.9 4425.93   132.7 4435.77  133.07 4439.05  133.05
 4445.61  133.44 4458.73  133.73 4465.29  133.65 4488.24  133.78  4494.8   133.6
  4511.2  133.66 4517.76  133.79 4537.43  133.64 4553.83  133.99 4563.67  134.85
 4573.51  135.39 4580.07  134.59 4583.35  133.47  4589.9  132.24 4596.46  132.24
  4606.3  132.99 4612.86  132.89 4619.42  132.42 4629.26  132.89 4635.82  133.45
 4652.21  133.59 4662.05  133.56 4668.61  133.38 4675.17  133.62 4685.01  134.44
 4694.85   134.9 4707.96  135.02 4714.52  134.92 4724.36  134.56 4740.76  134.79
 4747.32  134.51 4757.15  134.76 4763.71  134.58 4776.83  134.58 4786.67  134.17
 4796.51  133.91 4806.35  134.48 4816.18  134.11 4832.58  133.96  4845.7  133.67
 4852.26  133.67 4868.65  134.49 4871.93  134.32 4878.49  135.05 4885.05  135.39
 4898.17  135.43 4917.85  135.11 4934.24  135.36 4953.92  135.89 4963.76  135.81
 4970.32  135.94 4986.71  135.77 4999.83  135.85 5006.39  135.02 5009.67  134.87
 5029.35  135.24 5042.46   136.3 5049.02  136.59 5062.14  136.86  5068.7  136.79
 5081.82  136.98 5111.33   137.2 5137.57  137.17 5144.13  136.93 5153.96  137.38
 5160.52  137.35 5167.08  136.83 5173.64   137.1 5206.43  136.72 5219.55  137.56
 5235.95  137.69 5242.51  136.02 5245.79  135.56 5258.91  135.31 5265.46  135.57
 5272.02   136.4 5278.58  136.45

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .188  975.64    .066  982.19    .015    1244    .066 1431.72    .187

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      972.37 1431.72          1276.91    1300  905.72             .1       .3
Left Levee      Station=   19.64      Elevation=  126.94
Right Levee     Station= 5235.95      Elevation=  137.69
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0  926.53   113.1 1990.74 5278.58  108.32

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            123.57    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.62    Wt. n-Val.                 0.188      0.043      0.187
  W.S. Elev (ft)            122.96    Reach Len. (ft)          1276.91    1300.00     905.72
  Crit W.S. (ft)            114.80    Flow Area (sq ft)        9169.27    9520.81   31582.67
  E.G. Slope (ft/ft)      0.000960    Area (sq ft)             9169.27    9520.81   31582.67
  Q Total (cfs)           130000.00    Flow (cfs)              10243.25   77178.00   42578.75
  Top Width (ft)           3857.52    Top Width (ft)            939.40     459.35    2458.77
  Vel Total (ft/s)            2.59    Avg. Vel. (ft/s)            1.12       8.11       1.35
  Max Chl Dpth (ft)          22.12    Hydr. Depth (ft)            9.76      20.73      12.84
  Conv. Total (cfs)       4195514.0    Conv. (cfs)              330582.2   2490780.0   1374152.0
  Length Wtd. (ft)         1193.33    Wetted Per. (ft)          941.18     464.67    2464.91
  Min Ch El (ft)            100.84    Shear (lb/sq ft)            0.58       1.23       0.77
  Alpha                       5.94    Stream Power (lb/ft s)      0.65       9.96       1.04
  Frctn Loss (ft)             0.57    Cum Volume (acre-ft)    185333.70   69533.21   213990.30
  C & E Loss (ft)             0.10    Cum SA (acres)          22828.45    2852.97   25411.83


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 169.49

INPUT
Description: revised reach length to 1300, Bathymetric elevations translated
             from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  126.44    3.28  113.11    6.56  111.89    9.83  111.02   16.39  109.99
```

```
   19.67  109.89   26.22  110.33    29.5  110.42   49.17  109.89   55.72  109.86
   65.56  109.99   85.23  110.11    88.5  110.01   95.06  109.61   98.34  109.63
  104.89  109.43  114.73  109.55  127.84  109.37  134.39  109.54  140.95  109.25
  144.23  109.19  150.78  109.34  157.34  109.23  163.89  109.26  173.73  109.17
  180.28  109.22  190.12  109.72  199.95  109.79  206.51   109.7   222.9   109.7
  236.01  109.67   252.4  109.78  258.95  109.75  265.51  109.92  268.79  109.93
   281.9  109.74  291.73  109.74  295.01  109.61  304.84  109.74   311.4  109.92
  337.62  110.32   340.9  110.23  357.29  110.32  360.57  110.28  390.07  110.17
  396.62  110.06  416.29  109.88  432.68  109.86  439.24  110.01  445.79  110.07
   458.9  110.05  472.02  109.89  481.85   109.9  498.24     110  501.52  110.06
  514.63  110.11   534.3  110.42  540.85  110.43  544.13  110.51  553.96  110.41
  557.24   110.3   563.8  110.23  570.35   110.3  576.91  110.53  590.02  110.66
  596.58  110.45  603.13  110.48  612.97  110.72  629.35  110.75  635.91  110.83
  645.74  110.74  655.58   110.7  671.97  110.46   681.8  110.42  688.36  110.34
  694.91  110.38  701.47   110.2  704.75  109.78   711.3   108.8  714.58  107.17
  717.86  105.27  721.14   99.37  722.14   98.82  726.14   98.84  733.64   98.31
  737.14    97.1  737.14   97.61  744.14   96.76  747.14   96.02  752.14   95.04
  760.14   93.27  762.14   93.04  770.14   91.72  784.14   89.58  788.64    89.1
  799.14    87.8  803.14   87.49  810.14   86.74  814.14   86.58  815.14   87.54
  819.14   86.44  843.14   85.76  846.14   85.79  854.14   85.61  869.14    85.4
  884.14    85.1  900.14   84.44  917.14    84.3  933.14    84.7  950.14   85.07
  968.14    85.3  985.14    85.7 1001.14    86.2 1017.14    86.5 1033.14    87.4
 1050.14    88.2 1066.14    88.5 1083.14    88.3 1099.14      89 1116.14    92.1
 1117.14   92.43 1133.14    98.8 1146.14   99.47 1147.14    99.6 1156.14    99.8
 1166.14    99.2 1176.14    99.2 1187.14   100.1 1261.74  104.76 1265.01  105.08
 1271.56  106.71  1278.1  107.51 1284.65  108.56 1297.74   109.1 1301.01  109.12
 1304.29  108.94  1314.1  107.99 1320.65  107.83 1323.92  108.18 1333.74  108.63
 1340.29  108.77 1343.56  108.57 1350.11  107.76 1353.38   107.6 1356.65  107.59
  1363.2  107.83 1373.02  108.28 1379.56  108.37 1386.11  108.34 1389.38  108.72
 1395.94  108.73 1399.22  108.84 1412.35  108.89 1425.47   108.6 1428.75  108.57
 1441.87  108.88 1448.43  108.84    1455   109.3 1461.56  109.47 1468.12  109.39
 1474.68  108.97 1477.96  109.33 1481.24  109.43 1491.08  108.83 1497.65   108.5
 1500.93  108.06 1504.21  108.05 1507.49  108.23 1514.05  108.16 1517.33  108.33
 1527.17  108.41 1537.02   108.1 1543.58  108.06 1553.42  107.91 1566.54  108.04
 1576.39  107.97 1582.95  108.21 1589.51  108.22 1599.35  108.56 1602.63  108.48
 1609.19  108.11 1612.47  108.14 1619.04  108.82 1622.32  108.87  1625.6   108.7
 1632.16  108.03 1635.44  107.77 1645.28  107.15 1648.56  107.51 1655.12   108.9
 1661.69  108.79 1668.25  108.39 1678.09  108.43 1684.65  108.19 1691.21  108.24
 1701.06  108.11 1704.34  108.21  1710.9  108.04 1717.46  108.37  1727.3   108.6
 1737.15  108.59 1743.71  108.75 1750.27   108.8 1763.39  108.77 1769.95  109.04
 1776.52  108.81 1783.08  108.96 1806.04  109.12 1822.45   109.4 1835.57  109.53
 1842.13  109.71 1855.25  109.65 1861.82  109.71 1871.66  109.59 1878.22  109.63
 1884.78  109.54 1891.34  109.17 1894.62  109.22 1917.59  110.12 1927.43  110.22
 1930.71  110.36 1933.99  110.35 1947.12  110.46 1953.68  110.35 1956.96   110.5
 1960.24  110.49 1963.52  109.28  1966.8  109.51 1970.08   112.6 1973.36  114.87
 1976.64  115.51 1979.93  115.38 1989.77  114.44 1993.05  114.25 1996.33  113.82
 2006.17  112.04 2009.45  111.72 2016.01  111.81 2022.58  111.79 2025.86  111.87
 2032.42  112.61  2035.7  112.66 2042.26  112.54 2045.54  112.67 2058.66   113.7
 2065.23   113.9 2068.51  113.88 2075.07  114.26 2081.63  114.46 2094.75  114.41
 2098.03  114.33  2104.6  114.45 2107.88  114.37 2117.72  114.47 2124.28  114.43
 2127.56  114.54 2140.68  114.69 2143.96  114.62 2153.81  114.76 2160.37  114.59
 2163.65  114.21 2166.93  113.68 2170.21  113.45 2176.77  113.77 2180.05  114.04
 2183.33  113.96 2186.61  114.05 2193.18  114.67 2203.02  115.45 2212.86  115.61
  2222.7  115.68 2235.83  116.16 2242.39  116.35 2248.95  116.75 2262.07  117.79
 2265.35  117.95 2278.48  118.12 2281.76   118.1  2291.6  118.31 2298.16  118.75
 2304.72  119.61 2314.56  121.07 2317.85  121.49 2324.41  121.92 2330.97  122.23
 2337.53  122.36 2347.37  122.04 2363.78  122.15 2373.62  122.25 2383.46   122.4
 2386.74  122.39 2390.02  122.19  2393.3  121.76 2396.58  120.64 2399.86  119.07
 2409.71  114.11 2412.99  112.63 2416.27   111.9 2426.11  111.79 2435.95  111.77
  2445.8  111.82 2455.64  111.81 2465.48  111.88 2468.76  111.97 2472.04  112.49
 2475.32  113.75 2488.45  119.74 2491.73  120.95 2495.01  121.75 2498.29  122.01
 2504.85   122.8 2511.41   122.6 2521.25  122.64 2524.53  122.59  2531.1  122.81
 2537.66  122.85 2540.94  123.01 2544.22  123.45 2554.06   124.3 2560.62  124.26
 2570.46  124.48 2577.03  124.94 2580.31  125.29 2586.87  126.18 2590.15  126.79
 2593.43  127.56 2599.99  127.95 2626.24  128.45 2639.36  129.06 2642.64  129.12
 2655.76  129.01 2675.45  128.52 2678.73   128.5 2688.57  128.66 2698.42  128.67
  2701.7  128.52 2708.26  128.43  2718.1  128.54 2724.66  128.42 2737.78  128.57
 2750.91  128.58 2757.47  128.52 2767.31  128.55 2773.87  128.62 2783.72  128.56
    2787  128.68 2790.28  128.94 2796.84  129.65 2800.12  129.73 2813.24  129.41
 2823.08  129.75 2829.65  129.91 2842.77  129.99 2846.05  129.93 2849.33  129.69
 2852.61  129.26 2855.89  129.09 2862.45  129.58 2869.02   129.7 2875.58  130.05
 2882.14  130.25 2885.42  130.52 2891.98  130.47 2901.82  130.63 2908.38  130.89
 2911.67  131.11 2921.51  131.96 2924.79  131.96 2934.63  132.18 2951.03  132.43
  2957.6  132.26 2960.88  132.36 2964.16  132.16    2974  132.11 2983.84  132.01
  2990.4  132.05 2993.68  132.17 3006.81  131.96 3010.09  131.99 3016.65  131.78
 3023.21  131.87 3033.05  131.85 3039.62   131.7  3042.9   131.5 3046.18  131.55
 3052.74  132.33  3059.3  132.73 3065.86  132.57 3072.42   132.1 3088.83  131.54
 3101.95  131.23 3105.23  131.35 3124.92  131.11 3131.48  131.59 3134.76  131.53
 3141.32  131.08 3151.16  130.88 3154.44  131.03    3161  131.76 3170.85  131.48
 3180.69  130.94 3187.25  131.02 3193.81  131.27 3200.37  131.41  3213.5  132.44
 3220.06  132.45 3226.62  132.14 3239.74  132.84  3246.3  132.74 3252.87  132.15
 3259.43  132.83 3269.27  132.97 3272.55   132.9 3275.83  132.58 3285.67   130.6
 3288.95  130.66 3292.23  131.79 3295.52  132.38 3302.08  133.15 3305.36  133.25
 3318.48  133.05 3357.85  132.37 3364.41  132.18 3374.25  132.02  3384.1  132.04
 3387.38  132.57 3390.66  133.94 3393.94  134.42 3403.78  134.53 3410.34  134.44
 3430.03  134.61 3446.43  134.71 3452.99  134.84 3459.55  134.81  3469.4  134.88
 3475.96  135.03 3479.24  134.97  3485.8  135.09 3498.92   135.1 3512.05   135.5
 3518.61  135.52 3541.57  135.84 3544.85  135.74 3557.98  135.69 3564.54  135.61
 3574.38  135.67 3580.94  135.86  3587.5  135.73 3590.79  135.49 3603.91   134.2
 3613.75   133.7 3630.15  133.93 3643.28  133.98 3646.56  133.93  3656.4  134.58
 3662.96  134.81 3666.24  134.77  3672.8  134.37 3682.65  134.38

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066  752.14    .025 1117.14    .085    1455     .06 1917.59     .06
 2639.36    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         711.3  1278.1           188.88 1299.95 1556.14             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   711.3   108.8       T
  1278.1 3682.65  107.51       T
Left Levee      Station=       0      Elevation=  126.44
Right Levee     Station= 2639.36      Elevation=  129.06

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            122.90    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.27    Wt. n-Val.                0.066      0.049     0.064
  W.S. Elev (ft)            122.63    Reach Len. (ft)          188.88    1299.95    1556.14
  Crit W.S. (ft)            103.20    Flow Area (sq ft)       8922.33   17399.65   13099.50
```

E.G. Slope (ft/ft)	0.000282	Area (sq ft)	8922.33	17399.65	13101.87	
Q Total (cfs)	130000.00	Flow (cfs)	18095.71	85803.55	26100.74	
Top Width (ft)	2515.81	Top Width (ft)	710.36	566.80	1238.65	
Vel Total (ft/s)	3.30	Avg. Vel. (ft/s)	2.03	4.93	1.99	
Max Chl Dpth (ft)	38.33	Hydr. Depth (ft)	12.56	30.70	10.58	
Conv. Total (cfs)	7738974.0	Conv. (cfs)	1077248.0	5107935.0	1553792.0	
Length Wtd. (ft)	1248.34	Wetted Per. (ft)	718.46	575.61	1246.59	
Min Ch El (ft)	84.30	Shear (lb/sq ft)	0.22	0.53	0.19	
Alpha	1.60	Stream Power (lb/ft s)	0.44	2.63	0.37	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	185068.50	69131.51	213525.80	
C & E Loss (ft)	0.04	Cum SA (acres)	22804.27	2837.66	25373.39	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 169.14

INPUT
Description: Left bank elevations updated to match surface elevation of 126.70.
Original IBWC Cross-section data applied to this section

Station Elevation Data	num=	7							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4000	126.7	4067	126.7	4100	126.7	4100	84.64	4623.8	84.64
4623.8	124.74	4723.8	124.74						

Manning's n Values	num=	4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4000	.048	4067	.06	4100	.015	4623.8	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4100	4623.8	48.38	50.04	47.52	.2	.5

Left Levee Station= 4000 Elevation= 126.7
Right Levee Station= 4723.8 Elevation= 124.74

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	122.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.		0.015	
W.S. Elev (ft)	122.07	Reach Len. (ft)	48.38	50.04	47.52
Crit W.S. (ft)	97.06	Flow Area (sq ft)		19605.04	
E.G. Slope (ft/ft)	0.000043	Area (sq ft)		19605.04	
Q Total (cfs)	130000.00	Flow (cfs)		130000.00	
Top Width (ft)	523.80	Top Width (ft)		523.80	
Vel Total (ft/s)	6.63	Avg. Vel. (ft/s)		6.63	
Max Chl Dpth (ft)	37.43	Hydr. Depth (ft)		37.43	
Conv. Total (cfs)	19879180.0	Conv. (cfs)		19879180.0	
Length Wtd. (ft)	50.04	Wetted Per. (ft)		598.66	
Min Ch El (ft)	84.64	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.58	
Frctn Loss (ft)		Cum Volume (acre-ft)	185049.20	68579.34	213291.70
C & E Loss (ft)		Cum SA (acres)	22802.73	2821.38	25351.26

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

INLINE STRUCTURE

RIVER: Rio Grande
REACH: Lower Reach RS: 169.13

INPUT
Description: Anzalduas Dam
Distance from Upstream XS = 30
Deck/Roadway Width = 15
Weir Coefficient = 3.21
Weir Embankment Coordinates num = 2

Sta	Elev	Sta	Elev
4100	124.64	4623.8	124.64

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Weir crest shape = Ogee

INLINE STRUCTURE GATE Gate #1
Height = 34.75
Width = 75
Invert = 84.64
Gate Type = Radial Radial Coefficient= .6
Trunion Exponent = .16
Opening Exponent = .72
Head Exponent = .62
Trunion Height = 14
Weir Coefficient = 3.21
Weir crest shape = Ogee
Number of Gate Openings = 6

Sta	Sta	Sta	Sta	Sta	Sta
4137.5	4227.26	4317.02	4406.78	4496.54	4586.3

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 169.12

INPUT
Description: Original IBWC Cross-section data applied to this section

Station Elevation Data	num=	6							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	122.84	4100	122.84	4100	72.14	4623.8	72.14	4623.8	128.54
4723.8	128.54								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    4100    .015  4623.8     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4100  4623.8          100.93   99.44   96.53            .2       .5
Left Levee      Station=       0      Elevation=  122.84
Right Levee     Station=  4723.8      Elevation=  128.54

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            121.07    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.41    Wt. n-Val.                            0.015
  W.S. Elev (ft)            120.66    Reach Len. (ft)          100.93      99.44      96.53
  Crit W.S. (ft)             84.56    Flow Area (sq ft)                  25416.00
  E.G. Slope (ft/ft)      0.000019    Area (sq ft)                       25416.00
  Q Total (cfs)           130000.00    Flow (cfs)                        130000.00
  Top Width (ft)            523.80    Top Width (ft)                     523.80
  Vel Total (ft/s)            5.11    Avg. Vel. (ft/s)                     5.11
  Max Chl Dpth (ft)          48.52    Hydr. Depth (ft)                    48.52
  Conv. Total (cfs)       29906180.0    Conv. (cfs)                     29906180.0
  Length Wtd. (ft)           99.44    Wetted Per. (ft)                   620.84
  Min Ch El (ft)             72.14    Shear (lb/sq ft)                     0.05
  Alpha                       1.00    Stream Power (lb/ft s)               0.25
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)    185049.20   68559.41   213291.70
  C & E Loss (ft)             0.02    Cum SA (acres)          22802.73    2820.78   25351.26


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 169.1

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.84      99  122.84     100  108.14     150   83.64     707   83.64
     757  108.14     758  128.54     857  128.54

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .14      99    .015     758     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            99     758          1118.21 1200.01 1232.42            .1       .3
Left Levee      Station=       0      Elevation=  122.84
Right Levee     Station=     857      Elevation=  128.54

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            121.05    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.49    Wt. n-Val.                            0.015
  W.S. Elev (ft)            120.55    Reach Len. (ft)          1118.21    1200.01    1232.42
  Crit W.S. (ft)             95.38    Flow Area (sq ft)                  23036.52
  E.G. Slope (ft/ft)      0.000030    Area (sq ft)                       23036.52
  Q Total (cfs)           130000.00    Flow (cfs)                        130000.00
  Top Width (ft)            658.45    Top Width (ft)                     658.45
  Vel Total (ft/s)            5.64    Avg. Vel. (ft/s)                     5.64
  Max Chl Dpth (ft)          36.91    Hydr. Depth (ft)                    34.99
  Conv. Total (cfs)       23587410.0    Conv. (cfs)                     23587410.0
  Length Wtd. (ft)         1191.97    Wetted Per. (ft)                   693.23
  Min Ch El (ft)             83.64    Shear (lb/sq ft)                     0.06
  Alpha                       1.00    Stream Power (lb/ft s)               0.36
  Frctn Loss (ft)             0.10    Cum Volume (acre-ft)    185049.20   68504.10   213291.70
  C & E Loss (ft)             0.08    Cum SA (acres)          22802.73    2819.43   25351.26


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 168.85

INPUT
Description: Extended block obstruction, Bathymetric elevations translated from
             IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  127.06   19.67  126.76   29.51     124    45.9  118.38   59.01  114.77
    75.4  110.67   88.52  108.73   98.35  107.74  114.74  107.61   121.3  107.11
  134.41  107.28  140.97  107.76   167.2  107.45  173.75  107.82  186.87  107.83
  199.98  107.46  213.09  107.82  219.65  107.46  239.32  108.13  255.71  108.02
  265.55   107.4  281.94  107.66  288.49  107.25  311.44   107.3     318  107.68
  324.56   107.3  370.45  107.55  383.57  107.37  403.24  107.48  413.07  107.82
  422.91  107.13  436.02  106.76  449.13   107.5  465.53  107.12  472.08  106.64
  481.92  106.62  501.59  105.69   514.7  106.79  534.37  106.06  557.32  106.52
  567.15  106.39  586.82  107.47  596.66   106.8  606.49   107.1     636  107.35
  645.84  108.12  652.39  107.42  665.51  106.97  678.62  107.46  685.18  107.21
  695.01  107.51  714.68  107.37  727.79  107.62  737.63  106.99  744.19  107.59
  763.86  107.07  770.41  107.28  780.25  106.84  796.64  107.47  819.59  107.56
  826.15  107.84  842.54  107.31  862.21  107.26  868.76  107.65  888.43   106.8
  898.27  107.16  927.77  107.43  937.61  107.04  967.12   107.1  976.95  107.61
  993.34  107.98 1003.18  107.56 1009.73  108.01 1032.68  108.19  1045.8  108.06
 1052.35  107.64 1062.19  107.93 1078.58  107.94 1085.14  107.59 1094.97  107.79
 1104.81  108.86 1114.64   108.9 1127.75  107.96 1144.15  108.95  1150.7   108.4
 1163.82     109 1176.93  109.14  1196.6  109.69 1206.43  109.26 1222.83  109.42
 1239.22  108.99 1249.05  108.42 1255.61  108.48 1278.56  110.27 1294.95  110.43
 1301.51  109.68  1317.9  109.82 1337.57  110.71  1347.4  110.07 1357.24  111.95
 1380.19  109.72 1386.74  108.56 1403.14   109.1 1416.25  110.01 1426.08  109.03
  1439.2  108.58 1445.75  108.97 1458.87  108.17 1475.26   108.3 1485.09  108.79
 1491.65  108.52 1501.49  108.91 1508.04  108.52 1534.27  108.88 1557.22  109.74
 1586.72  109.26 1596.56  109.29 1606.39  108.49 1616.23  108.37 1626.06  109.14
  1635.9  108.76 1655.57   108.9  1665.4  107.44 1685.07  107.42 1708.02  108.53
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 1724.41  108.55  1740.8  108.25  1757.2   109.1 1773.59  108.18  1786.7  108.39
 1803.09  107.87 1812.93  108.79 1826.04   109.1 1845.71  110.43 1855.55  109.86
 1875.22  111.53 1885.05  110.27    1908  110.74 1921.11  110.47 1940.78  111.71
  1953.9  110.88 1967.01  111.56 1976.84   110.7 1986.68  110.97 1999.79  109.13
 2026.02  105.97 2035.85  106.35 2042.41  106.08 2068.64  108.41  2075.2  107.43
 2088.31  103.92  2104.7   102.6 2117.81  102.42 2134.21  102.52 2147.32  102.94
 2160.43  102.81 2176.83   103.4 2180.11  103.17 2189.94  103.92 2206.33  104.13
 2212.89  104.72 2235.84  104.79 2255.51   106.5 2265.34  108.09 2285.01  109.69
 2291.57  109.52 2304.69  110.59 2330.91  111.33 2337.47  111.07 2350.58   111.3
 2373.53   110.9  2393.2  111.44 2409.59  111.38 2419.43  110.63 2432.54  111.28
 2455.49  110.95 2468.61  111.87 2471.88  112.47 2491.56  111.24 2501.39  111.35
 2527.62  110.88 2547.29  111.62 2573.52  110.51 2603.02  110.82 2612.86  110.43
 2632.53  111.94 2642.36  111.68  2652.2  110.76 2675.15  110.78 2691.54  111.53
 2711.21  110.95 2734.16  111.09 2747.27  110.91 2753.83   111.2 2783.33  111.11
 2793.17  111.76 2799.73  111.34  2819.4  111.32  2848.9  112.32 2871.85  111.34
 2888.24  111.52 2901.36  111.29 2924.31  111.56 2947.26  111.27 2963.65  111.91
  2986.6  112.08 3006.27  110.06 3019.38  109.21 3025.94  109.38 3045.61  109.13
 3055.44  109.59    3062  109.46 3078.39  111.43 3111.18  110.35 3124.29  109.12
  3137.4  108.64 3160.35  109.24 3166.91  109.75 3186.58  108.66 3193.14     109
 3202.97  108.23 3222.64  108.43 3235.76  109.82 3242.31  109.79 3261.98   110.6
 3284.93  110.95 3301.33  112.94 3317.72  112.69 3324.27  113.31 3343.94  113.27
 3363.62   112.8 3370.17  113.78 3376.73  113.73 3386.56  112.74 3402.96  113.03
 3422.63  112.94 3432.46  112.35 3468.52  109.06 3484.92  105.74 3501.31  105.52
 3524.26  106.85 3537.37  106.03 3553.76  106.03  3563.6  105.66 3586.55  105.25
 3616.05  104.07 3632.45  104.43 3645.56  106.17 3652.12  106.56 3665.23  108.33
 3681.62  109.03 3688.18  108.96 3714.41  110.31 3720.96  111.07 3727.52  111.16
 3734.08  109.55 3743.91  109.42 3750.47   111.4 3757.03  111.76 3773.42   110.6
 3779.97  109.06 3793.09  108.53  3806.2  107.35 3832.43  107.97 3838.99  107.75
 3861.94  107.97 3868.49  108.94 3875.05  108.53 3891.44  108.22 3907.83  108.99
 3920.95  109.09 3934.06  109.71  3943.9  109.77 3950.45  109.36 3970.12  109.38
 3983.24  109.15 3989.79  108.42 4006.19  108.52  4019.3  108.03 4035.69  106.34
 4038.97  105.61  4065.2   95.85 4075.03    93.5 4081.59   89.08 4088.15   88.09
 4105.15   81.02 4115.15   79.64 4125.15   77.64 4135.15   76.64 4145.15   75.04
 4155.15   74.64 4165.15   73.04 4175.15   72.64 4185.15   71.64 4195.15   72.64
 4205.15   72.64 4225.15   73.64 4235.15   73.64 4245.15   73.04 4255.15   73.04
 4265.15   74.64 4275.15   75.04 4285.15   76.04 4325.15   76.04 4345.15   77.64
 4355.15   79.64 4365.15   81.02 4373.15   83.44 4455.36   88.09 4458.64   88.12
 4465.19   91.87 4478.31   97.88 4484.87    99.8 4501.26  102.84 4504.54  103.71
 4514.38  108.85 4517.65  109.76 4527.49  109.96 4534.05  112.22 4537.33  112.66
 4550.44  112.67    4557  111.43 4566.84  110.61 4573.39  111.24 4583.23  111.25
 4589.79  110.49 4599.62  110.91 4606.18  110.46 4625.85  110.14 4632.41  110.27
 4658.64  110.14  4711.1   110.1  4727.5   110.3 4763.56  110.01 4779.96  109.54
 4793.07  109.78 4802.91   109.5  4835.7   109.1 4871.77   109.9 4891.44  111.27
 4907.83  111.69 4920.95  112.77 4934.06  111.49  4943.9  111.18 4973.41  111.72
  4989.8  111.86  5006.2  111.61 5029.15  111.78 5068.49  111.44 5088.17  111.47
 5111.12  112.06 5127.51  111.46 5143.91  111.21 5157.02  111.38 5179.97  111.13
 5189.81  111.73 5212.76  110.91 5229.16  111.25 5242.27  110.77  5284.9  110.52
 5298.01  110.57 5317.68  110.27 5360.31  110.21 5370.14  109.61 5396.38  109.02
 5402.93   109.9 5416.05  109.32 5422.61   108.6 5435.72  108.38 5445.56  105.46
 5465.23  103.03  5484.9  101.61 5488.18  101.72 5494.74  103.58 5507.85   110.8
 5520.97   119.9 5527.53     123 5543.92  125.24 5566.87   125.5 5576.71   126.7
 5586.55  129.14  5593.1  132.19 5599.66  133.19 5622.61   132.6 5632.45   134.7
 5635.73  134.15 5639.01  132.17  5655.4  119.68 5658.68  118.86 5668.52  118.45
 5671.79  117.77 5678.35  114.61 5681.63  114.06 5694.75  114.13 5698.03  113.56
 5707.86  106.89 5714.42   100.1 5724.26    92.7 5730.81    91.6  5888.2    91.6
 5894.75   93.03 5904.59   99.75 5907.87   102.5 5917.71  112.59 5920.98  115.17
 5924.26  115.47  5934.1  114.93 5943.94  115.66 5960.33  127.02 5966.89  131.28
 5973.45  134.51 5976.72  135.28 5989.84  136.28 5999.68   137.9 6012.79  143.13
 6019.35  144.68 6025.91  145.01 6035.74  142.97  6042.3  142.42 6048.86     143
 6052.14  142.35 6065.25  131.43 6071.81  127.11 6075.09  126.06  6088.2  124.84
  6104.6  124.36 6111.16  121.63 6117.71  116.55 6120.99  114.81 6134.11   110.6
 6143.94  110.41  6150.5  111.27 6157.06  112.93  6166.9  113.73 6173.45  117.11
 6180.01  119.47 6186.57  123.33 6189.85  123.88 6202.96  124.09 6219.36  123.39
 6232.47  123.73 6252.14  125.12  6258.7  125.16 6265.26  123.62  6275.1  119.85
 6281.65   121.1 6291.49  120.89 6298.05  119.45 6307.88  121.04 6314.44  120.91
    6321  119.63 6330.84  120.75 6337.39  122.85 6340.67  123.15 6350.51  122.08
  6366.9   121.9 6380.02  122.12 6389.85  122.66 6402.97  122.74 6409.53  124.24

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0      .2  3943.9      .2  4065.2    .066 4105.15    .015 4373.15    .066
 4517.65    .116

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        3943.9 4534.05          1531.01 1524.99  1539.3             .1       .3
Left Levee      Station=       0      Elevation=  127.06
Right Levee     Station= 5632.45      Elevation=   134.7
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 3757.03  111.76 4550.44 6409.53  112.67

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            120.87    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.23    Wt. n-Val.                 0.200      0.087      0.116
  W.S. Elev (ft)            120.64    Reach Len. (ft)         1531.01    1524.99    1539.30
  Crit W.S. (ft)             94.09    Flow Area (sq ft)       34902.41   19416.58    7827.12
  E.G. Slope (ft/ft)      0.000711    Area (sq ft)            34902.41   19416.58    7827.12
  Q Total (cfs)           130000.00    Flow (cfs)              29771.61   89624.71   10603.68
  Top Width (ft)           5483.22    Top Width (ft)           3904.58     590.15     988.48
  Vel Total (ft/s)            2.09    Avg. Vel. (ft/s)            0.85       4.62       1.35
  Max Chl Dpth (ft)          49.00    Hydr. Depth (ft)            8.94      32.90       7.92
  Conv. Total (cfs)       4875220.0    Conv. (cfs)             1116486.0   3361078.0   397655.8
  Length Wtd. (ft)         1528.38    Wetted Per. (ft)         3906.67     601.78     990.95
  Min Ch El (ft)             71.64    Shear (lb/sq ft)            0.40       1.43       0.35
  Alpha                       3.43    Stream Power (lb/ft s)      0.34       6.61       0.48
  Frctn Loss (ft)             0.76    Cum Volume (acre-ft)    184601.20   67919.34   213181.00
  C & E Loss (ft)             0.04    Cum SA (acres)          22752.61    2802.23   25337.28


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 168.58

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	104.61	6.56	106.49	19.68	111.65	29.52	112.69	42.64	116.17
68.88	125.02	72.16	125.77	88.56	125.75	124.64	113.58	131.2	112.71
141.04	112.91	147.6	112.33	177.12	112.7	183.68	113.09	206.64	113.23
213.2	113.6	223.04	113.15	246	113.67	259.12	113.69	268.96	114.17
282.08	114.16	298.48	113.32	321.44	113.56	341.12	114.58	364.08	113.75
396.87	114.28	409.99	114.8	419.83	114.17	449.35	113.71	469.03	114.04
475.59	113.6	488.71	113.6	501.83	112.38	524.79	111.56	551.03	111.43
573.99	110.36	583.83	110.4	603.51	111.42	619.91	110.97	639.59	107.34
655.99	105.32	669.11	105.04	682.23	103.75	698.63	103.53	728.15	104.2
741.27	103.91	767.51	103.9	806.87	104.37	826.55	104.19	846.23	104.74
862.63	104.39	879.03	104.83	915.11	105.02	924.95	104.85	938.07	105.61
964.31	105.4	987.27	105.42	1006.95	105.09	1020.07	103.97	1036.47	104.02
1052.87	103.73	1069.27	104.85	1088.95	104.06	1095.51	104.83	1105.35	104.41
1125.03	104.56	1131.59	104.24	1144.71	104.54	1154.55	104.03	1170.95	104.81
1180.79	104.62	1190.63	103.51	1203.75	103.26	1229.98	103.98	1243.1	103.53
1256.22	103.79	1275.9	103.59	1298.86	103.66	1308.7	104.11	1331.66	103.71
1361.18	103.97	1374.3	103.5	1384.14	103.98	1390.7	103.77	1397.26	104.51
1420.22	103.71	1430.06	103.78	1436.62	104.46	1453.02	103.9	1459.58	104.13
1482.54	103.69	1495.66	104.45	1502.22	103.91	1518.62	104.07	1535.02	103.26
1571.1	103.79	1580.94	104.66	1603.9	104.28	1617.02	104.33	1630.14	105.01
1656.38	104.3	1676.06	104.58	1685.9	104.41	1695.74	104.81	1758.06	104.2
1761.34	103.81	1774.46	103.89	1810.54	103.57	1817.1	103.9	1840.05	103.64
1853.17	103.81	1863.01	103.41	1902.37	103.48	1918.77	104.05	1931.89	103.44
1958.13	103.54	1964.69	103.82	1984.37	103.67	1990.93	103.91	2007.33	103.64
2013.89	103.96	2036.85	103.43	2056.53	103.46	2079.49	104.27	2112.29	103.65
2125.41	104.16	2131.97	103.99	2145.09	104.65	2161.49	105.87	2171.33	105.92
2184.45	105.23	2207.41	105.36	2223.81	105.68	2233.65	104.96	2243.49	105.11
2253.33	104.23	2286.13	104.42	2302.52	104.75	2322.2	104.74	2351.72	105
2377.96	104.64	2394.36	104.62	2410.76	104.97	2427.16	105.72	2469.8	105.75
2486.2	106.4	2492.76	106.13	2515.72	106.67	2528.84	106.17	2558.36	106.83
2571.48	107.31	2591.16	107.56	2607.56	107.15	2627.24	107.96	2640.36	110.61
2660.04	109.17	2676.44	107.03	2722.35	106.94	2738.75	107.34	2748.59	107
2774.83	107.3	2787.95	108.16	2797.79	108.06	2807.63	108.9	2837.15	108.46
2856.83	108.92	2869.95	108.53	2892.91	108.65	2912.59	109.33	2922.43	109.33
2942.11	110.74	2971.63	110.78	2991.31	106.98	2997.87	104.75	3007.71	102.65
3020.83	101.4	3037.23	101.59	3047.07	101.29	3056.91	101.69	3096.26	101.49
3106.1	102.47	3112.66	104.19	3129.06	106.8	3138.9	109.91	3152.02	110.46
3165.14	109.29	3174.98	110.14	3204.5	109.61	3224.18	110.39	3234.02	110.22
3240.58	110.79	3260.26	110.74	3270.1	111.4	3276.66	110.88	3309.46	110.62
3319.3	110.34	3332.42	110.63	3358.66	110.1	3368.5	111.66	3388.18	110.52
3407.86	110.53	3417.7	111.1	3430.82	110.28	3447.22	110.68	3453.77	110.36
3470.17	111.45	3512.81	111.25	3539.05	111.39	3548.89	111.09	3594.81	111.52
3601.37	111.11	3607.93	109.76	3624.33	108.29	3637.45	105.55	3647.29	104.67
3666.97	103.89	3689.93	103.6	3709.61	103.74	3735.85	104.82	3781.77	105.85
3798.17	106.01	3808.01	106.9	3827.69	106.85	3840.8	107.56	3850.64	107.45
3867.04	108.16	3883.44	107.61	3945.76	107.86	3975.28	107.47	3981.84	107.72
4008.08	107.31	4031.04	108.13	4044.16	107.75	4057.28	108.92	4093.36	108.86
4113.04	109.79	4122.88	109.66	4132.72	110.34	4139.28	109.71	4155.68	109.82
4162.24	110.2	4178.64	109.55	4185.2	109.95	4211.44	109.34	4221.28	109.87
4240.96	109.16	4254.08	110.05	4273.76	110.84	4290.16	111.85	4313.12	112.22
4332.8	111.9	4359.04	112.22	4385.28	111	4411.53	111.58	4424.65	113.19
4434.49	111.12	4441.05	109.16	4460.73	106.76	4480.41	108.08	4500.09	108.07
4513.21	109.9	4532.89	110.4	4546.01	111.92	4555.85	112.1	4562.41	111.69
4572.25	109.47	4575.53	109.37	4582.09	110.8	4611.61	112.21	4621.45	114.3
4624.73	114.26	4657.53	107.88	4664.09	107.45	4680.49	108.96	4703.45	108.77
4710.01	105.41	4723.13	101.95	4729.69	101.19	4749.37	101.16	4762.49	102.86
4775.61	105.62	4795.29	105.59	4808.41	101.78	4824.81	99.93	4828.09	99.24
4841.22	94.55	4851.06	92.18	4857.62	88.74	4864.18	87.93	4884.18	79.96
4924.18	80.13	4964.18	80.16	4980.18	72.86	5015.18	72.16	5032.18	70.46
5049.18	69.86	5064.18	71.56	5077.18	72.16	5094.18	72.46	5104.18	80.03
5124.18	79.96	5133.1	87.93	5139.65	88.57	5152.77	95.85	5156.05	97.12
5162.61	97.89	5172.45	96.1	5179	95.85	5185.56	96.45	5195.4	98.83
5201.96	101.82	5208.52	107.15	5218.35	108.66	5234.75	108.78	5247.86	109.55
5267.54	108.14	5274.1	108.65	5290.49	107.69	5303.61	108	5323.28	107.87
5339.68	106.35	5352.8	105.97	5365.91	106.55	5382.31	105.13	5395.42	104.94
5408.54	105.92	5418.38	108.23	5428.21	112.04	5457.73	112.58	5477.4	110.83
5490.52	110.84	5500.35	110.31	5513.47	110.52	5523.31	109.97	5536.42	110.3
5579.05	109.36	5585.61	109	5611.84	108.99	5621.68	109.78	5638.08	109.87
5654.47	110.44	5657.75	110.14	5680.7	105.8	5683.98	105.48	5706.94	105.17
5726.61	106.03	5733.17	106.7	5749.57	107.38	5759.4	107.47	5785.64	106.79
5824.98	107.4	5847.94	107.06	5861.05	107.38	5884.01	111.46	5890.57	112.23
5897.12	111.73	5913.52	111.66	5933.19	113.24	5949.59	113.51	5965.99	115.05
5972.54	114.63	5979.1	113.37	6028.29	113.67	6057.8	113.54	6064.36	113.86
6077.47	113.54	6087.31	113.79	6100.43	113.03	6113.54	113.85	6129.94	112.71
6136.5	112.88	6143.06	112.02	6162.73	111.95	6169.29	112.38	6179.13	111.99
6202.08	112.49	6221.75	111.65	6244.71	112.13	6257.82	111.7	6284.06	111.73
6333.24	111.54	6359.48	112.14	6375.87	111.73	6405.38	111.89	6418.5	112.29
6451.29	114.23	6467.69	114.58	6480.8	116.88	6493.92	122.41	6503.76	123.4
6516.87	122.17	6536.55	122.92	6552.94	124.11	6575.9	123.99	6585.73	126.15
6592.29	126.34	6602.13	124.92	6605.41	123.55	6611.97	117.13	6618.52	112.97
6628.36	112.21	6641.48	112.18	6648.04	109.71	6657.87	102.91	6667.71	100.32
6680.83	98.84	6690.66	95.15	6693.94	92.69	6700.5	91.6	6880.85	91.6
6884.13	92.06	6897.25	98.12	6900.53	98.83	6907.08	103.41	6913.64	110.14
6920.2	115.89	6930.04	122.81	6936.6	124.38	6939.88	123.46	6946.43	123.64
6952.99	126.78	6962.83	126.65	6979.22	123.17	6985.78	123.09	6992.34	125.18
6995.62	125.37	7008.74	124.26	7018.57	121.84	7025.13	121.12	7041.53	114.59
7054.64	111.76	7077.6	111.23	7084.15	110.4	7097.27	110.17	7116.95	110.49
7123.5	111.1	7149.74	109.95	7162.85	109.97	7169.41	110.42	7182.53	110.25
7202.2	110.4	7218.6	109	7231.71	109.04	7241.55	109.5	7257.95	109.36
7264.5	108.89	7274.34	109.19	7287.46	108.79	7310.41	108.71	7320.25	109.99
7326.81	111.87	7343.2	114.77	7349.76	114.21	7369.44	110.24	7375.99	109.55
7389.11	113.18	7395.67	113.9	7408.78	113.42	7418.62	113.89	7431.74	113.95

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	72.16	.12	4884.18	.025	5124.18	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4703.45 5218.35 1510.38 1525.35 1543.94 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	4703.45	108.77	T
5218.35	7431.74	108.66	T

Left Levee Station= 72.16 Elevation= 125.77
Right Levee Station= 6592.29 Elevation= 126.34

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	120.08	Element			
Vel Head (ft)	0.11	Wt. n-Val.	0.120	0.076	0.085
W.S. Elev (ft)	119.97	Reach Len. (ft)	1510.38	1525.35	1543.94

Crit W.S. (ft)	96.46	Flow Area (sq ft)	47029.73	16649.70	11385.05	
E.G. Slope (ft/ft)	0.000365	Area (sq ft)	57714.56	16649.70	12069.80	
Q Total (cfs)	130000.00	Flow (cfs)	52332.48	61296.49	16371.03	
Top Width (ft)	6382.42	Top Width (ft)	4597.74	514.90	1269.77	
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)	1.11	3.68	1.44	
Max Chl Dpth (ft)	50.11	Hydr. Depth (ft)	10.23	32.34	8.97	
Conv. Total (cfs)	6807426.0	Conv. (cfs)	2740381.0	3209779.0	857265.7	
Length Wtd. (ft)	1522.90	Wetted Per. (ft)	4607.19	533.56	1273.59	
Min Ch El (ft)	69.86	Shear (lb/sq ft)	0.23	0.71	0.20	
Alpha	2.38	Stream Power (lb/ft s)	0.26	2.62	0.29	
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	182973.60	67288.02	212829.50	
C & E Loss (ft)	0.01	Cum SA (acres)	22603.19	2782.89	25297.38	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 168.3

INPUT
Description: Extended block obstruction, Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	101	9.84	101.04	36.07	100.56	52.47	102.76	68.87	107.15
91.83	113.83	98.38	116.48	124.62	124.51	134.46	125.28	144.3	124.83
167.25	117.43	180.37	112.81	186.93	112.17	203.33	111.53	213.17	111.95
229.56	111.56	252.52	112.06	275.48	111.49	311.55	111.92	327.95	111.72
350.91	111.86	357.46	112.28	393.54	111.82	406.66	112.04	432.89	111.7
446.01	111.27	482.09	111.76	491.92	111.19	498.48	111.7	508.32	110.69
518.16	111.15	528	110.34	544.4	110.3	564.07	110.85	580.47	110.45
590.31	110.92	603.43	110.8	613.26	111.22	636.22	111.22	649.34	111.78
672.3	111.23	688.69	111.39	695.25	111.01	714.93	111.07	734.61	111.68
741.17	111.3	783.8	111.75	790.36	111.43	800.2	111.94	806.76	111.6
823.15	111.94	832.99	111.35	862.51	111.97	888.74	112.03	898.58	112.46
937.94	111.98	947.77	112.87	964.17	112.24	977.29	112.74	1006.8	112.52
1026.48	112.77	1036.32	112.51	1049.44	113	1056	112.43	1075.67	112.44
1088.79	112.89	1108.47	112.31	1141.27	112.28	1180.62	112.9	1193.74	112.6
1219.97	112.95	1249.49	112.75	1256.05	113.12	1275.73	113.15	1318.36	113.82
1328.2	113.52	1370.83	113.6	1397.07	114.6	1413.47	113.84	1420.02	114.33
1456.1	114.08	1462.66	114.46	1485.62	114.4	1492.17	114.8	1498.73	114.27
1528.25	114.84	1538.09	114.33	1587.28	114.36	1593.84	113.88	1633.19	113.19
1646.31	113.76	1669.27	113.79	1718.46	110.04	1744.7	106.48	1757.82	105.89
1774.21	105.86	1790.61	103.67	1816.85	103.61	1843.08	103.83	1852.92	104.62
1866.04	103.74	1879.16	103.65	1902.12	104.24	1925.07	103.67	1957.87	103.64
2003.78	103.37	2023.46	103.72	2066.09	103.41	2085.77	104.06	2112.01	103.96
2125.12	104.33	2141.52	104.21	2151.36	103.7	2177.6	104.19	2193.99	103.92
2216.95	104.26	2226.79	103.84	2246.47	103.73	2259.58	104.5	2272.7	103.58
2289.1	103.81	2305.5	104.7	2321.9	104.56	2338.29	105.98	2348.13	104.61
2361.25	105.06	2371.09	104.03	2390.77	103.7	2397.32	104.78	2407.16	104.1
2417	105.44	2436.68	103.85	2456.36	104.46	2469.47	104.46	2476.03	103.72
2495.71	104.15	2518.67	105.11	2541.62	103.69	2564.58	103.72	2571.14	104.47
2600.66	103.39	2607.21	103.51	2649.85	103.36	2662.97	103.86	2685.92	103.2
2705.6	103.37	2718.72	103.95	2738.4	104.23	2787.59	105.99	2803.99	107.27
2820.38	106.89	2833.5	107.26	2849.9	107.06	2863.02	107.4	2869.58	107.1
2885.97	107.93	2899.09	109.67	2931.89	109.54	2941.73	107.3	2958.12	107.16
2977.8	107.39	2997.48	108.35	3013.88	108.51	3023.71	108.01	3036.83	108.64
3043.39	108.24	3072.91	108.47	3082.75	109.12	3095.86	109.33	3122.1	108.61
3138.5	108.71	3158.17	108.27	3184.41	109.34	3220.49	109	3233.6	109.46
3246.72	109.33	3259.84	109.96	3289.36	110.25	3295.91	109.67	3315.59	109.74
3325.43	110.39	3335.27	109.96	3358.23	109.74	3368.06	110.84	3384.46	110.98
3391.02	110.37	3410.7	111.86	3427.1	110.55	3446.77	110.86	3456.61	110.42
3473.01	105.54	3489.41	103.32	3502.53	102.75	3545.16	102.73	3577.95	103.84
3587.79	103.64	3643.54	105.64	3653.38	106.56	3659.94	106.47	3679.62	105.21
3715.69	105.31	3728.81	107.59	3745.21	108.04	3774.73	105.02	3787.84	104.35
3804.24	104.25	3817.36	104.6	3853.43	104.5	3866.55	104.1	3896.07	104.37
3912.47	104.73	3922.3	104.59	3938.7	105.05	3971.5	104.91	4001.01	105.92
4017.41	103.7	4033.81	102.69	4060.04	102.67	4073.16	103.06	4089.56	103.1
4105.96	103.76	4112.52	104.42	4148.59	105.51	4171.55	107.44	4187.94	107
4201.06	107.36	4230.58	107.01	4263.37	107.69	4266.65	107.04	4292.88	107.14
4306	106.66	4315.84	106.87	4355.19	106.41	4374.87	106.38	4381.43	106.74
4404.38	106.32	4420.78	106.97	4433.9	106.06	4447.02	106.39	4460.13	106.18
4466.69	106.58	4492.93	105.77	4506.05	106.44	4522.44	106.64	4548.68	106.29
4561.8	106.46	4568.36	107.3	4604.43	107.63	4637.22	108.53	4647.06	109.14
4670.02	108.62	4679.86	109.71	4702.81	110.9	4722.49	110.88	4732.33	111.46
4742.17	111.07	4765.12	111.85	4784.8	111.65	4794.64	112.08	4814.31	111.32
4827.43	111.21	4837.27	111.97	4856.94	111.85	4886.46	110.17	4902.85	108.59
4919.25	105.82	4932.37	107.27	4955.33	107.32	4965.16	110.2	4971.72	110.95
4984.84	109.58	4994.68	109.64	5004.52	106.72	5014.36	102.6	5020.91	101.09
5027.47	101.12	5043.87	103.71	5050.43	105.56	5060.27	105.63	5066.83	104.47
5073.39	101.49	5083.22	98.76	5089.78	97.56	5109.46	92.1	5116.02	88.6
5122.58	87.79	5124.58	86.12	5171.58	81.97	5191.58	81.02	5211.58	80.52
5241.58	80.52	5251.58	80.02	5271.58	80.32	5291.58	79.72	5301.58	80.02
5321.58	80.02	5331.58	79.52	5351.58	79.62	5381.58	79.02	5401.58	79.32
5411.58	81.02	5414.43	87.79	5420.99	88.61	5434.1	93.3	5443.94	96.34
5450.5	99.43	5463.61	100.72	5483.29	103.12	5496.4	103.81	5522.64	102.82
5558.7	102.81	5575.1	103.44	5584.94	104.76	5598.05	107.17	5607.89	105.54
5627.56	106.2	5670.19	105.87	5693.14	106.31	5706.26	107.45	5712.82	110.3
5716.1	110.81	5732.49	111.03	5755.44	110.1	5771.84	109.95	5834.14	109.95
5850.53	109.43	5870.21	110.11	5883.32	109.82	5909.55	110.16	5919.39	109.63
5952.18	109.59	5962.02	109.27	5984.97	109.34	5998.09	109.73	6014.48	109.23
6024.32	109.69	6057.11	109.51	6073.5	109.72	6106.29	109.31	6145.64	109.51
6155.48	110.02	6165.31	109.62	6207.94	109.76	6230.89	109.43	6244.01	109.99
6263.68	109.59	6273.52	110.49	6286.63	109.41	6319.42	108.89	6329.26	109.04
6352.21	108.48	6430.91	107.98	6450.58	108.32	6460.42	108	6483.37	108.48
6493.21	108.3	6503.05	108.99	6519.44	108.88	6529.28	108.41	6548.95	108.38
6565.35	108.79	6578.46	108.36	6591.58	108.99	6598.13	108.35	6611.25	108.7
6637.48	108.61	6647.32	109.14	6653.88	108.11	6673.55	108.05	6689.94	108.5
6703.06	108.48	6709.62	109.07	6722.73	108.5	6732.57	108.98	6748.97	109.19
6765.36	109.04	6775.2	108.41	6821.1	108.29	6840.78	108.49	6847.33	108.92
6863.73	108.48	6880.12	108.52	6903.08	109.39	6916.19	114.12	6922.75	117.42
6939.14	127.27	6942.42	127.71	6965.38	126.31	6978.49	126.2	6988.33	125.6
7001.44	126.45	7011.28	128.42	7017.84	128.57	7030.96	129.85	7037.51	129.38
7040.79	128.08	7050.63	121.2	7057.19	117.32	7067.02	114.16	7083.42	114.24
7089.98	112.67	7103.09	103.8	7106.37	101.13	7112.93	97.92	7119.49	92.79
7126.05	91.6	7293.27	91.6	7299.83	93.6	7309.67	103.46	7319.5	111.82

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 7326.06  113.48  7335.9  112.92 7342.46  113.67 7349.01  115.95 7358.85  120.27
 7368.69  125.53 7378.52  127.56  7381.8  127.36 7388.36  124.46  7398.2  125.59
 7421.15  126.41 7440.83  130.29 7457.22  127.63 7467.06  124.78 7473.61  121.89
 7480.17  120.57 7493.29  115.27 7512.96  113.37 7526.08   110.2 7542.47  110.19
 7549.03  111.16 7571.98  112.41 7598.21  112.65 7621.17  112.14 7640.84  112.18
 7653.96  111.69 7696.58  111.61 7706.42  111.25 7726.09   111.4    7772  111.25
 7791.67  111.68 7804.79  111.41  7834.3  111.61 7840.86  111.98 7857.25  111.55
  7896.6  111.93 7909.72  112.69 7926.11  112.42 7932.67   111.8  7958.9  110.64
 7972.02  111.69 7981.85  113.07 7988.41  114.65 7998.25  114.49 8004.81  112.97
 8027.76  111.56 8040.88  112.02 8060.55  111.95 8076.94  111.36 8086.78  111.66

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0      .2 5089.78      .2 5109.46    .066 5171.58    .015 5411.58    .066
 5443.94    .116

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4971.72 5598.05          1645.88    1675 1663.72             .1       .3
Left Levee      Station=  134.46      Elevation=  125.28
Right Levee     Station= 7030.96      Elevation=  129.85
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1658.06 4974.18  110.98 5737.23 6942.05  111.06

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            119.15    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.19    Wt. n-Val.                 0.200      0.103      0.116
  W.S. Elev (ft)            118.97    Reach Len. (ft)          1645.88    1675.00    1663.72
  Crit W.S. (ft)             99.09    Flow Area (sq ft)       35977.37   16997.22   10980.52
  E.G. Slope (ft/ft)      0.001177    Area (sq ft)            35977.37   16997.22   10980.52
  Q Total (cfs)           130000.00    Flow (cfs)              35061.07   75231.05   19707.88
  Top Width (ft)           6762.83    Top Width (ft)           4809.23    626.33    1327.27
  Vel Total (ft/s)            2.03    Avg. Vel. (ft/s)            0.97       4.43       1.79
  Max Chl Dpth (ft)          39.95    Hydr. Depth (ft)            7.48      27.14       8.27
  Conv. Total (cfs)       3789897.0    Conv. (cfs)             1022137.0  2193215.0   574544.9
  Length Wtd. (ft)         1661.36    Wetted Per. (ft)         4811.25     639.54    1330.08
  Min Ch El (ft)             79.02    Shear (lb/sq ft)            0.55       1.95       0.61
  Alpha                       2.92    Stream Power (lb/ft s)      0.54       8.64       1.09
  Frctn Loss (ft)             1.03    Cum Volume (acre-ft)    181349.30   66698.91   212421.00
  C & E Loss (ft)             0.04    Cum SA (acres)          22440.11    2762.91   25251.35


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 168

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  119.98   13.12  124.23   29.52  124.25    32.8  123.56    49.2  117.39
   55.76  115.33   78.72  106.72   88.56  105.09  101.68  103.86  114.81  104.47
  141.05  104.51  180.41  104.01  318.18  104.67  367.38  105.24  383.78   105.7
  403.46  105.67  442.82  105.98  452.66  105.79  488.74  106.05  511.71  105.96
  528.11  106.19  600.27  106.24  619.95     106  633.07  106.59  678.99  106.42
  685.55  105.71  695.39  105.63  705.23  106.55     761  106.25  783.96  106.39
  797.08  106.12   810.2  106.39  829.88  106.18     843  106.51  852.84  106.21
  888.92  106.56  931.57  106.08  957.81  106.54  990.61  106.43 1007.01  106.12
 1059.49  106.29 1105.41  106.04  1157.9  106.25 1177.58  106.58 1197.26  106.26
 1236.62  106.47 1275.99  105.99 1298.95  106.74 1318.63  106.57 1331.75  107.19
 1341.59  106.89 1377.67  107.45 1394.07   109.5 1403.91  109.57  1423.6   106.1
 1430.16  105.61 1449.84  105.64 1469.52  106.35 1479.36  105.76 1492.48  105.63
 1515.44  106.96 1535.12  105.85 1544.96  106.24 1584.33  105.27 1597.45  105.28
 1633.53   104.6 1640.09  103.72 1659.77  104.02 1666.33  104.69 1676.17   104.4
 1699.13  104.45 1705.69   103.8 1728.65  104.34  1738.5  103.96 1774.58  104.62
 1781.14  104.09 1794.26  104.51  1820.5  104.03 1846.74   104.2 1856.58  105.09
 1872.98  103.86 1892.67  104.26 1902.51     105 1909.07  104.56 1932.03  104.36
 1948.43  103.86 1958.27  104.26 1987.79   103.5 2014.03  104.26 2020.59  103.94
 2036.99  104.09 2046.84  103.67 2059.96  104.51  2102.6  104.41 2122.28  103.74
 2158.36  105.11 2171.48   105.3  2184.6  104.22 2194.44  104.59  2217.4  107.69
 2223.96  107.89 2243.64  106.66 2260.04  107.43 2269.88  106.27 2296.12  106.75
 2305.96  106.27 2322.36  106.29 2335.48  107.74 2345.32  107.98 2358.44  106.07
 2368.28   105.2  2381.4  106.06 2391.25  106.15 2401.09  106.99 2420.77  107.29
 2427.33  107.94 2440.45  107.32 2453.57   107.3 2499.49  107.84 2525.73  107.22
 2578.21  107.13 2614.29  107.65 2633.97   106.6 2643.81  104.73 2653.65  103.83
 2666.77  103.43 2686.45  103.46 2696.29  103.93 2735.65  103.32 2755.33  103.54
  2778.3   105.6 2784.86  105.44 2801.26  104.08 2817.66  103.83 2834.06  104.05
 2850.46  105.81 2866.86     107 2879.98  104.61 2902.94  103.49  2925.9  104.05
 2935.74   103.7 2955.42  104.05 2965.26  103.45 2994.78  103.67 3001.34  104.13
 3017.74  103.92 3037.42  105.26 3053.82  103.74 3076.78   103.6 3109.58  104.17
 3119.43  104.67 3132.55  103.82 3152.23  103.51 3198.15  103.69 3227.67   103.5
 3250.63  103.87 3270.31  103.39 3280.15  103.78 3306.39  103.92 3316.23  103.74
 3345.75  104.21 3388.39  104.53 3450.71  105.34 3470.39  106.43 3496.64  105.82
 3516.32  106.03 3522.88  106.83 3549.12  106.63 3562.24  107.43 3572.08  106.94
 3581.92  107.61 3591.76  107.47  3601.6  106.46 3631.12  106.36 3640.96  106.59
  3650.8  106.16  3683.6  106.48 3706.56  106.19  3732.8  106.24 3768.88  106.72
 3801.68  106.73 3827.92  107.34 3850.89  106.82 3893.53  107.45 3913.21  107.09
 3932.89  107.54 3982.09  107.53 4011.61  110.73 4024.73  110.96 4054.25  109.09
 4067.37  109.58 4073.93  109.13 4093.61  108.93 4110.01  110.69 4116.57   110.3
  4146.1  109.57 4152.66  110.18 4169.06  110.61  4178.9  112.05 4208.42  110.64
 4214.98  111.28  4244.5  111.21 4274.03  109.81 4296.99  110.84 4313.39  110.58
 4336.35  111.19 4342.91  112.32 4359.31  111.15 4369.15  111.19 4388.84  109.08
 4405.24  107.74 4415.08  107.58 4421.64  108.64  4444.6  109.55 4457.72  110.43
 4480.68  109.58 4503.65   108.3 4520.05  108.02 4526.61  107.16 4543.01  106.39
 4562.69  106.98 4569.25  106.63 4608.61   107.8 4618.45  109.18 4638.14   108.5
 4647.98  108.57 4667.66  110.09 4674.22  109.62 4684.06  110.42 4703.74   108.9
 4713.58  109.61 4736.54  109.14 4762.79  106.93 4782.47  108.93 4795.59  108.97
 4808.71   109.8 4818.55  109.29 4828.39   109.4 4841.51  107.35 4851.35  107.85
 4861.19   107.4 4890.72   109.2 4907.12  109.94 4916.96  108.77 4933.36  109.07
  4943.2  110.64  4959.6  111.04 4979.28  109.53 4995.68  110.59 5008.81   108.9
 5031.77  110.37 5058.01  110.72 5067.85  109.29 5074.41  110.98 5080.97   111.6
 5094.09  111.88 5103.93  111.17 5117.05  111.75 5130.18   111.2  5143.3  111.68
```

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 5166.26  111.86 5172.82  110.45 5182.66  105.31 5195.78   99.14 5205.62   96.98
 5218.74   96.26 5235.14   97.06 5251.55   99.33 5264.67  102.62 5271.23  103.28
 5284.35  106.32 5297.47  107.35 5307.31  107.12 5317.15  103.16 5333.55   92.67
 5340.11   89.12 5346.67   87.56 5366.67   85.11 5386.67    85.1 5394.67   76.98
 5404.67   76.54 5421.67   77.09 5469.67   77.84 5482.67   77.64 5494.67   77.94
 5508.67   77.34 5520.67   77.74 5538.67   77.57 5546.67   85.23 5566.67   85.14
 5626.67    85.2 5655.02   87.56  5658.3   87.59 5664.86   90.82 5668.14   91.47
 5684.54   91.03 5694.38   94.16 5704.22   94.28 5727.18   95.36 5733.74   95.25
 5753.41   93.19 5766.53   92.79 5786.21   94.35 5792.77   96.47 5809.16  102.82
    5819  108.67 5825.56   110.3 5832.12  110.56 5841.96  109.95 5855.07  110.08
 5894.42   108.8 5937.05  108.28 5982.96  108.46 6015.76  108.09 6045.27  108.46
 6064.95  108.48 6094.46  109.56 6114.14  109.32 6150.21   108.1 6169.88  108.28
 6186.28  108.09 6219.07  108.95 6228.91  108.55 6255.15  108.57 6284.66  107.55
 6307.62  107.12 6327.29  107.32 6343.69   107.8 6379.76  109.74 6399.44  110.06
 6428.95     111 6438.79   110.4 6448.62  110.83  6468.3  109.79  6484.7   109.6
 6491.26     109 6514.21  108.53 6533.89     109  6563.4  107.95 6583.08   108.6
 6596.19   108.3 6635.54  108.41 6648.66  108.08 6668.34  108.44 6691.29  108.06
 6707.69  108.27 6756.88  108.33 6763.44  108.55 6792.95     108 6815.91  108.14
 6855.26  107.05 6861.82  107.12 6894.61  106.15 6901.17  106.35 6940.52  105.25
 6986.43  104.88 6999.55  105.07 7019.22  104.17 7042.18  104.64 7074.97  104.56
 7088.09  104.86 7111.04  104.83 7137.28  106.01 7147.12  106.19 7166.79  107.45
 7193.03   110.8 7199.58  112.04 7209.42   112.9 7215.98  114.49 7222.54  119.18
 7225.82  120.57 7235.66  122.19 7245.49  124.78 7252.05  124.67 7258.61   123.6
 7265.17  123.94 7281.57  126.63  7291.4  128.65 7301.24  128.22 7304.52  127.34
 7314.36  122.48 7320.92  116.48  7324.2  114.78 7330.76  113.47 7347.15  112.42
 7353.71  109.33 7360.27  105.18 7376.67   91.63 7557.03    91.6 7560.31    93.4
 7566.87   99.25 7583.26  106.82  7593.1  112.39 7596.38  113.35 7616.06  113.51
 7632.45  119.62 7642.29  126.33 7648.85  129.15 7655.41  130.11 7661.97  130.08
  7671.8  128.35 7681.64  123.19  7688.2  121.25 7698.04  119.54 7720.99  114.48
 7727.55  114.41 7734.11  112.75 7743.95  108.47 7753.79  108.44 7763.62  110.99
 7770.18  111.04 7780.02  109.42 7793.14  109.33 7812.81  110.31 7822.65  109.52
 7835.77  107.32 7852.17  107.19 7865.28  106.68 7888.24  106.97 7901.35  107.47
 7943.99  106.06 7960.38  106.32 7980.06  108.44  7989.9  107.87 7999.73  105.94
 8006.29  105.61 8012.85  106.32 8029.25  106.06 8035.81  106.56 8045.64  105.49
 8062.04  104.59 8071.88  103.23 8111.23  105.07 8117.79  104.88 8127.63  105.81
 8140.74  105.45 8166.98  106.26 8176.82  106.01 8229.28  106.18 8235.84  105.76
 8265.36  106.09 8275.19  105.84 8288.31  106.54 8311.27  108.53 8324.38  108.01
 8363.74   107.6 8393.25  107.39 8429.32  107.48    8449  107.04 8465.39  107.39
 8481.79  108.22 8491.63  109.92 8498.19   112.8 8508.02  115.86 8517.86  116.41
 8530.98  112.51 8537.54  109.62  8544.1   108.3 8557.21  107.73 8567.05  108.62

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   29.52    .066 1597.45     .12 5394.67    .025 5546.67     .12
  7291.4    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5297.47 5832.12          1221.72  1587.5  1609.1             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5297.47  107.35       T
 5832.12 8567.05  110.56       T
Left Levee      Station=   13.12      Elevation=  124.23
Right Levee     Station= 7291.41      Elevation=  128.65

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            118.08    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                 0.095      0.099      0.120
  W.S. Elev (ft)            118.02    Reach Len. (ft)         1221.72    1587.50    1609.10
  Crit W.S. (ft)             98.92    Flow Area (sq ft)       52930.12   16120.51   10271.84
  E.G. Slope (ft/ft)      0.000384    Area (sq ft)            60949.59   16120.51   13911.42
  Q Total (cfs)           130000.00    Flow (cfs)              75390.41   45159.96    9449.61
  Top Width (ft)           7173.39    Top Width (ft)           5249.95     534.65    1388.80
  Vel Total (ft/s)            1.64    Avg. Vel. (ft/s)            1.42       2.80       0.92
  Max Chl Dpth (ft)          41.48    Hydr. Depth (ft)           10.08      30.15       7.40
  Conv. Total (cfs)       6635506.0    Conv. (cfs)             3848104.0  2305071.0   482330.3
  Length Wtd. (ft)         1395.43    Wetted Per. (ft)         5262.38     551.19    1390.99
  Min Ch El (ft)             76.54    Shear (lb/sq ft)            0.24       0.70       0.18
  Alpha                       1.48    Stream Power (lb/ft s)      0.34       1.96       0.16
  Frctn Loss (ft)             0.28    Cum Volume (acre-ft)    179518.10   66062.18   211945.60
  C & E Loss (ft)             0.01    Cum SA (acres)          22250.07    2740.59   25199.48


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 167.70*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  121.54    6.56  123.67   23.96  120.85   31.28 118.349   53.08  111.28
   62.38  108.84   74.79  104.81   80.99  103.78   87.18  104.03  100.52  103.74
   115.1  104.24   136.8     104  174.02  103.87  217.43   103.9  245.34  104.14
  330.23  104.33  363.18  104.61  372.49  104.54  397.29  104.91  440.71  105.07
  472.92  104.95  552.97  105.22  598.86  105.23  620.57  105.37  650.41  105.25
  664.33  105.58  694.99   105.7  713.05  105.57  726.01  104.98  735.32  104.06
  747.71  104.83  794.23  104.41  815.94  104.65  838.35  104.37  873.15   104.4
  887.07  104.67  902.77  104.47  935.79  104.69  981.04  104.42 1008.89   104.7
 1061.09  104.47 1116.77  104.62 1165.49  104.44 1242.06  104.85 1262.94  104.69
  1304.7  104.91 1346.48  104.77 1370.84  105.22 1391.72  105.26 1405.64   105.7
 1416.08  105.66 1454.36  106.05 1471.76  107.05  1482.2  107.15 1503.09  105.49
 1510.05  105.25 1530.93  105.27 1551.81  105.69 1576.17  105.29 1600.54  105.98
 1621.42  105.44 1631.86  105.64 1673.63  105.22 1692.69105.1844 1725.83  104.89
 1732.79  104.44 1753.67  104.58 1760.63  104.93 1795.43  104.88 1802.39  104.57
 1826.75  104.79  1837.2  104.62 1875.49  105.03 1882.45  104.78 1896.37  104.92
 1924.21  104.72 1952.05   104.8 1962.49  105.24 1979.89  104.62 2000.78  104.82
 2011.22  105.23 2059.94  104.67 2070.38  104.87  2101.7  104.48 2129.54  104.88
 2164.36  104.67 2178.28   105.1 2223.52     105  2244.4  104.77  2296.6  105.51
 2310.52  105.01 2320.96  105.18 2345.32  106.69 2352.28   106.8 2373.16  106.23
 2390.56  106.66    2401  106.11  2428.5  106.28 2456.69  106.13 2470.61  106.87
 2481.05  106.99 2505.41  105.61 2529.78  106.03 2540.22  106.52  2561.1   106.7
 2568.06  107.04 2605.25  106.69 2644.62  106.91 2672.46  106.65 2728.14  106.62
 2766.43  107.02 2787.31   106.6 2797.75  105.67 2808.19  105.22 2828.52  105.03
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 2853.43  105.81 2884.34  105.66 2916.07  106.13 2940.44  107.24  2964.8  106.48
 2992.88   106.5 3005.28  107.04  3039.4   107.8 3048.69   106.5    3058  106.99
 3073.51  106.15 3097.05  106.36 3113.82  106.05 3128.37  106.24 3138.81  105.99
 3177.09  106.37 3194.49  106.26 3215.37  106.84 3232.77  106.07 3257.13  106.04
 3291.93  106.28 3302.38  106.55  3316.3  106.15 3368.11  105.54 3399.11  104.63
 3417.71  104.88 3441.59  104.87 3462.47  104.36 3472.91  104.46 3511.19  104.24
 3544.86  104.53 3578.97  104.51 3613.08  104.88 3653.88  105.11 3674.76  105.48
 3702.61  105.18 3723.49  105.35 3730.45  105.77 3758.29  105.98 3772.21  106.51
 3782.65  106.24 3793.09  106.51 3813.97  105.97 3842.56  105.51 3889.07  105.38
  3941.8  105.78  3957.3  105.72 3985.21  106.03 4026.26   106.1  4054.1  106.44
 4093.75  106.09 4115.45  106.56 4130.96  106.64 4144.59  106.39 4165.47  106.64
 4192.99  106.73 4217.67  106.45    4249  108.24 4262.92  108.36 4289.12  107.35
 4308.16  107.39    4336  106.93  4353.4  107.92 4391.69  107.14 4410.06  107.51
 4426.49  108.45 4457.81  107.92 4478.29  108.17 4496.09  108.87 4534.11  108.21
 4549.62  109.04 4562.03  110.23 4571.33  109.97 4600.51  111.78 4628.35  111.51
 4639.55  110.32 4658.16  109.76 4670.56  108.65 4689.16  106.62  4708.4  106.45
 4729.49  106.78 4771.05  105.92 4788.46  106.01 4803.91  105.45 4812.82  105.55
  4833.7   106.5 4844.23  106.64 4853.53  107.33 4859.73  107.15 4890.74  108.64
 4900.05  107.06 4909.35  106.24 4924.85  106.21 4945.07  107.14 4952.03  106.98
 4962.47  107.57 4974.47  107.42 4983.35  106.91 5005.49  107.63 5018.15  107.24
    5046  105.17 5066.89  105.89 5080.81  105.64 5105.17  106.24 5115.61  106.95
 5139.97  106.77 5157.44  105.56 5163.64  105.77 5176.05  107.44 5197.76  108.12
 5203.95  107.52 5213.26  105.43 5234.97  103.34 5265.98  101.47  5275.7  101.24
  5293.1  101.73 5307.03  100.78  5331.1  102.02 5352.81  103.38 5369.68  103.46
 5376.64  104.44  5383.6  104.76 5435.81  103.97 5455.15  104.75 5474.09   104.9
 5481.05  103.91 5495.46   99.55 5505.41   97.21 5515.85   96.14 5529.77   95.85
 5547.17    96.5 5557.4297.44787 5564.58   98.11  5579.2  100.76 5594.71  100.96
 5613.31  103.76 5621.02  103.32 5628.73  101.02 5646.73   91.99 5651.87   90.45
 5667.55   87.55 5683.23   86.46 5691.4481.09632 5692.9180.35841 5697.33   78.14
 5709.96   78.39 5722.59   78.07 5735.22   78.44  5761.9    78.3 5771.83   78.53
 5808.26   78.28 5814.88   81.99 5817.3981.92387 5823.61   81.76  5881.1   81.63
 5907.28   82.53 5915.43    84.4    5929   84.15 5937.25    85.7 5945.9189.91332
 5947.63   90.75 5955.92   91.22 5972.48   95.04 5986.01   95.27 5996.87   95.94
 6005.61   97.32 6013.16   97.66 6026.31  100.84 6032.16  102.86  6040.3  106.82
 6051.17  109.88 6053.92   110.2 6059.42  109.42 6067.67  109.31 6073.18     110
 6086.94  109.11 6092.44  107.84 6100.69  108.61 6119.95  108.85 6125.46  108.55
 6147.47  108.47 6155.73  107.91 6163.99  109.11 6205.26  109.13 6237.76   108.8
 6307.08  107.47 6339.18  107.58 6375.69  107.95 6422.65  107.59  6430.9  107.25
 6450.17  107.15 6472.18  106.33 6502.45  106.22 6529.83  106.43 6542.01  106.13
 6565.74  106.08 6596.01  105.68 6610.97  105.33 6639.37  105.04  6663.7  105.12
 6683.99  105.37 6728.61   106.3 6750.11  106.42 6789.46  107.01 6801.63  106.76
 6813.79  107.02 6838.14  106.47 6858.42  106.32 6866.54  105.99 6894.93  105.74
 6919.27  106.14 6955.78  105.64 6980.12  106.11 6996.34  106.01 7045.02  106.05
 7061.25  105.89 7085.59  106.28 7113.98  106.48  7127.1  106.85 7160.12  106.74
 7195.12  106.82 7203.23  106.98 7239.74  106.96 7292.21  107.55 7311.47  108.26
 7347.24  108.79 7373.61  108.93 7399.52  108.78 7429.79  108.92 7479.08  108.38
 7495.31  108.49 7519.64  107.78 7548.12  108.01 7561.88  107.75 7588.61  107.61
 7633.22  107.67 7669.19  108.28 7682.96   108.3 7707.72  109.18 7718.73  110.15
 7740.75  111.54 7746.25  112.49 7763.04  117.16 7775.21  120.81 7779.28  121.65
 7787.38  121.91 7799.54  123.38 7807.66  123.64 7815.77  123.18 7837.07  123.77
 7842.57  124.75 7854.22127.9321 7861.84  126.29 7875.63  119.17 7884.67  116.53
 7896.81  111.69 7905.95  108.95 7919.74  106.27 7928.01  102.48 7941.32   98.35
 7961.55   91.57 8101.67   91.56 8115.46   92.09 8137.51   91.98 8145.78   91.56
 8178.86   91.56  8184.1   91.77 8196.25   95.93 8216.47   99.98 8222.97  101.91
 8228.61   104.4 8239.51   107.8 8253.29  110.24 8256.94   110.5 8277.17  114.56
 8289.31  118.17  8297.4  119.62  8305.5  120.15 8313.59  119.94 8325.72  118.83
 8337.86  116.15 8349.78  114.26 8363.56  113.47 8374.58  112.37 8382.86  111.97
 8394.51   112.8 8402.61  112.08 8414.75  109.83 8426.89  109.62 8439.02  110.71
 8447.12   110.7 8459.26  109.98 8499.72  110.53 8511.86  110.01 8528.05  108.73
 8564.46  108.31 8592.79  108.36 8608.97  108.62 8639.23  108.12 8661.58  107.23
 8681.81  107.21 8708.15  108.66 8727.44  107.22 8738.46  106.99 8746.55  107.34
 8766.79  107.22 8774.88  107.51 8793.61  106.53 8801.87  107.23 8819.39  106.45
 8834.96  106.62 8867.95  107.43 8876.04  107.43 8888.18  108.05 8917.65  108.41
 8936.95  109.17 8964.52  109.31 8972.79  108.58 8983.82  108.22 8994.85  108.47
 9003.11  108.04 9021.71  107.75 9047.22  108.02 9070.26  107.91 9086.45  108.24
 9114.78  109.32 9130.96  109.16 9149.22  109.29 9165.75  110.17 9198.83  109.98
 9253.97  110.37 9267.76   111.1 9281.54  110.88 9295.32  112.52 9300.84  112.67
 9311.86  111.72 9322.89  111.42 9337.33  112.75 9357.56  115.93  9369.7  116.45
 9385.89  114.54 9393.98  113.24 9402.08  112.87 9418.25  113.16 9430.39  113.69

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   23.96    .066 1725.83     .12 5628.73    .025 6026.31     .12
 7854.22    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5613.31 6051.17          1221.72  1587.5  1609.1            .1       .3
Left Levee      Station=    6.56      Elevation=  123.67
Right Levee     Station=  7854.7      Elevation= 128.295

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 167.4

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  123.11   22.96  116.06   32.79  112.43   49.19  107.69   59.03  106.09
   72.15  102.41   78.71   101.6   85.26  103.02   91.82  103.43  114.78     104
  137.73   103.5  177.09  103.61   190.2  103.86     223  103.64  252.51  103.99
  278.75  103.86  304.98  104.06  347.61  103.99  377.13  104.19  386.97  103.95
   413.2  104.19  419.76  104.04  459.11  104.33  482.07  104.11  527.98   104.1
  547.66  104.25  626.36  104.24  649.32   104.5  688.67   104.5  728.02  104.91
   747.7  104.72  760.82   104.3  770.66  102.07  783.77  103.14  813.29  102.95
  832.96  102.55  855.92  102.96   875.6  102.61  918.23  102.63  934.63  102.89
  947.74  102.68  990.37  102.84 1036.29  102.74 1055.96  102.89  1082.2  102.74
  1177.3  102.95 1200.26  102.78 1249.45  102.91 1282.24  103.12 1351.11  103.13
 1393.74  103.55  1400.3  103.45 1456.05  103.79 1492.12  104.45  1528.2  104.66
 1551.15   104.6 1570.83  104.89 1610.18  104.88 1633.14  105.03 1659.37  104.95
  1718.4  105.04 1728.24  105.15 1816.78  105.19 1839.74   105.1 1905.33  105.37
 1918.44  105.22 1984.03  105.47 2006.99  105.24 2023.38  105.42 2105.37  105.36
 2144.72  105.61 2154.56  105.49 2233.26  105.44 2292.29  105.71 2334.92  105.49
 2374.27  105.87 2413.63  105.62 2430.02  105.83 2475.93  105.68 2531.68  105.95
  2561.2  105.81 2567.76  105.96 2643.18  106.02 2669.41   105.9 2692.37  106.26
 2705.49  106.04 2715.33  106.36 2748.12  105.97 2777.63  106.11 2784.19  105.95
  2862.9  106.25 2872.73   106.1 2905.53  106.18 2931.76  106.59 2984.23  106.62
 3000.63   107.4  3020.3  107.99 3043.26  107.85 3069.49  108.68 3102.29  108.88
 3121.96  108.72 3141.64   109.2 3158.04  109.04 3171.15  109.46 3180.99  108.92
 3197.39   108.7 3207.23  109.46 3217.06   108.4  3226.9  109.82  3243.3   108.8
```

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 3279.37  108.61 3285.93   108.3 3341.68  108.77 3358.08  108.53 3377.75  108.62
 3397.43  108.37  3449.9  108.51 3459.73  108.34 3515.48  108.54 3554.84  107.45
 3571.23  106.34 3587.63  105.66  3607.3  106.25 3620.42  106.17 3659.77  105.21
 3699.13  104.72 3741.76  104.83 3777.83  104.56  3813.9  104.91 3827.02  104.77
  3846.7  105.04 3886.05  104.41  3941.8  104.74 3948.36  105.01 3984.43  105.63
 4013.94   105.3 4033.62  105.59 4056.57  104.66 4086.09  104.62 4105.76  104.39
 4161.52  105.34 4177.91  105.14 4207.43  105.42 4240.22  105.37  4259.9  105.55
 4305.81  105.53 4322.21  105.14 4345.16  105.79 4361.56  105.95 4368.12  105.58
 4384.52  105.81 4414.03  105.65 4427.15  105.93 4450.11  105.29 4469.78  105.75
 4512.42  105.76 4528.81   105.3 4538.65  105.51 4555.05  105.01 4564.89  105.31
 4581.29  104.84 4607.52  105.37 4633.76  104.74 4656.71  104.56 4663.27   104.9
 4686.23  104.79 4699.35  105.24 4728.86  105.09 4741.98  106.49 4771.49  106.66
 4787.89  106.33 4804.29  107.34 4817.41  109.78 4827.25  109.31 4843.64  110.91
  4866.6  111.44 4879.72  112.23 4886.27  111.96 4899.39  110.58 4919.07  111.12
 4932.19  109.62 4938.75  108.18 4951.86  104.41 4958.42  103.75 4984.66  102.97
  4994.5  103.37 5004.34  103.13 5046.97  103.63 5063.37  104.26  5073.2  104.12
 5099.44  105.77 5115.84  106.55 5125.68  107.66 5132.23  107.13 5151.91  108.31
 5158.47  108.98 5165.03  108.38 5174.87  105.17 5184.71  103.84  5201.1   103.8
  5233.9  104.41 5253.57  105.29 5269.97  104.65 5286.37  105.87 5302.77  105.22
  5312.6  104.35 5335.56  103.04 5348.68  102.95 5368.36  102.22 5378.19  102.13
 5388.03  102.74 5417.55  106.27 5430.67  105.58 5447.06  103.32 5453.62  103.38
 5466.74     106  5489.7  106.36 5496.25  105.63 5506.09  102.03 5519.21    99.3
 5529.05    96.4 5552.01   93.12 5561.84   92.71 5578.24   93.09 5604.48   92.62
 5630.71   93.69 5653.67   96.12 5663.51   96.51 5670.07   97.57 5683.18   98.06
 5702.86   97.09 5715.98   97.23 5725.82   96.65 5752.05   96.81 5761.89   97.78
 5771.73   98.12 5784.85    97.9 5804.52   95.55 5817.64   95.22 5847.16   95.49
 5870.11   96.35 5883.23   97.31 5893.07   98.84 5899.63   98.61 5909.47   96.62
 5916.03   97.01 5929.14  100.17 5942.26   98.65 5948.82   97.09 5955.38   93.85
 5971.78   88.99 5984.89   87.08    5990   79.74    6000   79.74    6010   78.84
    6020   79.34    6040   78.94    6060   79.34    6080   78.94    6090   78.34
    6140   78.04    6160   77.34    6180   77.24 6188.22   87.08 6194.78   87.56
  6207.9   95.18 6227.57   99.17 6234.13  101.01 6243.97  100.96 6250.53   101.6
 6260.37  104.37 6270.21   109.2 6273.49  109.98 6280.05  108.69 6289.88  108.64
 6296.44  109.97 6312.84  108.33 6319.39  105.93 6329.23   107.7 6339.07  108.39
 6352.18  108.68 6358.74  108.22 6384.97  108.32 6391.53  107.06 6394.81   107.3
 6404.65  109.78 6424.32  110.09 6453.83  109.91 6473.51  109.61 6539.09  108.01
 6558.76  107.02 6575.16  106.56  6614.5  106.68 6660.41  106.31  6693.2  106.32
 6699.76  106.07 6712.88  106.48 6722.71  106.02 6745.67  106.16  6771.9   104.4
 6801.41  104.29 6807.97  104.08 6837.48  103.96 6860.43  103.64 6883.38  103.59
  6896.5  103.28 6919.45   103.4 6935.85  103.12 6978.48  102.93 7050.62  102.93
 7067.01  102.75 7093.24  103.04 7103.08  102.82 7132.59  102.91 7185.05  103.26
 7267.03  102.86 7306.38   103.3 7342.45  103.27 7388.35  103.72 7424.42  103.76
 7470.33  103.66 7496.56  103.98 7539.19  104.96 7552.31   105.5 7591.65  105.19
 7624.44  105.23 7667.07  105.64 7719.54  106.37 7729.37  106.98 7749.05  107.49
    7772  109.35 7814.63  110.99 7853.98  111.64 7876.93  111.79    7913  112.64
 7922.84  112.31 7939.23  112.33  7975.3  111.83 7985.14  112.04 8014.65  111.39
    8054  111.39 8070.39  110.89 8080.23  110.94 8122.86  110.39 8168.76  110.55
 8181.88  110.28 8198.27   110.5 8214.67  110.15 8224.51  110.41 8244.18  110.33
  8257.3  111.15 8270.42  111.01 8283.54  111.34 8290.09   112.7 8303.21  118.12
 8309.77  119.83 8319.61  119.89 8329.45  122.19 8339.28  121.63 8355.68  122.04
 8365.52  122.79 8385.19  122.71 8398.31  121.85 8404.87  123.08 8411.43  125.99
 8417.99  127.94 8421.27  127.31 8427.82  124.12 8437.66  115.93 8444.22  112.24
 8450.78   110.6 8460.62  110.53 8467.18  109.44 8480.29  104.49 8496.69   99.84
 8506.53   93.64 8516.37   91.51 8713.12   91.51 8729.52   92.58 8755.75   92.35
 8765.59   91.52 8804.94   91.52 8821.34   92.61 8834.46   92.59 8850.85   93.18
 8857.41   94.02 8867.25   97.52 8877.09  102.21 8893.48     107 8909.88  108.82
 8929.56  109.95 8955.79  110.19 8975.47  109.36 8998.42  109.05 9008.26   107.8
 9024.66  108.38 9037.77  108.15 9047.61  108.82 9057.45  111.09 9077.12  111.56
 9083.68  111.23 9119.76   110.3 9142.71   110.6 9165.67  111.14 9224.69  110.06
 9254.21  109.87  9270.6     110    9287  109.74 9332.91   109.8 9352.59  109.58
 9378.82  108.41 9401.78  108.08 9424.73  108.41 9434.57  108.97 9441.13  108.25
 9457.52  108.03 9464.08  108.39 9496.88  108.33 9523.11  108.54 9536.23  107.86
 9546.06  109.64 9578.86   109.7 9585.42  109.43 9608.37  109.48 9647.72  110.23
 9664.12  111.08 9683.79  111.04 9706.75  112.08 9713.31  111.99 9732.98  112.65
 9739.54  112.56 9749.38  111.08  9762.5  110.34 9775.62   110.8 9785.45  109.93
 9801.85  109.68 9837.92  110.04 9900.23  109.91 9946.14  110.41 9959.26  110.72
 9978.93  112.6210018.28  112.4710034.68  112.87 10047.8  112.8610083.87  113.28
10100.27  114.8510116.66  114.66 10126.5  116.0810133.06  117.8210139.62  118.02
10152.73  115.7710165.85  114.7210182.25  115.5810195.37  115.6210224.88   116.6
10234.72  116.3910254.39  116.9910267.51  118.0510280.63  118.6610293.74  118.77

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .106 5870.11    .106 5929.14    .066    5990    .015 6188.22    .066
 6273.49     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5929.14 6270.21          1756.68    2500 2391.12             .1       .3
Left Levee      Station=       0      Elevation=  123.11
Right Levee     Station= 8417.99      Elevation=  127.94
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0  3020.3  107.99 6296.4410293.74  109.97

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            117.56    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.18    Wt. n-Val.                 0.106      0.041      0.130
  W.S. Elev (ft)            117.38    Reach Len. (ft)         1756.68    2500.00    2391.12
  Crit W.S. (ft)            102.41    Flow Area (sq ft)       64989.19   10720.50   14398.24
  E.G. Slope (ft/ft)      0.000214    Area (sq ft)            64989.19   10720.50   14398.24
  Q Total (cfs)           130000.00     Flow (cfs)             66119.77   54974.43    8905.79
  Top Width (ft)           8282.76    Top Width (ft)          5910.48     341.07    2031.21
  Vel Total (ft/s)            1.44    Avg. Vel. (ft/s)           1.02       5.13       0.62
  Max Chl Dpth (ft)          40.14    Hydr. Depth (ft)          11.00      31.43       7.09
  Conv. Total (cfs)       8876346.0    Conv. (cfs)             4514631.0  3753631.0   608083.6
  Length Wtd. (ft)         2165.80    Wetted Per. (ft)        5918.46     355.73    2032.74
  Min Ch El (ft)             77.24    Shear (lb/sq ft)           0.15       0.40       0.09
  Alpha                       5.61    Stream Power (lb/ft s)     0.15       2.07       0.06
  Frctn Loss (ft)             0.42    Cum Volume (acre-ft)    175855.80   65082.64   210774.40
  C & E Loss (ft)             0.03    Cum SA (acres)          21937.06    2708.67   25073.02


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 167
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INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.83   26.24   114.8   42.63  108.97   52.47  106.51   65.59  105.42
   75.43  102.02   85.26  102.05   91.82  103.28  108.22  103.89  131.17  103.17
  173.81  103.34  216.44  103.83  242.67  103.88  288.58  103.27  298.42  101.25
   318.1  102.14  337.78   101.7  370.57  101.76  386.97  102.09  400.08  101.68
  452.55  101.78  472.23  102.25  485.35  102.01   508.3  102.54  534.54  104.48
   541.1  104.03  587.01  104.55  623.08  104.04  639.48  104.43  649.32  104.12
  682.11  104.32  718.18  104.04   731.3  104.64  741.14  104.18  750.98  104.64
  760.81  103.62  767.37   104.1  787.05  104.01  803.45   104.5  823.12  104.56
  832.96  104.16  885.43  103.85  928.06  104.15  957.58  103.84 1026.44  103.85
  1049.4   104.4 1062.52  104.05 1095.31  104.14 1134.66  103.87 1170.74  104.55
 1187.13  104.21 1233.04  104.28 1242.88  104.91 1249.44  104.42 1311.75  104.12
 1337.98  104.87 1360.94  104.37 1380.61  105.06 1400.29  104.08 1406.85  104.53
 1436.36  104.26 1459.32  104.44 1482.27  104.25 1511.79  104.64 1534.74  104.38
  1541.3   104.7 1560.98  104.44 1570.82  105.01 1583.93  104.54 1597.05  104.96
 1613.45  104.48 1646.24  105.01 1662.64  104.53 1672.48  104.86 1695.43  104.53
 1701.99  105.04  1747.9  104.59 1757.74  104.85 1777.42  104.51  1859.4  104.63
 1882.36  104.31 1898.75  105.04 1921.71  104.42  1954.5   104.7 1964.34  104.01
  1970.9  104.38 2013.53  104.11  2082.4  104.44 2092.23  104.05 2102.07  104.57
 2125.03   104.2 2138.14  104.54 2187.33  104.57 2203.73  104.21 2220.13  104.63
 2236.52  104.31 2252.92  104.65 2315.23  104.36 2328.34  104.61 2344.74  104.28
 2364.41  104.95 2393.93  104.49 2459.51  104.62 2469.35  104.37 2489.03  104.71
 2498.87  104.36  2525.1  104.39 2554.61  105.27 2571.01  104.52 2590.69  104.79
 2623.48  104.39 2639.87  104.85 2666.11  104.65 2689.06   104.9 2731.69  104.62
 2744.81  104.97 2774.33  104.68 2790.72  105.03 2823.51  104.84 2875.98   105.4
 2885.82     105 2954.69  104.96 2974.36  105.31 2994.04  104.89 3003.88  105.25
 3036.67  104.92 3089.14  106.11 3102.25  108.12 3121.93  107.57 3148.16  107.39
 3180.96  107.58 3203.91  107.45 3249.82  107.63 3292.45  107.44 3351.48  107.64
 3397.39  107.46 3423.62  107.71 3462.98  107.48 3508.89  107.77 3544.96  107.62
 3676.13  107.51 3695.81  107.65 3735.16   107.5  3807.3   107.7 3833.54  107.14
 3856.49  107.64 3869.61   108.7 3876.17  110.64 3882.72  111.34 3892.56  110.01
 3915.52  109.85 3928.64  108.74 3974.54  107.69 4000.78  107.99 4017.18  107.64
 4040.13  108.22 4069.64  107.93 4089.32  108.29 4102.44  107.52 4112.28  108.46
 4131.95  108.56 4158.19  107.66 4174.58  107.92 4207.37  107.94 4230.33     109
 4246.73  107.85  4266.4  108.35 4305.75  107.87 4315.59   108.2 4341.82   108.2
 4384.46  107.74 4413.97  107.87 4427.09  107.64 4443.48  108.09 4476.28  108.27
 4489.39  107.83 4495.95  108.24 4525.46  107.83 4571.37  107.89 4584.49  107.57
  4630.4  107.73 4705.83  107.59  4741.9  107.99 4814.04  107.52    4837  107.84
 4886.19  107.65 4896.02  107.81 4951.77  107.64 5004.24  107.91 5023.92  107.67
 5063.27  107.99 5073.11  107.65  5089.5  107.92 5128.85  107.91 5171.49  107.62
 5191.16  107.96 5305.94  107.56 5325.61  107.88 5394.48  107.97 5407.59  108.62
 5414.15  109.75 5430.55  108.73 5437.11  104.44 5443.67   98.64 5450.22   95.33
 5460.06    93.6 5479.74   92.67 5489.58   86.75 5529.58   81.14 5534.58   73.88
 5560.58   73.18 5583.58   71.78 5604.58   71.68 5616.58   72.69 5628.58   71.48
 5639.58   71.28 5650.58   72.28 5682.58   72.38 5695.58      74 5705.99   86.72
 5712.51   87.78 5719.02    90.4 5732.06   97.07 5745.09  101.08 5758.12  103.72
 5774.41  103.26 5797.22  100.95 5810.26  101.45 5816.77  100.72 5833.07   96.83
 5849.36   96.58 5868.91   95.79 5917.78   98.36 5934.08  100.86 5953.63  106.41
 5960.14   107.6 5979.69  107.06 5995.98  108.74 6018.84  108.04 6038.52  109.77
 6061.48  109.68 6084.44  108.34 6097.56  108.12  6107.4  106.75 6136.93   106.9
 6159.89  105.92 6173.01  105.95 6182.85  103.55 6192.69  104.85 6199.25   104.7
 6205.81   103.1 6232.06  101.51 6248.46  102.04 6261.58  101.59 6277.98   99.35
  6291.1   98.48  6307.5   98.48 6327.18   97.84 6340.31   96.49 6356.71   95.86
 6376.39   96.75 6402.63   95.96 6415.75    96.7 6425.59   99.44 6441.99   98.34
 6451.84   96.99  6474.8  100.27 6484.64  100.29 6501.04  101.26 6517.44   97.77
 6527.28   97.59 6543.68   94.85 6566.65    94.5 6576.49   95.02 6609.29   94.84
 6619.13    96.3 6632.25  101.04 6642.09  103.76 6651.93  104.77 6661.77  106.65
 6681.46  107.17 6704.42  105.17 6733.94  104.45 6743.78  105.43 6753.62  107.99
  6773.3  109.85 6783.14  110.13 6812.67  109.77 6819.23  109.24 6842.19  108.95
 6858.59  109.48 6874.99  109.52 6891.39  111.44 6904.52  110.05 6917.64  106.75
 6930.76  106.34 6943.88  107.48 6963.56  105.86 6976.68  106.01 6986.52  106.99
 7012.77  105.38 7029.17  105.56 7039.01  106.42 7045.57  104.84 7052.13  101.34
 7065.25   99.64 7084.93      99 7104.61    99.4 7117.73   98.86 7130.86   99.28
 7176.78   99.09 7186.62   99.53 7199.74   99.12 7212.86  100.31 7248.95   99.15
 7268.63  100.15 7281.75   99.31 7288.31   99.64 7301.43  101.52 7307.99  103.55
 7317.83  104.47 7330.95  104.18 7340.79  102.71 7353.92  101.95 7399.84  101.59
  7422.8  101.73 7445.76   101.4 7465.45   98.96 7485.13   98.99 7501.53   99.95
 7524.49  102.22 7531.05  102.51 7547.45  101.45 7563.85   99.14  7573.7  101.22
  7606.5  100.52 7619.62  100.96  7639.3   99.96 7649.14   98.82 7675.38  100.12
 7685.23   99.88 7704.91  100.39 7724.59   99.58 7731.15  100.02 7747.55    99.4
 7763.95   99.84 7777.07  102.05  7806.6  102.89 7829.56  102.98 7852.52  102.55
  7888.6  103.34 7898.44  102.75 7931.25  102.56 7947.65  102.94 7960.77   99.05
 7990.29   99.36 8003.41  101.18 8019.82  100.72 8042.78   99.48 8085.42   99.92
 8118.22  100.53 8144.47   99.55 8154.31  100.28 8160.87   99.58 8200.23   99.75
 8213.35   99.23 8233.04    99.2 8265.84   99.78 8275.68   99.17 8324.88   98.89
 8364.25   99.76 8374.09    98.9 8426.57   99.41 8449.53   99.03 8482.34   99.43
 8502.02   100.3 8518.42   99.14 8541.38  100.04  8570.9   99.56  8587.3    98.9
 8633.23   98.72 8702.11   98.75 8734.92   99.08 8744.76   99.54 8774.28   99.21
 8866.13   99.01 9026.86  100.12  9053.1  100.66 9072.79  107.18 9082.63  108.33
 9099.03  108.81 9151.51  108.91 9167.91  109.57 9200.72  109.04 9230.24   109.6
 9279.44  109.72 9305.68   109.4 9354.89  109.49 9407.37  109.03 9413.93  107.29
 9427.05   106.6 9446.74  107.75 9509.06  107.78 9532.02  107.58 9568.11   105.9
 9581.23  105.83 9594.35  104.99 9620.59  104.97 9630.43  104.23 9640.27  104.75
 9669.79  104.07 9725.56  104.64 9738.68   104.6 9755.08  105.93 9781.32  108.74
 9817.41   110.7 9837.09  112.21 9843.65  113.19 9856.77  117.94 9869.89  124.18
 9879.73  125.15 9886.29  127.26 9902.69  129.53  9919.1  136.31 9938.78  138.32
 9945.34  137.57  9951.9  133.17 9965.02  122.95 9974.86  116.53  9984.7  113.52
 9994.54 113.1410004.38 113.7310007.66 112.3810024.06   98.2110030.62   94.94
10043.75   91.6310047.03   91.4410211.04   91.44 10217.6   93.2410227.44   99.81
10240.56 101.7610247.12 106.0410260.24 112.1410263.52 112.7910296.33 113.44
10312.73 114.4410319.29  116.310332.41 117.0310352.09 113.0810365.21 114.57
10394.74   116.3 10401.3 114.5610407.86 114.0610427.54 115.7110443.94 116.14
10473.46 115.7410480.02 114.4410489.86 109.2910502.98 107.6810509.54 107.52

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   26.24    .066 5529.58    .025 5712.51    .066 9938.78    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5414.15 5995.98          1855.62 2500.27 1953.43             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5414.15  109.75       T
 5995.9810509.54  108.74       T
Left Levee      Station=       0      Elevation=  122.83
Right Levee     Station= 9938.78      Elevation=  138.32

CROSS SECTION OUTPUT  Profile #Design Flow
```

E.G. Elev (ft)	117.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.066	0.055	0.066
W.S. Elev (ft)	117.04	Reach Len. (ft)	1855.62	2500.27	1953.43
Crit W.S. (ft)	99.15	Flow Area (sq ft)	39224.66	15419.89	31461.10
E.G. Slope (ft/ft)	0.000176	Area (sq ft)	60431.02	15419.89	55564.82
Q Total (cfs)	130000.00	Flow (cfs)	43914.33	48147.82	37937.85
Top Width (ft)	9835.36	Top Width (ft)	5395.23	581.83	3858.30
Vel Total (ft/s)	1.51	Avg. Vel. (ft/s)	1.12	3.12	1.21
Max Chl Dpth (ft)	45.76	Hydr. Depth (ft)	7.27	26.50	8.15
Conv. Total (cfs)	9811981.0	Conv. (cfs)	3314512.0	3634042.0	2863427.0
Length Wtd. (ft)	2108.68	Wetted Per. (ft)	5399.64	603.43	3870.64
Min Ch El (ft)	71.28	Shear (lb/sq ft)	0.08	0.28	0.09
Alpha	1.96	Stream Power (lb/ft s)	0.09	0.87	0.11
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	173326.90	64332.52	208854.20
C & E Loss (ft)	0.00	Cum SA (acres)	21709.10	2682.19	24911.37

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 166.6

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	115.83	16.4	121.78	26.24	122.95	39.37	122.83	55.77	117.64
68.89	114.38	88.57	106.68	121.38	100.53	131.22	100.1	137.78	102.18
147.62	103.64	173.87	102.88	216.52	103.4	269.01	103.23	282.13	103.58
344.46	103.25	383.83	103.94	423.19	103.52	475.68	103.65	492.08	104.23
508.49	103.65	557.7	103.91	574.1	103.56	652.83	103.82	659.39	104.22
695.48	103.36	764.37	103.66	849.67	103.64	885.75	104.03	934.96	103.67
984.17	103.94	1007.13	103.82	1043.22	104.17	1095.71	103.75	1105.55	104.02
1131.8	103.75	1138.36	104.15	1190.85	103.43	1197.41	103.66	1243.33	103.7
1253.18	103.48	1292.54	103.71	1305.67	104.22	1348.31	103.86	1364.72	104.14
1387.68	103.84	1413.92	104.23	1433.61	103.73	1453.29	104.23	1482.82	103.79
1512.34	104.29	1522.18	103.86	1541.87	104.32	1554.99	103.73	1581.23	103.69
1604.2	104.09	1623.88	103.76	1640.28	104.46	1663.25	103.95	1722.3	104.08
1728.86	104.46	1755.1	104.09	1764.95	104.5	1794.47	104.23	1833.84	104.76
1869.93	104.08	1912.57	103.94	1922.41	104.29	1958.5	103.92	1997.87	103.98
2050.36	103.07	2086.44	103.23	2112.69	103.66	2129.09	103.06	2148.77	103.05
2214.38	103.51	2243.91	103.05	2302.96	103.2	2322.64	103.03	2362.01	103.66
2414.5	103.32	2444.02	103.73	2457.15	102.64	2470.27	103.85	2486.67	104.21
2509.64	103.87	2549	103.8	2601.49	104.15	2621.17	103.87	2693.35	104.13
2703.19	103.86	2742.55	104	2762.24	104.39	2768.8	103.9	2811.45	103.92
2827.85	104.3	2854.09	103.97	2896.74	103.99	2909.86	104.32	2929.55	103.87
2972.19	104.27	2998.44	103.82	3034.52	104.31	3083.73	103.9	3103.42	104.44
3139.5	104.26	3188.71	105.06	3224.8	105.17	3244.48	106	3257.6	107.81
3270.72	108.43	3296.97	107.76	3303.53	108.34	3339.62	108.39	3356.02	108.09
3411.79	108.54	3447.87	108.34	3474.12	108.67	3500.36	107.93	3513.49	108.48
3539.73	107.96	3575.82	108.6	3588.94	108.19	3621.74	108.56	3641.43	108.13
3664.39	108.72	3700.48	108.48	3710.32	107.91	3720.16	108.36	3756.25	107.93
3815.3	108.51	3825.14	108.15	3851.38	108.45	3861.22	108.06	3887.47	109.3
3900.59	106.79	3907.15	106.55	3920.27	104.5	3953.08	103.05	3979.32	102.67
4028.53	102.79	4061.34	103.26	4100.71	104.29	4185.99	105.31	4238.48	105.5
4258.16	106.39	4281.12	108.14	4300.81	108.93	4317.21	109.08	4350.01	110.31
4359.85	109.89	4382.82	109.98	4409.06	108.14	4418.9	106.91	4441.86	106.43
4491.07	109.26	4563.23	107.24	4576.36	107.68	4592.76	106.76	4602.6	107.12
4664.93	107.56	4674.77	107.4	4779.74	107.58	4802.7	107.88	4822.38	107.61
4960.16	107.93	4986.4	107.81	5002.8	108.1	5048.73	107.85	5058.57	108.39
5081.53	108.34	5120.9	106.08	5153.7	105.52	5206.18	105.81	5334.12	105.59
5357.08	106.07	5416.13	105.66	5507.98	105.6	5527.66	106.04	5550.62	105.8
5570.3	106.23	5629.35	106.13	5671.99	106.33	5763.84	106.04	5770.4	106.4
5809.77	106.04	5829.45	106.37	5878.66	105.9	5908.18	106.41	5940.98	106.01
5957.38	106.16	6013.15	106.07	6036.11	106.39	6065.64	106.15	6114.84	106.26
6124.68	106.55	6144.36	106.04	6180.45	106.14	6203.41	105.77	6232.93	107.85
6249.34	104.69	6272.3	103.37	6324.78	102.78	6351.03	102.67	6364.15	103.3
6387.11	102.39	6410.07	102.4	6429.76	100.28	6439.6	97.33	6459.28	94.66
6472.4	94.3	6492.08	95.04	6518.33	99.74	6544.57	106.23	6560.97	107.27
6577.37	106.17	6593.77	106.4	6603.61	107.23	6636.42	106.68	6652.82	107.37
6669.22	106.45	6698.74	106.05	6708.59	106.77	6718.43	106.17	6728.27	106.72
6741.39	106.38	6774.19	106.96	6790.59	105.9	6810.28	107	6826.68	106.71
6833.24	107.36	6843.08	106.73	6856.2	106.94	6872.6	105.88	6905.41	105.05
6915.25	105.64	6921.81	104.71	6934.93	105.14	6948.05	106.4	6967.73	105.3
7003.82	104.11	7112.08	103.79	7131.76	104.32	7164.57	104.52	7177.69	103.96
7246.58	104.26	7269.54	104.82	7279.39	104.37	7348.28	104.44	7374.52	105.05
7423.73	107.69	7443.42	107.71	7449.98	105.1	7456.54	104.52	7472.94	104.52
7489.34	102.38	7502.47	103.77	7518.87	102.99	7531.99	104.92	7548.4	104.8
7564.8	103.85	7597.6	97.18	7617.29	89.56	7623.85	86.22	7630.85	80.15
7637.85	79.11	7657.85	74.61	7677.85	73.91	7687.85	74.61	7697.85	73.61
7757.85	73.61	7777.85	74.11	7787.85	73.61	7797.85	79.11	7801.85	80.15
7836.85	84.41	7860.05	91.37	7866.61	94.34	7879.74	103.02	7883.02	103.78
7896.14	103.36	7912.54	102.07	7968.31	101.83	8060.17	102.03	8109.38	102.87
8132.34	102.93	8194.67	103.62	8230.76	103.75	8237.32	104.15	8286.52	103
8319.32	102.7	8375.09	102.76	8417.73	102.6	8453.82	102.15	8493.18	101.93
8532.54	102.39	8594.87	101.82	8657.19	101.8	8699.84	101.61	8749.04	101.68
8801.52	101.42	8860.57	101.38	8939.3	100.93	8972.1	101.03	8985.22	98.95
9008.18	98.95	9024.58	100.13	9047.54	99.63	9067.23	100.75	9083.63	99.33
9096.75	99.32	9109.87	100.3	9119.71	99.55	9139.39	100.48	9188.6	100.85
9198.44	99.63	9237.8	100.22	9250.92	101.02	9264.04	99.69	9293.57	100.36
9303.41	99.89	9316.53	100.35	9339.49	99.63	9362.45	99.96	9408.38	100.15
9431.34	101.6	9447.74	98.98	9454.3	98.85	9473.98	100.37	9513.34	99.55
9536.31	101.07	9546.15	100.27	9575.67	99.05	9592.07	100.24	9615.03	99.45
9657.68	99.86	9674.08	99.7	9697.04	100.49	9713.44	100.38	9726.56	99.27
9749.52	100.06	9775.77	99.63	9788.89	100.13	9811.85	99.35	9828.25	100.14
9847.93	99.89	9857.77	100.93	9864.33	99.8	9897.14	100.51	9916.82	100.33
9923.38	99.74	9956.18	100.51	9962.74	99.95	9998.82	99.3210018.51		99.44
10041.47	101.210077.55		101.5610087.39		100.3510110.35		101.0610133.32		100.99
10146.44	100.3610175.96		100.810205.48		98.9410225.16		98.8510244.84		99.66
10254.69	98.9710277.65		99.6910290.77		99.2710333.41		99.1810349.81		100.13
10372.78	103.93 10385.9		105.4910392.46		105.1510405.58		101.7110412.14		103.13
10425.26	107.4810438.38		108.2810454.78		110.8410481.02		111.0410494.15		110.09
10503.99	110.2510513.83		108.310536.79		111.2910549.91		110.9710592.55		111.18
10602.39	111.9810631.92		112.4610654.88		112.3510674.56		110.610690.96		110.18
10717.2	110.2410727.04		110.8410743.45		110.5810756.57		109.3210766.41		109.59
10818.89	109.2910835.29		110.0610854.98		109.15 10884.5		109.6210910.74		109.61
10920.58	110.2310943.54		11010963.22		109.3210986.19		109.8510999.31		108.87
11045.23	109.4211074.75		108.611084.59		107.8911104.28		108.1411143.64		107.98

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 11166.6  108.5811192.84  107.5811255.17  107.3911310.93  107.0411327.33   108.6
 11350.3  108.8511376.54  107.82 11415.9  108.2511425.74  108.7311461.83   107.8
11511.03  109.6111530.71   109.211550.39   109.611560.23   110.611576.64  110.21
11602.88  110.7211612.72  111.6211622.56  114.2811635.68  120.4911645.52  123.92
11655.36  123.6111694.73  126.3311707.85   123.911734.09  123.8911740.65  118.88
11747.21  115.5711757.05  113.5511776.73  112.7811789.85  106.6111802.97   98.42
11812.82    91.411944.03   91.4111947.31   92.0211953.87  101.1411966.99  114.55
11970.27   115.811986.67  112.7511993.23  113.0112019.47  111.4612042.43  111.16
12088.36  111.82 12098.2   111.6 12114.6  112.2712196.61   112.412216.29  112.03
12226.13  108.4612239.25  107.4212255.65  107.6312278.61  114.1112291.74  116.56

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .118 7502.47    .066 7630.85    .015 7801.85    .066 7879.74    .132

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7531.99 7879.74         417.48212330.936 2564.68            .1       .3
Left Levee      Station=   26.24      Elevation=  122.95
Right Levee     Station=11694.73      Elevation=  126.33
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 7531.99  105.44 7896.1412291.74  103.36

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            116.77    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                0.118      0.045     0.132
  W.S. Elev (ft)            116.69    Reach Len. (ft)           417.48    2330.94    2564.68
  Crit W.S. (ft)             98.82    Flow Area (sq ft)       78646.88   11251.12   42598.07
  E.G. Slope (ft/ft)      0.000144    Area (sq ft)            78646.88   11251.12   42598.07
  Q Total (cfs)           130000.00     Flow (cfs)             57202.01   43752.35   29045.64
  Top Width (ft)          11568.05    Top Width (ft)           7472.39     347.75    3747.91
  Vel Total (ft/s)            0.98    Avg. Vel. (ft/s)            0.73       3.89       0.68
  Max Chl Dpth (ft)          43.08    Hydr. Depth (ft)           10.52      32.35      11.37
  Conv. Total (cfs)       10842970.0     Conv. (cfs)             4771074.0   3649272.0   2422623.0
  Length Wtd. (ft)          1512.41    Wetted Per. (ft)         7476.85     360.22    3751.27
  Min Ch El (ft)              73.61    Shear (lb/sq ft)            0.09       0.28       0.10
  Alpha                        5.64    Stream Power (lb/ft s)      0.07       1.09       0.07
  Frctn Loss (ft)              0.29    Cum Volume (acre-ft)    170364.60   63567.08   206653.20
  C & E Loss (ft)              0.01    Cum SA (acres)          21435.02    2655.51   24740.82


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 166

INPUT
Description: New Cross-Section, Bathymetric elevations translated from
             Corrected Effective XS
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  109.71   18.91  115.51   37.82  121.87   56.73  122.43   63.03  121.44
    82.2  115.15    98.6  110.51  108.45  107.01  124.85  104.38  137.97    99.2
  144.53   98.77  160.94  103.15   183.9  103.89  193.75  103.01  229.83  103.05
  246.24  103.45  265.92  103.15  308.57  103.18  328.26  103.62  364.35  103.28
  374.19  104.02  410.28  103.47  449.65  103.59  466.05  103.24  495.58  103.19
   577.6  103.42  616.97   103.7  636.65  103.55  659.62  103.98  672.74  103.19
  695.71  103.56  738.36  103.81  840.06  103.67  879.43  104.18  892.55  103.71
  938.48  103.94  981.13  103.79 1000.82  104.16 1050.03  103.72 1099.24  104.09
 1151.73  103.56 1171.42  104.26 1184.54  103.73 1237.04  103.88 1273.12  103.72
 1309.21  104.38 1348.58  104.02 1381.39  104.23 1394.51  104.69 1424.04  103.74
 1483.09  103.84  1499.5  104.35 1522.46  104.39 1548.71   104.9 1558.55  104.23
 1607.76  104.21 1617.61  104.58 1634.01     104 1650.41  104.21 1706.19  103.92
 1735.71  103.98 1768.52  104.65 1781.64  104.47 1791.49  105.29 1821.01  104.34
 1830.86  104.96 1870.22  104.13 1880.07  104.66 1903.03   104.8 1919.44   104.2
 1962.09  104.04 1971.93   104.6 2004.74  103.79 2017.86  104.17 2030.98   103.5
 2063.79  103.52 2080.19  104.02 2086.76  103.63 2106.44  103.96 2145.81  103.28
  2165.5  103.88 2188.46  103.32  2198.3  103.74 2214.71  103.19 2254.08  104.41
 2280.32  103.46 2313.13  103.79 2322.97  103.57  2336.1  104.43 2345.94  103.88
 2385.31  103.32 2424.68  103.29 2450.92  103.66 2483.73  103.38 2513.26  103.92
 2526.38  103.47 2552.63  104.52 2565.75  103.75 2585.44  103.72 2595.28  103.18
 2628.09  103.88 2634.65  103.58 2674.02  103.94 2703.55  103.41 2729.79  103.87
 2756.04  103.91 2765.88  102.71    2779  104.15 2834.78  104.06 2841.34  104.35
 2880.71  103.75 2920.08  103.65 2952.89  104.02 3005.38  103.95 3021.78  104.21
 3041.47  103.82 3070.99   104.2 3130.05  103.91 3159.58  104.36 3205.51  104.01
 3228.47  106.13 3251.44  106.68 3294.09  106.28 3323.61  106.78 3336.74  106.45
 3379.39  106.55 3389.23  106.17 3523.74  106.43 3553.27  106.14 3579.52  106.33
 3586.08  106.79 3612.32  106.21 3641.85  106.24  3668.1  106.67 3681.22  106.33
  3753.4   106.6 3773.08  106.38 3812.45  106.53 3825.58  106.15  3855.1  106.09
 3874.79  106.99 3887.91  103.35 3904.31  103.21 3963.37  104.51 3983.05  104.63
 4042.11   105.8 4061.79   105.8 4071.63  106.57 4081.48     106 4091.32  106.43
 4114.29  106.04 4137.25  106.86 4147.09  106.09 4183.18  106.27 4209.43  106.76
 4222.55  106.12 4261.92  106.31 4317.69  106.89  4334.1  106.51 4353.78  106.86
 4376.75   108.4 4389.87  107.07 4409.55  107.62 4445.64  107.18 4478.45  107.74
 4507.98  107.41 4514.54  106.74 4540.78  106.97 4544.06  107.57 4567.03   107.2
 4599.84  107.13 4616.24  107.45 4688.42  107.21 4717.95  107.56 4829.49  107.67
  4862.3  107.32 4934.48  107.47  4947.6  107.75 5055.86  108.13 5068.99  106.21
 5088.67  105.44 5154.29  105.19 5193.66  105.45 5236.31  105.26 5246.15  105.64
 5295.36  105.17 5328.17  105.39 5397.06  105.48 5420.03  105.77 5439.71  105.25
  5475.8  105.49 5488.92  105.25 5551.26  105.57 5607.03   105.4 5695.61  105.74
 5718.58  105.54 5787.47  105.44 5869.49  105.93 5892.46   105.7 5912.14  106.14
 5921.98  105.74 6036.81  105.98 6118.83   105.7 6138.52  107.13 6161.48  106.36
 6168.04  107.48 6177.88  106.94 6194.29  108.01 6213.97  107.67 6223.81  105.73
 6233.66  106.81  6243.5  105.93  6259.9  107.47 6276.31  108.16 6299.27  108.31
 6305.83   109.4 6332.08  109.13 6351.76  109.62 6361.61  108.96 6374.73  109.21
 6391.13   107.3 6410.82  105.89 6423.94  106.06 6433.78  103.99 6450.19  103.33
 6476.43  103.44 6492.84  104.18  6515.8  103.79 6545.33  104.12 6594.54  103.82
 6614.23  104.59 6627.35   104.4 6640.47  105.73 6653.59  103.79 6683.12  103.18
 6702.81  103.59 6719.21   103.4 6752.02  103.74 6797.95  103.33 6873.41   103.7
 6886.53  103.46 6912.77  104.14 6932.46  103.94 6948.86  104.39 6961.99  103.67
 6991.51  104.05 7001.36  105.18 7017.76  105.27 7040.72  103.88 7057.13  105.03
 7063.69     104 7076.81  103.79 7106.34  104.97 7119.46  106.12 7132.59  104.06
 7148.99  103.71 7178.52  104.16 7185.08  103.71 7234.29     104 7247.41  104.39
 7276.94  103.88 7293.34  105.26 7313.03  104.62 7342.55  105.03 7358.96  104.55
  7368.8  105.35  7385.2  104.51 7401.61  105.07 7431.14  104.78  7470.5  105.36
 7486.91  105.35 7506.59  106.44 7526.28  106.28 7545.96  106.61 7568.93  104.67
 7595.17  105.13 7634.54  104.53 7654.23  104.48 7660.79  105.38 7673.91  105.57
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 7696.88   104.3 7739.53  104.13 7772.33  105.06 7792.02  103.99 7798.58  104.43
 7834.67  104.18 7851.07  104.57 7874.04  105.83 7887.16  107.34 7946.21  108.45
 7962.62  107.82 8021.67  108.74  8051.2  108.11 8093.85  108.59  8120.1  108.25
  8152.9   108.3 8182.43  107.82 8202.11  108.53  8221.8  108.13 8287.42  108.91
 8303.82  108.18 8330.07  108.33 8336.63  107.99 8395.68   108.4 8418.65  108.05
 8431.77  108.86 8451.46   107.9 8467.86  107.76 8520.35  108.14 8533.48  107.88
 8543.32  108.45 8559.72  112.22 8572.85  112.89 8589.25  112.34 8605.66  109.68
 8628.62  104.41 8661.43  103.55 8740.17  103.81 8825.47  103.62 8861.56  103.86
 8904.21  103.59 8966.55  103.81 9012.43  103.44  9061.6  103.82 9130.43  103.44
 9140.27  103.95 9169.77  111.85 9176.32  112.66 9202.55  113.16 9218.94  110.44
 9235.32  110.15 9261.55  108.82 9271.38  109.05 9281.21  108.16 9300.88  108.87
 9317.27  106.22 9330.38   106.4 9336.94  105.24 9353.32   106.6 9359.88  105.92
 9376.27  101.36  9386.1  100.47 9412.32  100.57 9425.43  100.04 9441.82   97.92
 9458.21   99.02  9474.6   98.22 9490.99   92.64 9513.93   87.55 9527.05    85.9
 9527.05   87.23 9533.61   83.89 9540.61   77.82 9547.61   76.78 9567.61   72.28
 9587.61   71.58 9597.61   72.28 9607.61   71.28 9647.61   71.28 9726.99    85.9
 9733.55   86.54 9743.38   90.48 9759.77   95.38 9772.88  100.66 9782.71  107.18
 9785.99  107.85 9795.82  106.77 9822.05   107.1 9848.27  106.89 9874.49  107.13
 9920.38  106.49 9940.04  106.68 9966.27 106.3210051.49     10610084.27  105.07
10146.55 105.2510166.21  104.87 10182.6  105.0910238.32   104.510287.49   104.8
10303.88 105.4510326.82 104.6810392.38   104.610444.82  104.28 10477.6  104.81
10487.43 104.3210526.77 103.9710543.16 104.1410575.94  103.85 10625.1  104.17
10664.44 103.8910710.32   104.110779.16 103.5610815.21 103.5610887.33  103.24
10929.94 103.3710962.71 103.1410985.66 103.6711015.16 104.9611051.21   107.7
11070.88  108.111133.16 107.7411162.66 108.0611188.88     108 11215.1  107.05
11251.16 106.9411300.33 107.3211326.55  108.81 11362.6 107.0311375.71  106.92
11388.83  108.411395.38 111.0111405.21 112.9711411.77 112.9311428.16  108.24
11447.83 107.3211474.05 107.9811519.94 108.2211555.99 109.4911578.94  108.73
11611.71    11011654.33 109.5111696.94  109.311713.32 110.2911752.66  110.57
11772.33 111.5411782.16 113.7311791.99 118.0511801.83 117.1811811.66  118.29
11847.71 118.5411896.88 117.8511916.55 111.5711932.94 101.1611942.77   97.58
 11952.6   95.3711959.16   91.8711965.71   90.52 12129.6   90.5212139.44   92.76
 12159.1 101.9812182.05 116.0712191.88 116.7612198.44 119.4712208.27  128.14
12214.83 130.9712224.66  131.612241.05 127.9912263.99 119.7412293.49  114.57
12303.33 110.4612313.16 109.3812322.99  105.39 12336.1 105.1512345.94  109.11
12352.49 110.5512385.27 112.0412401.66 111.7612421.33 110.0812444.27  109.76

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .118 8572.85    .066 9527.05    .015 9726.99    .066 9795.82    .132

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9300.88 9785.99           203.14 3680.24  4630.8            .1       .3
Left Levee      Station=   56.73      Elevation=  122.43
Right Levee     Station=11847.71      Elevation=  118.54
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    24.1 9293.17  108.72 9791.1711767.07  107.97

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            116.47    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                 0.112      0.049      0.131
  W.S. Elev (ft)            116.33    Reach Len. (ft)           203.14    3680.24    4630.80
  Crit W.S. (ft)             99.68    Flow Area (sq ft)       69585.13   13143.96   16066.75
  E.G. Slope (ft/ft)      0.000275    Area (sq ft)            69585.13   13143.96   16066.75
  Q Total (cfs)           130000.00     Flow (cfs)             59042.58   58886.47   12070.94
  Top Width (ft)          11709.46    Top Width (ft)           9222.27     485.11    2002.08
  Vel Total (ft/s)            1.32    Avg. Vel. (ft/s)            0.85       4.48       0.75
  Max Chl Dpth (ft)          45.05    Hydr. Depth (ft)            7.55      27.09       8.03
  Conv. Total (cfs)       7840448.0     Conv. (cfs)            3560925.0  3551510.0   728012.3
  Length Wtd. (ft)          1820.58    Wetted Per. (ft)         9225.16     498.93    2005.14
  Min Ch El (ft)              71.28    Shear (lb/sq ft)            0.13       0.45       0.14
  Alpha                        5.47    Stream Power (lb/ft s)      0.11       2.03       0.10
  Frctn Loss (ft)              0.32    Cum Volume (acre-ft)    169654.20   62914.38   204926.20
  C & E Loss (ft)              0.03    Cum SA (acres)          21355.02    2633.23   24571.55


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 165

INPUT
Description: New Cross-Section, Bathymetric elevations translated from New
             Cross-Section 166
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  102.72   12.82  103.78   41.68  113.61   70.53  122.41   86.94  122.51
  119.74  112.99  139.42  106.59  172.23   98.76  191.91   103.4  218.15  102.83
  287.04  103.12  359.21  102.92  405.14  103.12  418.26  103.65  464.19  103.07
  572.44  103.48  667.57  103.57  680.69  104.22  693.81  103.26  716.78  103.73
  841.43  103.84  890.64  104.53  920.16   103.7  995.61  103.93 1077.62  103.89
 1120.27  104.22  1215.4  103.88 1267.89  104.45 1277.73  104.92 1307.25  104.12
 1320.37  105.05 1363.02  104.27 1408.94  104.66 1441.75  104.03 1461.43  104.55
 1474.55  103.99  1500.8  104.56  1533.6  104.05 1559.84  104.85 1576.24  104.45
 1641.85   104.3 1661.54  105.03 1677.94  104.34 1727.14  104.29 1812.43  104.87
 1861.64  104.41 1943.65  104.17 1960.05  104.75 1992.86  104.24  2019.1  104.46
 2065.03  103.77 2078.15  104.21 2133.92  103.69  2153.6  104.29 2186.41  103.49
 2212.65  103.91 2261.86  103.97 2330.75  103.39  2406.2  104.38 2465.25  103.84
 2471.81  103.41 2534.14  103.73 2543.98  105.09 2570.23  103.52 2685.05   103.6
 2714.57  104.03 2783.46  104.11  2793.3  103.65 2816.27  104.51 2835.95   103.5
 2855.63  103.39 2885.16  104.29 2901.56  103.63 2944.21  103.36 2957.33  103.89
  2996.7  103.72 3006.54  104.56 3052.46  104.54 3078.71  106.83 3088.55  106.36
  3131.2  106.29 3167.28  106.93 3183.69  106.44 3236.17  106.12 3268.98  106.68
 3305.07  106.01 3364.11  106.34 3377.24   105.9 3455.97  106.29 3482.21  105.95
 3570.79   106.3 3587.19  107.42 3600.31  106.47  3652.8  106.43 3685.61  106.92
 3767.62  106.26 3780.74  106.56 3836.51  106.06 3852.91  106.61 3879.16  106.02
 3898.84  106.36 3908.68  102.53 3954.61  103.48 3967.73  105.39 3980.85  104.33
 3997.26  106.75  4023.5  107.91 4053.03  107.46 4079.27  105.36 4118.63  105.76
 4135.04  104.23 4154.72  105.02 4164.56  104.09  4190.8  104.34 4203.92  102.62
 4236.73  102.23 4269.53   105.2 4272.81  104.43 4302.33  105.67 4325.29  108.27
 4344.98  108.36 4361.38   105.9 4377.78  107.21 4400.74  106.25 4426.98  107.89
 4463.07  108.17 4492.59  106.25 4505.71   106.7 4541.79  106.04 4564.75  104.96
 4577.88  105.24 4604.12  104.36 4659.88  104.99 4669.72  103.19 4679.56  106.09
 4692.69  106.15 4718.93   104.6 4735.33  106.01 4748.45  103.94 4755.01   105.3
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 4797.66  102.91 4820.62  102.91 4837.02  103.97 4850.14  102.44  4873.1  102.67
 4879.66  101.74  4905.9  101.58 4919.03  103.18 4964.95  103.23 4974.79  102.06
 4994.47  102.52 5004.31  106.14 5020.72  105.22 5030.56   103.1 5060.08  105.59
 5086.32   105.1    5106  100.94 5142.09  100.58 5224.09  100.93 5247.06  105.03
  5289.7  102.02 5312.66  102.97 5332.34  105.19 5352.02  105.79 5361.87  104.35
 5391.39  103.24 5427.47  103.79 5440.59  103.38  5506.2  104.72 5565.24  104.67
 5581.65   104.2 5601.33  105.61 5627.57  104.99 5663.65  107.07 5676.77  106.13
 5703.02  105.78 5716.14  104.86 5732.54  105.68 5758.78   105.5  5788.3  106.26
 5824.39  105.28 5857.19  107.67 5883.43  106.65 5896.55  104.38 5912.95  103.62
 5975.28  103.82 5991.68   103.2 6024.48  103.71 6103.21  103.55 6139.29  103.95
 6165.54  103.56 6227.86  103.72 6313.15  103.33 6401.72  103.61 6450.92  103.36
 6532.93  103.67 6562.45   104.2 6582.13   103.4 6683.82  103.31 6706.79  104.56
 6729.75   103.7  6821.6  103.51 6956.09  103.77 6988.89  104.25 7005.29  103.58
 7074.18  105.72 7113.54  103.42 7126.66  104.14 7146.34  103.52 7166.03  104.05
 7205.39  103.93 7215.23     105 7241.47  105.46  7287.4  104.29 7297.24  105.05
 7333.32  104.98    7353  103.84 7382.53  105.04 7451.41  105.56 7471.09  105.13
 7497.34  105.79 7530.14  105.44 7546.54  106.19 7582.62  104.75 7615.43  105.23
 7697.43  104.36 7730.24   105.7 7763.04  104.66 7825.37     104 7851.61  104.86
 7881.13  104.55 7910.65  105.71 7963.14  108.47  8035.3  108.73 8058.27  108.23
 8153.39  108.38 8173.08   107.9 8228.84  108.06  8235.4  108.67 8271.48  108.21
 8307.57  109.04 8323.97  108.17 8376.45  108.03  8402.7   108.5  8435.5  108.25
 8520.79  109.35 8540.47  108.45 8560.15  111.79 8592.95  113.51 8619.19  112.46
 8638.88  110.05 8655.28  106.34 8678.24  104.15 8707.76  104.42 8724.16  103.57
 8819.29  104.38 8848.81  103.84  8884.9  104.43 8943.94  103.61 9035.79  103.76
 9075.17  104.08  9121.1  103.84 9157.19  104.34 9167.03  103.99 9354.04  104.05
 9449.18  104.49 9475.43  104.32 9485.28  105.12 9537.77  104.59 9613.23  104.38
  9721.5  104.46 9977.41  104.16 10013.5  103.94   10066  104.1710098.81  104.71
10161.14   104.110187.39   104.410213.64  103.9410246.45   104.210315.34  103.75
10357.99  103.7810387.52  104.5310420.33  108.87 10443.3  104.6610456.42   105.1
10502.35  102.4310541.72  101.7510561.41  103.1410600.78  102.8310633.59  103.96
10653.27  101.6610689.36  102.4610702.49  101.6710732.02  102.1110748.42  101.21
10784.51  102.3810814.04   104.110840.29  102.0310863.25  104.2310925.59  107.61
10941.99     10510951.84  104.8510978.08  108.3111017.46  104.56 11027.3  104.42
 11043.7   102.211063.39   102.911079.79  101.44 11096.2  103.92 11112.6   100.4
11122.44  100.0611142.13  101.3211168.38   98.9111191.34   98.2711217.59   98.59
11237.28  100.3711273.37   98.8111302.89   92.1411322.58   90.1611338.98      90
11352.11   85.2711358.67   83.3811365.67   77.3111392.67   71.7711432.67   70.77
11462.67   70.7711493.18   85.2711499.75   85.8211525.99   97.5411532.56  101.37
11555.52  108.8411568.65  108.5911598.17  106.6811617.86  106.6311660.51  105.58
11690.04  109.5311745.78  107.9711788.41  108.5611827.76  108.3411850.72  109.17
11883.51  108.0111919.58  108.17 11932.7  107.1411985.17   107.212004.84  105.95
12024.52  107.2312096.66  108.0512116.34  107.4712195.04  107.3812214.71   107.8
12231.11  107.0512309.81  107.2212329.49  103.5612336.04  101.2712365.56   97.63
12401.63    96.912418.03   95.8112447.54   95.1212513.12   94.78 12549.2   95.36
12575.43   98.5612601.67   96.2812614.78   96.8212631.18   100.412637.74  105.38
12660.69  107.8212670.53  107.2112713.16  106.8812726.28  105.2112736.11  107.37
12775.46  107.7612837.77  107.4912860.73  106.6712903.36  106.6512942.71  105.67
12952.54  106.27 12975.5  105.8313044.36  106.0413086.99   105.613119.79  106.07
 13132.9  107.07 13165.7  107.1713182.09  106.1213195.21  106.4413250.96  106.21
13273.91   104.813293.59  105.45 13323.1  104.3713382.12  105.1213395.24  106.29
13428.03  104.9913454.27  105.2713506.74  104.4413536.25  103.19 13575.6   104.6
13631.35  103.6313677.26  104.4613710.05  104.2713726.45  103.6113746.12  104.37
13755.96  103.4513775.63  105.1213795.31  104.4813854.34  107.7713933.04  108.22
13962.55  109.3414044.53  107.7914054.37  107.2814172.42  106.8714198.66     107
14218.33  108.2614228.17     11014244.57  109.18 14254.4  109.8314303.59  108.96
14329.83     10714346.22   106.514408.53  106.6914418.37  106.3514454.44  107.09
14500.35  107.3614516.74  106.9214556.09   107.214595.45  108.8314651.19  110.26
14670.87  109.3714687.26  111.0914700.38  108.1214726.62   108.114759.41  108.89
 14792.2  108.47 14808.6  111.0114831.55  110.5814851.23  111.1814897.14  111.37
14906.97  110.5414949.61  111.3814972.56   113.115002.07  113.99 15044.7  113.48
 15061.1  114.6315080.77  114.3115103.73  115.2915126.68  115.4115146.36  119.68
15185.71  119.3515205.39  118.13 15234.9  117.5715254.57  113.8615264.41  109.98
15274.25  101.9415287.37   94.8915310.32   90.2615480.84   90.26 15487.4   92.71
15510.35  107.8615516.91  109.0215536.59  108.3815579.22  109.5715585.78  110.53

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .11810541.72    .06611352.11    .01511493.18    .06611788.41    .132

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      11237.2811555.52          200.92 3697.62 2252.28             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       011237.28  100.37       T
11555.5215585.78  108.84       T
Left Levee      Station=   86.94      Elevation=  122.51
Right Levee     Station=15146.36      Elevation=  119.68
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  139.42 3078.71  106.83

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            116.12    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.110      0.047      0.123
  W.S. Elev (ft)            116.07    Reach Len. (ft)           200.92    3697.62    2252.28
  Crit W.S. (ft)            107.37    Flow Area (sq ft)       118978.70    9587.31   24383.74
  E.G. Slope (ft/ft)      0.000124    Area (sq ft)            119111.60    9587.31   33957.08
  Q Total (cfs)           130000.00     Flow (cfs)              86522.52   31737.67   11739.81
  Top Width (ft)          15020.63    Top Width (ft)          11128.17     318.24    3574.22
  Vel Total (ft/s)            0.85    Avg. Vel. (ft/s)            0.73       3.31       0.48
  Max Chl Dpth (ft)          45.30    Hydr. Depth (ft)           10.69      30.13       6.82
  Conv. Total (cfs)       11683000.0    Conv. (cfs)             7775714.0   2852241.0   1055048.0
  Length Wtd. (ft)          1482.44    Wetted Per. (ft)        11141.38     331.06    3580.63
  Min Ch El (ft)              70.77    Shear (lb/sq ft)            0.08       0.22       0.05
  Alpha                        4.22    Stream Power (lb/ft s)      0.06       0.74       0.03
  Frctn Loss (ft)              0.17    Cum Volume (acre-ft)    169214.30   61954.13   202267.20
  C & E Loss (ft)              0.01    Cum SA (acres)          21307.57    2599.29   24275.15


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 163

INPUT
Description: New Cross-Section, Bathymetric elevations translated from New
             Cross-Section 165
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Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   99.57   22.29  103.27   38.21  105.17   63.68  113.19   86.06  121.17
   92.62  122.46  105.74  122.54   112.3  121.44   145.1  110.79   161.5  106.14
  171.34  105.03  187.74   98.83   194.3   98.76  207.42  103.23  279.58  103.25
  289.42  102.83  315.66  103.02  371.42  102.89   489.5  102.98  587.91  103.37
  623.99  103.13  660.07  103.38  699.43  104.05  709.27   103.6  758.47  104.25
  797.83  103.68  807.67  104.06  886.39  104.19  945.43  104.88  968.39  104.07
  978.23   99.37  984.79   98.57  994.63  100.59 1017.59    99.5 1040.55  103.77
 1053.67   98.78 1063.51   99.43 1079.91   94.69 1102.87   93.58 1119.27   90.76
 1125.83   88.24 1138.95   87.22 1145.51   88.35 1158.63   93.81 1171.75   93.12
 1184.87   89.39 1214.39   85.37 1234.07   84.36 1247.19   82.45 1260.31   82.06
 2657.59   82.06 2690.39    83.8 2700.23   84.98 2723.19   89.02 2739.59   92.73
 2752.71   93.82 2769.11   94.22 2782.23   96.93 2788.78   99.75 2795.34   99.24
 2828.14  106.08  2851.1   105.4 2870.78  106.03 2893.74  105.72  2916.7  106.35
 2959.34  105.72 2992.14  104.48 3011.82  104.76 3024.94  104.09 3051.18  104.49
 3077.42  106.72 3120.06  106.67 3136.46  106.15 3182.38  106.53 3205.34  106.09
 3257.82  106.65 3287.34  105.99 3313.58  106.66 3372.62  106.04 3421.81  106.42
 3480.85  106.51 3510.37   106.8 3533.33  106.35 3559.57  106.57 3703.89  103.31
 3756.37  102.79 3831.81  102.78 3858.05  103.16 3890.85  102.55 3913.81  103.64
 3926.93  102.17 3940.05  103.03 3972.85  101.66 4022.04  101.26 4071.24  101.53
  4110.6  101.11 4163.09  101.33 4172.93  100.99 4264.77  101.22 4310.69  101.01
 4386.13  101.37 4445.17  101.22 4520.62  101.68 4559.98  102.45  4589.5  104.13
 4599.34  105.74 4612.46  105.31  4622.3  102.83  4655.1   103.5 4678.06  103.19
  4687.9  104.41  4720.7   102.7 4799.43     103 4812.55  105.19 4828.95  104.75
 4838.79  105.35 4861.75  105.36 4868.31  103.15 4901.11  102.89 4917.51  102.04
 4969.99     101 5035.59  101.61 5058.55  102.48 5091.36  101.85  5117.6  102.49
 5137.28  101.99  5183.2  102.81 5222.56  102.34 5242.24   103.1  5265.2  102.58
 5278.32  103.41 5301.28  106.01 5320.96  104.46 5340.64  104.53  5363.6  105.89
 5396.41  104.87 5432.49  105.95 5448.89  106.97 5478.41  105.76 5517.77  104.65
 5527.61  105.39 5547.29  104.77 5566.97   106.2 5580.09  105.93 5596.49  107.05
 5622.73  105.91 5652.25  106.22 5662.09  105.42 5685.05  105.47 5708.02  106.65
 5717.86  106.02 5763.78  106.93 5796.58  106.23 5812.98  104.93  5858.9   108.4
 5878.58  108.06 5898.26  106.66  5908.1  104.75 5944.18  103.38 6009.79   103.3
 6068.83  103.63 6104.91  103.34 6213.15  103.42 6239.39  103.28 6282.03  103.58
 6331.24  103.59  6370.6  103.29 6446.04  103.38 6462.44   103.8  6501.8  103.26
 6541.16  103.56 6626.45  103.62 6675.65  103.48 6688.77  103.77 6741.25  103.38
 6833.09  103.53 6898.69  103.93 6938.06  103.52  6964.3  104.23 6970.86   103.6
 7016.78  103.28  7046.3  103.97 7088.94  103.51  7111.9  104.37 7141.42  103.57
 7147.98  104.29 7174.22  104.41 7197.18  103.67 7243.11  104.08 7295.59  103.86
 7341.51  105.53 7357.91  103.58 7371.03  105.14 7397.27  104.81 7416.95   93.19
 7439.91   86.34 7456.31   82.87 7463.31    76.8 7490.31   71.26 7510.31   70.56
 7520.31   71.26 7530.31   70.26 7560.31   70.26 7590.82   84.76 7633.43   84.65
 7649.83   85.46 7672.79   87.75 7689.19   91.25 7695.75   93.71 7721.99   97.37
 7741.67   95.93 7761.35   98.31 7800.71   98.65 7830.23   98.05 7849.91    96.6
 7863.03   97.95 7882.71   97.04 7895.83   98.34 7931.91   98.01 7941.75   97.14
 7958.15   97.69 7974.55   95.61 7987.67   94.95 8017.19   96.11 8043.43   94.78
 8086.07   98.03 8102.47   98.55 8109.03   97.97 8194.32   98.07 8207.44   97.05
 8223.84   96.82 8256.64   94.52 8276.32   94.84 8292.72   96.88 8318.97   98.55
 8332.09  101.27 8345.21  101.17 8361.61   98.64 8371.45   98.31 8423.93   98.87
 8460.02   97.55 8505.94   96.69 8525.62   96.64 8558.43   97.38 8568.27   98.63
 8610.91  100.89 8624.03  104.29 8643.71  105.17 8669.96  100.79 8706.04  100.81
    8729  100.23 8758.52   100.6  8778.2  101.57 8801.17   105.5 8814.29  105.62
 8827.41  107.42 8853.65  106.04 8896.29  107.74  8929.1  107.63 8988.14  108.19
 9043.91  107.96 9112.79   105.7 9181.68  106.38 9217.76  107.03 9237.44  106.53
 9306.33  106.61 9339.13  106.09 9368.65  106.61 9440.82  107.38 9522.83  106.22
 9542.51  105.69 9588.43  105.98  9644.2  107.02 9663.88  108.12 9670.44  107.53
 9703.24  107.44 9713.08  106.88 9772.13  106.48  9877.1  107.19 9886.93  106.77
 9965.61  106.78 9985.28 107.7610001.67 107.1410077.08 108.4810083.63 108.98
10100.02 108.0810145.92 107.8210152.48 107.1810260.66 106.3710303.28 106.73
10322.95 106.3810336.06 104.3510349.18 106.1410359.01 105.3110365.57 103.16
10378.68 102.1910401.63 102.05 10421.3 102.5110437.69 106.5710483.59 106.51
10519.65 106.7710545.88 107.3410568.82 106.6410585.21 108.2710614.72 109.49
10650.78 109.0210660.62 105.8410673.73    10310690.12 100.7510726.18 101.24
10752.41 103.3510765.52   98.510775.36  97.4210791.75 101.23 10844.2 100.43
10867.15 102.2610899.93 101.33   10936    10110945.83   99.110981.89   99.29
11017.95   99.0611024.51  99.6511044.18 105.4211103.19 105.9411145.81 107.12
 11191.7 107.4711290.05  107.211342.51 107.5511414.63 108.5611424.46 107.99
11460.53 107.9311483.47 106.7111522.81 106.7611535.93 106.4211598.22  106.9
11634.28    10611657.23  103.811749.02 104.5611778.52 105.0111808.03 104.87
 11827.7 103.9911886.71  103.511899.82 103.9511955.55 104.7511965.39 105.61
11985.06 108.7412014.56 107.21 12053.9 108.7312067.02 109.7312080.13 108.95
12103.08 108.7212119.47 107.8312148.97 108.5712165.37 107.7812191.59 107.56
12204.71 108.08 12221.1 107.6912247.32 108.2512273.55 107.69   12326 107.31
12365.34 105.79 12371.9 106.9312388.29 106.1512407.96 107.2312430.91 106.46
12444.02 107.0512503.03 107.1412516.15 107.5312529.26 106.7912535.82 101.71
12542.37   99.2212555.49  101.512562.04 101.0112571.88 103.8612591.55  98.75
12607.94   97.9612624.33  98.6512657.11  97.8912666.95  99.1412680.06 107.07
12725.96  106.812742.35  107.1 12765.3 106.2212811.19 106.6712821.03 106.34
12896.43 105.8112922.66 106.1112935.77 105.4412978.39 105.8813001.34 105.54
 13037.4 105.9613053.79 105.61 13066.9 106.1513125.91 105.69 13158.7 106.43
13198.04  105.713211.15 105.9913230.82  107.413243.93 105.5413289.83  104.6
13322.61 104.9513345.56 103.5813365.23 103.7313381.62 105.0413394.74 104.12
13404.57   99.9113417.68 103.4313443.91 103.8813453.75 103.2213479.97 102.99
13489.81 103.6813512.75 103.2213522.59 103.9213561.93  103.713604.55 104.36
13620.94 103.7313634.05 104.6213643.89 103.6913653.72 104.4613686.51 103.89
 13702.9 102.5113716.01 103.7813725.85 103.1113748.79 103.4213788.13 103.04
13797.97 103.8813843.87 104.2413866.81 103.0213915.99 104.7213965.16 104.26
13978.28 104.8113994.67 103.6514011.06 103.6714034.01 104.57 14050.4 104.09
 14096.3 105.09 14125.8 106.9414155.31 106.1814161.86 105.04 14171.7 106.21
14207.76 105.5614220.87 106.2814266.77 106.3514286.44 107.74   14293 107.08
14315.94 107.1314325.78 102.1414335.61 106.4214345.45 107.6914355.28 107.41
14378.23 108.5314401.18 108.3914417.57  113.414424.13 114.3414450.35 114.08
14460.19 113.4914479.86 109.6414489.69 110.1214496.25 109.1314535.59 108.72

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066  105.74     .12 7463.31    .025 7649.83     .12 8332.09    .085
12067.02     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7397.27 7800.71         2552.46 4131.21 2270.67             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 7397.27  104.81       T
 7800.7114535.59   98.65       T
Left Levee      Station=  105.74      Elevation=  122.54
Right Levee     Station=14424.13      Elevation=  114.34
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  945.43 2828.14  104.8810308.6614366.04  106.56
```

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	115.95	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.02	Wt. n-Val.	0.120	0.084	0.080	
W.S. Elev (ft)	115.93	Reach Len. (ft)	2552.46	4131.21	2270.67	
Crit W.S. (ft)	102.35	Flow Area (sq ft)	78579.47	12245.05	67719.81	
E.G. Slope (ft/ft)	0.000103	Area (sq ft)	85626.80	12245.05	68756.53	
Q Total (cfs)	130000.00	Flow (cfs)	48169.51	20944.93	60885.57	
Top Width (ft)	14406.32	Top Width (ft)	7268.00	403.44	6734.88	
Vel Total (ft/s)	0.82	Avg. Vel. (ft/s)	0.61	1.71	0.90	
Max Chl Dpth (ft)	45.67	Hydr. Depth (ft)	10.81	30.35	10.06	
Conv. Total (cfs)	12831780.0	Conv. (cfs)	4754619.0	2067390.0	6009770.0	
Length Wtd. (ft)	2702.40	Wetted Per. (ft)	7274.79	415.56	6748.42	
Min Ch El (ft)	70.26	Shear (lb/sq ft)	0.07	0.19	0.06	
Alpha	1.47	Stream Power (lb/ft s)	0.04	0.32	0.06	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	168742.10	61027.50	199611.80	
C & E Loss (ft)	0.00	Cum SA (acres)	21265.14	2568.66	24008.63	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 162.1

INPUT
Description: Extended block obstruction, Bathymetric elevations translated from
IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	122.38	19.67	122.78	62.3	111.77	78.7	106.85	98.37	103.8
114.77	98.23	121.32	98.73	127.88	101.81	141	103.58	163.95	103.46
193.46	102.59	216.42	103.05	275.44	103.07	288.56	102.27	308.23	102.59
331.18	104.54	354.14	104.45	370.53	95.67	386.93	92.11	413.16	82.07
609.9	82.06	639.41	84.25	662.37	90.65	672.2	95.56	678.76	97.05
691.88	96.39	701.71	99.45	718.11	99.06	744.34	100.53	760.74	98.27
809.92	96.8	826.32	97.06	836.16	98.44	852.55	96.64	875.5	97.42
908.29	100.48	921.41	100.75	927.97	102.75	944.36	102.93	973.88	105.65
983.71	104.37	1009.95	103.77	1019.78	102.54	1042.74	102.37	1068.97	104.62
1082.08	104.24	1114.87	105.14	1154.22	104.47	1167.34	106.16	1187.01	106.87
1213.25	104.55	1223.08	104.69	1262.43	102.85	1275.55	102.67	1291.94	103.73
1311.62	106.2	1341.13	106.58	1373.92	104.98	1380.48	103.91	1413.27	102.65
1442.78	103.9	1449.34	103.5	1528.03	103.57	1541.15	105.32	1564.1	104.93
1573.94	105.97	1590.33	105.79	1596.89	106.78	1613.29	105.38	1675.59	105.43
1688.71	105.03	1728.05	107.17	1757.57	105.88	1777.24	107.89	1796.91	106.59
1829.7	106	1842.82	106.88	1849.38	105.98	1872.33	106.12	1882.17	106.91
1898.56	105.33	1931.35	106.33	1954.31	104.42	1983.82	105.59	2016.61	106.12
2069.07	105.44	2095.31	104.06	2105.14	102.86	2118.26	105.54	2174	104.7
2193.68	105.06	2210.07	103.79	2223.19	103.84	2236.31	105.22	2262.54	105.96
2272.37	105.2	2292.05	105.98	2305.17	105.11	2344.51	106.02	2354.35	105.16
2393.7	106.05	2426.49	105.43	2449.44	105.89	2472.4	105.32	2511.75	105.46
2531.42	104.98	2547.82	105.55	2557.65	104.53	2606.84	103.68	2623.23	103.77
2656.02	105.18	2682.26	104.13	2711.77	105.82	2724.89	105.14	2741.28	105.59
2774.07	104.02	2803.58	104.5	2859.33	104.73	2872.44	105.75	2901.95	105.68
2934.74	104.93	2947.86	105.59	2974.09	105.39	2997.05	106.56	3029.84	104.65
3042.95	106.34	3056.07	106.35	3085.58	109.67	3118.37	117.18	3164.28	112.76
3220.02	111.24	3229.86	111.6	3259.37	110.45	3292.16	111.17	3305.28	112.64
3351.18	115.72	3380.7	118.56	3400.37	119.64	3413.49	119.45	3429.88	117.69
3482.35	118.08	3502.02	118.57	3574.16	117.98	3606.95	119.12	3623.35	118.62
3662.69	118.54	3675.81	119.2	3692.21	118.73	3718.44	119.44	3751.23	118.48
3806.97	118.35	3826.65	117.17	3833.21	115.2	3859.44	111.77	3872.55	108.77
3888.95	102.58	3895.51	101.78	3931.58	101.85	3954.53	102.44	3974.2	104.29
4000.44	101.91	4049.62	103.56	4079.13	103	4115.2	103.93	4131.6	103.01
4141.44	98.01	4167.67	87.29	4177.51	84.32	4197.51	82.17	4238.51	72.94
4270.51	73.82	4297.51	73.74	4313.51	74.84	4327.51	74.14	4367.51	75.94
4379.51	75.44	4400.51	76.44	4409.51	76.13	4413.55	84.32	4423.38	86.38
4436.5	92.57	4456.17	88.33	4466	87.78	4492.23	89.99	4498.78	91.51
4515.17	98.12	4538.12	105.04	4544.68	105.53	4570.91	105.1	4626.64	105.83
4652.86	104.81	4679.09	104.95	4724.99	106.25	4738.1	107.96	4754.49	108.74
4777.44	111.31	4829.89	114.11	4843.01	108.61	4852.84	106.72	4879.07	105.99
4905.29	105.93	4921.69	106.49	4957.75	103.66	5003.64	102.51	5069.21	101.7
5079.05	102.35	5108.55	100.74	5138.06	100.23	5147.89	101.05	5161	100.07
5193.79	99.84	5203.62	100.52	5233.13	100.04	5249.52	100.51	5272.47	100.07
5311.81	100.09	5347.87	99.24	5370.82	99.4	5406.88	98.93	5423.27	99.71
5456.05	99.21	5465.89	99.94	5492.12	100.18	5508.51	99.06	5541.29	99.7
5554.4	98.46	5570.79	99.94	5580.63	98.96	5600.3	100.95	5613.41	103.19
5652.75	103.16	5659.31	102.56	5715.04	101.26	5734.71	96.12	5760.94	94.54
5793.72	94.65	5846.17	95.96	5872.4	95.81	5931.41	96.8	5947.8	98.7
5967.47	97.22	5990.42	97.2	6000.25	96.46	6023.2	92.43	6088.77	92.49
6105.16	95.13	6118.27	96.1	6144.51	95.21	6164.19	92.59	6206.82	93.03
6226.5	92.76	6256.01	95.93	6265.85	99.35	6308.48	98.44	6334.72	98.77
6360.96	102.85	6374.07	101.46	6397.03	102.42	6406.87	101.94	6436.38	105.85
6475.74	105.45	6498.69	105.92	6528.21	105.13	6649.55	104.58	6672.51	105.74
6698.74	106.01	6724.98	104.74	6767.61	105.15	6836.48	105.38	6895.51	104.93
6905.35	105.64	6918.47	104.96	6964.38	105.19	6980.78	105.8	7020.13	105.89
7059.49	105.07	7161.15	106.77	7266.09	106.79	7334.96	106.59	7357.92	107.02
7374.32	106.61	7423.51	106.58	7439.91	107.49	7512.06	107.14	7561.25	106.3
7574.37	106.82	7613.72	106.41	7659.63	104.81	7728.5	107.04	7754.74	103.97
7780.97	104.44	7807.21	106.87	7836.73	106.28	7872.8	106.2	7902.31	106.65
7954.79	108.35	7994.14	108.66	8030.21	108.18	8049.89	108.46	8059.73	107.6
8105.64	106.7	8167.95	106.17	8256.5	106.07	8279.46	106.31	8302.42	105.86
8312.26	106.96	8331.94	106.05	8381.13	106.39	8390.97	106.9	8430.33	106.65
8463.12	106.97	8548.39	105.83	8561.51	105.33	8627.11	106.29	8653.34	106.41
8669.74	107.75	8702.54	107.12	8725.5	109.74	8755.01	111.09	8787.81	110.41
8807.49	103.01	8814.05	102.09	8843.57	100.95	8863.24	100.87	8879.64	101.63
8905.88	101.44	8922.28	102.23	8935.4	100.28	8951.79	99.49	8964.91	101.43
9000.99	100.75	9010.83	99.15	9046.91	99.18	9060.02	100.64	9076.42	99.12
9096.1	99.67	9132.18	97.4	9145.3	97.26	9155.13	95.21	9168.25	97.61
9184.65	98.59	9201.05	106.31	9224.01	106.46	9269.92	105.52	9289.6	105.84
9378.15	105.89	9414.23	106.31	9437.19	107.29	9463.42	106.26	9515.9	106.47
9545.42	105.81	9558.54	106.09	9637.25	105.47	9686.44	105.69	9702.84	104.75
9729.08	104.58	9758.6	103.55	9768.43	103.87	9794.67	102.87	9850.43	103.14
9899.62	104.9	9916.02	106.98	9935.7	106.95	9971.77	107.8410001.29		107.95
10037.37	106.8810073.44		107.56	10096.4	107.0610132.48		107.3710148.88		108.25
10168.56	108.110204.63		106.4610237.43		106.4810253.83		104.1910266.95		105.47
10299.74	103.23	10322.7	103.3110329.26		104.6110358.78		103.6410375.17		105.12
10394.85	105.2310407.97		103.7810444.05		102.9710450.61		105.0410480.12		107.18
10489.96	107	10499.8	99.9310512.92		97.8510526.04		98.710539.16		106.11

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10545.72  107.1810585.07  106.2110594.91   106.610617.87   95.0810637.55   95.07
10644.11   98.1510667.07  100.1710696.58  100.2310716.26   98.6810729.38   99.67
10739.22   98.36 10758.9   97.7910765.46  103.7410778.58  106.4810857.29   106.4
10893.36  106.09 10903.2  106.59   10936   105.810988.47  105.1111037.67  105.07
11067.19  105.5711093.42  105.1311106.54  105.7611136.06  105.8911273.81  105.17
11303.32   105.811316.44  104.9611342.68  104.6111352.52  105.3311375.48  103.89
11457.47  103.4411480.43   105.311519.78  106.31 11565.7  102.7211608.33  104.08
11631.29   103.511667.37  103.8111683.77  105.0611700.17  105.2911713.28  104.41
11732.96   104.511769.04  103.4911801.83  103.5611814.95  104.3711851.03  103.73
11870.71  103.9811900.23  102.8611946.14  104.8511992.06  104.4112015.01  103.64
12031.41  106.2912044.53  107.4512064.21  107.8212080.61   107.312106.85   108.4
12139.64  107.0912215.07  107.1812244.59  107.7612283.95  106.0112297.07  106.47
12310.19  105.5412329.86   108.512346.26  109.3812362.66  111.2612379.06  114.22
12392.18  113.95 12405.3  110.4112434.81  107.8512451.21  108.2112497.13  106.99

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066   19.67     .12 4197.51    .025 4423.38     .12 5652.75    .085
 8755.01     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4115.2 4538.12         2695.37 2260.89 1608.69             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  4115.2  103.93       T
 4538.1212497.13  105.04       T
Left Levee      Station=   19.67      Elevation=  122.78
Right Levee     Station=12379.06      Elevation=  114.22
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  331.18  973.88  104.54

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.64    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.120      0.078      0.074
  W.S. Elev (ft)            115.61    Reach Len. (ft)          2695.37    2260.89    1608.69
  Crit W.S. (ft)             96.63    Flow Area (sq ft)       35768.70   13534.22   76716.83
  E.G. Slope (ft/ft)      0.000125    Area (sq ft)            36560.40   13534.22   90820.73
  Q Total (cfs)           130000.00    Flow (cfs)              23409.46   28545.68   78044.86
  Top Width (ft)          11944.35    Top Width (ft)           3562.42     422.92    7959.01
  Vel Total (ft/s)            1.03    Avg. Vel. (ft/s)            0.65       2.11       1.02
  Max Chl Dpth (ft)          42.67    Hydr. Depth (ft)           10.04      32.00       9.64
  Conv. Total (cfs)       11632690.0    Conv. (cfs)             2094731.0   2554331.0   6983629.0
  Length Wtd. (ft)         2091.78    Wetted Per. (ft)         3572.06     437.71    7993.26
  Min Ch El (ft)             72.94    Shear (lb/sq ft)            0.08       0.24       0.07
  Alpha                       1.57    Stream Power (lb/ft s)      0.05       0.51       0.08
  Frctn Loss (ft)             0.17    Cum Volume (acre-ft)    165162.20   59805.06   195452.60
  C & E Loss (ft)             0.04    Cum SA (acres)          20947.83    2529.48   23625.65


Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 161.4

INPUT
Description: Updated on left with new survey to Station 1032.71, extended
             cross-section and block obstruction, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     458
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   95.84       8   95.75   74.98   96.61   99.97   97.17  122.96   99.54
  150.96  103.86  175.95  104.45  191.94  104.26  204.94  104.44  314.91  104.01
  449.87  104.56  483.86  104.75  517.85   105.1  548.84  104.37  580.83  103.36
  606.83  102.93  657.81   102.6  666.81  102.25   696.8  102.51  749.79  102.17
  870.75  102.11  918.74  101.77  928.74  101.94  938.73  102.74  955.73   108.7
  967.73  112.55  989.72  120.67 1006.72  121.09 1013.71  119.77 1032.71  112.08
 1085.95   96.43 1118.76   96.61 1154.85   96.41 1200.78    96.7 1279.52   97.99
 1312.33   99.19 1332.01   98.87 1354.98   99.32 1417.32    99.3 1476.37   99.93
 1499.34   99.92 1512.46   100.7 1538.71  100.45 1548.55  100.82 1558.39  102.26
  1574.8  101.09  1591.2   101.8 1627.29  100.88  1660.1  101.86 1689.63  101.26
 1719.15  101.59 1758.52   100.4 1771.65  100.31 1797.89  102.04 1824.14  101.48
 1840.55  102.31 1850.39  101.77 1863.51  102.81 1909.44  102.52 1919.29  102.94
 1935.69  101.82 1971.78  102.27 1988.18   102.8 2014.43  102.82 2027.55  103.65
 2050.52   104.2 2060.36  102.52 2086.61  101.48 2106.29  102.74 2119.42  103.06
 2165.35  101.94 2175.19  102.41 2214.56  102.44 2237.52  102.79 2286.74  102.92
  2309.7  102.27 2335.95  102.54 2349.07  102.18 2391.72  101.81 2421.25  100.33
 2434.37  100.69 2440.93  100.06 2460.62  100.69 2490.14   99.75 2503.27   99.83
 2513.11  100.62 2529.51  100.76 2542.64  102.53  2549.2  102.46 2562.32  100.72
 2572.16  100.46 2601.69  102.79 2614.81  100.33 2637.78  100.28 2657.46  101.21
 2677.15  101.24 2700.11  100.73 2709.96  101.14 2723.08  103.21 2729.64  105.75
  2736.2  105.88 2746.04  102.81 2755.89  101.87 2769.01  102.25 2798.54   105.4
 2831.35  102.29 2854.31  102.97 2877.28  104.69 2883.84  105.66 2900.24  105.81
 2910.08  102.77 2926.49  103.18  2975.7  103.17 2985.54  103.56 2998.66  102.87
 3031.47  103.08 3047.88  101.61 3070.84  102.98 3097.09  103.55 3103.65  103.09
 3136.46  104.58 3149.58  105.55 3182.39  104.61 3195.51  105.13 3211.92  103.23
 3218.48  103.57  3231.6  106.01    3248  104.95 3257.85  105.53 3270.97  104.46
 3287.37  105.42  3300.5   103.5 3320.18  103.01 3336.58  105.12 3346.43  103.68
 3359.55  103.26 3389.08    99.8 3398.92   99.85 3412.04   96.97 3444.85   93.12
 3454.69   92.84 3467.82   93.57 3480.94   91.83 3500.62   85.69 3507.18    84.9
 3523.59   84.99 3530.15   86.16  3556.4   95.77 3579.36  101.44 3595.77  100.27
 3612.17   99.73 3667.94  100.02 3684.35  102.62 3710.48  102.05 3730.09  102.46
 3749.69   95.48 3762.76   91.86 3801.97   90.83  3808.5   89.86  3818.3   85.08
 3828.11   84.22 3833.11   78.33 3841.11   73.66 3851.11   72.06 3861.11   71.66
 3881.11   72.06 3911.11   74.36 3931.11   73.66 3941.11   75.66 3971.11   76.36
 3981.11   75.96 3991.11   76.66 4021.11   77.36 4031.11   78.33 4036.11   81.56
 4043.74   84.22 4050.28   84.41 4063.35   88.53 4076.42   94.11 4086.22   93.72
 4099.29   90.49 4112.36   89.63 4128.69   89.84 4151.56   93.95  4167.9   98.11
 4174.43  100.86 4180.97  102.14 4223.44  102.61 4236.51  103.13 4259.38  103.31
 4275.72  102.76 4324.72  102.69 4331.26  103.27 4350.86   107.1 4363.93   107.7
 4393.33  105.96  4406.4  106.24 4465.38  104.05 4498.18  103.11 4557.24  102.55
 4593.33  102.41 4613.01  102.92 4635.98  102.21 4675.34  102.32 4691.75  101.97
 4721.28  102.13 4754.08  101.57 4809.86  101.67 4852.51  101.39 4878.75  101.56
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 4924.68  100.98 4980.46     101 5003.42  101.34 5059.19  101.45 5095.28  102.03
 5131.37  101.92 5137.93  101.16 5147.77   98.51 5167.46   99.37 5187.14  105.16
 5210.11   104.9 5229.79   103.3 5249.48  103.08 5275.72  101.24 5282.29  101.45
 5298.69  100.45 5311.81  101.17 5321.65  100.58 5338.06  101.19  5347.9  100.96
  5364.3  101.57 5410.24  101.84 5423.36  101.47 5429.92  102.05 5459.45  101.27
 5479.13   101.8 5492.25  103.52 5521.78  103.08 5528.34  103.91 5551.31  103.29
 5564.43  103.54 5580.83   105.3 5593.96  105.96 5607.08  108.13 5639.89  107.39
 5653.01  108.55 5666.13  106.55 5685.82   106.3 5708.78  105.28 5741.59  106.93
 5751.43  102.95 5761.28  100.41 5767.84   100.7  5790.8   98.99 5800.65   100.5
 5820.33  100.42 5836.73   102.8  5843.3  105.55 5849.86  104.94  5859.7  107.32
 5872.82  108.41 5892.51  107.39 5915.47  108.22 5935.16  107.85 5951.56  108.72
 5977.81  108.13 6020.46  107.98 6027.02  107.51 6063.11  107.84 6092.63  107.58
  6099.2  107.93 6151.69  108.16 6174.65  109.14 6197.62   109.4 6233.71  108.97
 6259.95  109.08 6269.79  108.64 6338.69  108.96 6401.03  108.46 6427.27   108.5
 6479.76  108.16 6492.89  108.35 6499.45  107.17 6519.13  107.63 6528.98   107.3
 6561.78  107.96 6630.68  107.72 6663.49  107.92 6693.01   107.8 6748.79  107.92
 6768.47  107.63 6824.24  107.46 6853.77  107.76  6883.3  107.53 6896.42  107.84
  6916.1  107.55 6935.79  107.91    6985  107.92 7034.21  107.56 7057.18  108.07
 7168.72  107.56 7221.22  107.61 7270.43  108.05  7326.2  107.48  7342.6  108.11
 7368.85  107.94 7385.25  108.33  7427.9   108.1 7434.47   109.2 7467.27  108.56
 7519.77  108.08 7546.01  108.58 7588.66  108.58 7634.59  109.06 7660.84  108.64
 7677.24  109.12 7706.77  109.29 7723.17  108.47 7742.86  108.63  7752.7  109.49
 7772.38  110.23 7815.03  109.27 7851.12  109.34 7874.09  108.26  7939.7  107.75
 7995.48  108.03  8008.6  108.57 8038.13  108.54 8051.25  107.76 8097.18  107.67
 8136.55  107.02 8205.44  107.65 8225.13   106.5 8254.65  106.39 8271.06  107.57
  8280.9  107.35 8290.74  105.93 8316.98  105.87 8326.83   105.1 8333.39  105.92
 8339.95  104.18 8359.63  103.53 8402.28  104.39  8431.8  106.57 8444.93  107.13
 8481.01  106.15 8513.82  106.85 8540.06  107.09 8582.71  105.89 8595.83  104.86
  8618.8  104.09 8645.04  104.78 8658.17  106.08 8671.29  105.24 8713.94  105.39
 8733.62  104.81 8782.83  103.92 8835.32  103.54 8868.12  102.84 8881.25  103.44
 8914.05  103.75 8933.74  102.92 8943.58  103.58 8992.79  103.64 9019.03  105.67
 9038.72  106.61 9051.84  106.65 9071.52  105.08 9084.64  105.89 9107.61   106.6
 9130.57   106.3  9160.1  106.99 9189.62  106.05 9199.46  106.31 9232.27  105.16
 9258.52  103.41 9271.64  101.91 9301.16  101.96 9327.41  101.12 9356.93  101.36
 9370.06  102.46 9386.46  101.58 9402.86  101.75  9412.7  100.53 9448.79   98.82
 9461.91   97.47 9484.88   96.21    9498   96.75 9517.68   96.08 9540.65   96.36
 9576.73   95.96 9625.94   96.23 9671.87   96.02 9704.68   96.59 9714.52   95.98
 9760.45   96.23 9793.25   98.19 9809.66   98.65 9829.34   96.95 9862.15   96.81
 9878.55    96.3 9891.67   97.32 9917.92   97.79 9927.76  100.14 9934.32  104.05
 9940.88  104.37 9947.44  102.48 9976.97  102.87 9999.93   104.710019.61  104.86
10045.86   105.810065.54  104.8810075.38  103.9410101.63  105.0810127.87  105.39
10137.72  105.13 10173.8  105.2110190.21   105.610252.54  105.4910268.94  106.29
10278.78  107.4810285.34  109.2610301.75  108.8510327.99  109.6410344.39  108.62
10364.08  108.3310396.88  107.2710410.01  105.9710436.25  105.4410446.09  105.72
10475.62  105.2810514.98  106.0810531.39  107.7110544.51  106.6510574.04  106.32
10600.28  105.6110646.21  106.2110659.33  105.6910672.45  106.1210692.14  105.66
10711.82  106.3210764.31  106.4110839.76  105.6410905.38  106.0810974.27   105.6
11000.51  106.1311023.48  107.0211056.28  106.0111092.37  107.6511108.77  105.37
11128.46  105.28 11138.3  105.7311174.38     11011180.95  113.0411187.51  114.61
11213.75  114.6711230.16  111.5111259.68  108.99

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108 3320.18    .108 3336.58    .066 3762.76    .015 4063.35    .066
 4259.38    .144

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3684.35 4259.38          2304.01 1690.29 1564.64            .1       .3
Left Levee      Station= 1006.72      Elevation=  121.09
Right Levee     Station=11213.75      Elevation=  114.67
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 3684.35  102.62  4406.411259.68  106.24

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.43    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.40    Wt. n-Val.                 0.099      0.018     0.144
  W.S. Elev (ft)            115.03    Reach Len. (ft)          2304.01    1690.29    1564.64
  Crit W.S. (ft)             97.27    Flow Area (sq ft)       31876.77   15514.18   55998.07
  E.G. Slope (ft/ft)      0.000059    Area (sq ft)            31876.77   15514.18   55998.07
  Q Total (cfs)           130000.00     Flow (cfs)             19147.05   93130.79   17722.16
  Top Width (ft)          10234.25    Top Width (ft)           2658.92     575.03    7000.30
  Vel Total (ft/s)            1.26    Avg. Vel. (ft/s)            0.60       6.00       0.32
  Max Chl Dpth (ft)          43.37    Hydr. Depth (ft)           11.99      26.98       8.00
  Conv. Total (cfs)       16937400.0    Conv. (cfs)             2494624.0   12133790.0   2308979.0
  Length Wtd. (ft)         1814.65    Wetted Per. (ft)         2664.04     587.68    7010.55
  Min Ch El (ft)             71.66    Shear (lb/sq ft)            0.04       0.10       0.03
  Alpha                      16.37    Stream Power (lb/ft s)      0.03       0.58       0.01
  Frctn Loss (ft)             0.08    Cum Volume (acre-ft)    163044.90   59051.21   192741.50
  C & E Loss (ft)             0.06    Cum SA (acres)          20755.35    2503.58   23349.43


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 161.35

INPUT
Description: RGV-04, New Cross-Section, Begin Wall, Updated on left with new
             survey to Station 3215.65, Bathymetric elevations translated from
             IBWC 2008 Cross-sections
Station Elevation Data    num=     441
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  112.07      49  110.22   93.99  110.29  137.99  107.98  151.99  108.87
  204.98  107.62  322.96  108.34  444.95  112.54  581.93  118.75  614.93  119.42
  756.91  118.86   813.9  116.43   861.9  117.78  889.89  113.11  952.89  109.61
 1048.87  105.57 1146.86   100.2 1289.85   98.39 1386.84   98.45 1404.83  100.66
 1457.83  100.73 1467.83   98.73 1570.82   97.02 2066.76   97.46 2400.73   98.06
 2775.69   98.17 2845.69   98.58 2875.68   96.24 3123.66   96.24 3215.65   96.53
  3388.7   96.12 3418.23   90.66 3431.35   90.52 3454.31   92.82 3503.52   92.21
 3779.08    92.3  3808.6   92.46 4084.16   92.78 4090.72   92.59 4235.06   92.88
 4267.87    92.7 4372.85   93.18 4389.25   92.95  4415.5   94.92 4435.18   93.77
 4563.12   94.26 4628.74   95.04 4704.19   97.29 4763.24   96.55 4792.77    95.3
 4809.17   95.92 4868.22   94.59 5068.34   94.64 5170.04   94.97 5202.84   95.84
 5225.81  100.08 5238.93  101.24 5340.63  100.69 5347.19   97.71 5393.12   97.82
 5425.92   98.68 5475.13   98.69 5488.26  100.48 5619.48  100.76 5639.16   101.5
 5763.83  101.37 5845.84  101.54 5901.61  101.08 5924.58  101.48  6072.2  101.13
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 6229.67  101.75 6354.33  101.46 6400.26  101.69 6406.82  100.26 6462.59   98.66
 6492.12  101.02 6679.11  101.21 6797.21   101.6 7371.32  101.79 7509.11  102.34
 7528.79  101.68 7561.59  103.43 7653.45  103.14  7679.7  103.92 7827.32  103.62
 8342.36  104.15 8355.48  103.54 8385.01  105.61 8398.13  100.08 8407.97   93.16
 8440.77   79.73 8447.33   79.46 8617.91   79.46 8634.31   80.39 8653.99   84.69
 8663.83   89.94 8676.95   92.24 8686.79   91.47 8703.19   85.12 8719.59   83.35
 8732.72   84.78 8765.52    94.2 8804.88   96.06    8818   98.41 8850.81   95.06
 8860.65   95.97 8877.05  102.53 8903.29  100.07 8913.13  102.04 8926.25  101.65
 8942.65   96.74 8972.18   91.76 8991.86   89.79 9047.62   90.44 9060.74    91.9
 9073.86   90.54 9090.27    93.2 9109.95    89.4 9126.35   90.31 9132.91   92.74
 9149.31   87.18 9165.71   89.88 9182.11   88.34 9195.23   89.36 9221.48   88.58
 9241.16   90.03 9264.12   95.26  9283.8  102.64 9296.92  101.18 9313.32  103.02
 9326.45  101.58 9349.41  102.81 9408.45  101.98 9457.66  103.99 9477.34  102.71
 9519.98  102.83 9546.22  101.62 9585.59  103.34 9674.15   101.5 9687.28   99.24
 9739.76  104.06 9759.44  103.42  9782.4  104.29 9815.21  103.17 9831.61  104.03
 9880.81  101.07 9930.02  102.13  9998.9  102.1710021.86   101.310077.63  102.43
10100.59  101.5710130.11  102.1810146.51  101.0110208.84  101.6310284.29  100.41
10343.33  101.69 10382.7  100.9910408.94   101.510445.03  100.9410556.56  105.07
10595.93  104.3410697.62  105.7610714.02  103.9510756.67  105.3510779.63   105.3
10799.31  107.0110855.08   108.310881.32  109.6310950.21  115.2210983.02  113.23
11032.23  113.5511068.31  118.1611124.08  118.88 11153.6  120.3211176.57  122.42
11219.21  122.8611252.02  119.6911265.14  119.3811304.51   115.511347.15  114.41
11399.64  105.88   11439  102.7811478.37   104.311517.73   103.211609.59   102.6
11639.11  101.0511671.92  101.4711698.16  103.1911744.09  103.3711796.58  104.32
 11826.1  104.0111855.62  102.4411894.99  101.3711914.67  102.5611950.76  102.73
11990.12  101.4212059.01  101.5512081.98  100.6612124.62  102.1212173.83     107
12209.91  106.0712236.16  104.0312301.76  106.0912308.33  107.3112334.57   106.5
12403.46  109.3412432.98  109.89   12515  108.2912570.76   105.912600.29  103.07
12610.13  103.43 12682.3  101.4212738.07   100.5   12784  101.3312793.84    99.1
12839.77   78.7712847.77   73.6612857.77   72.0612867.77   71.6612887.77   72.06
12917.77   74.3612937.77   73.6612947.77   75.6612997.77   76.6613027.77   77.36
13037.77   78.3313066.11   78.7713082.52   81.2113098.92   91.1113115.32   99.11
13125.16  101.8313180.93  102.3213217.02  101.6713249.82  102.7213282.63  100.16
13440.09  100.3413482.74  100.03 13623.8  100.3113689.41  100.19 13758.3   101.1
13794.38  102.6613810.78  105.6213866.55  105.2413876.39  105.7113892.79  103.66
 13909.2  105.0813938.72  102.9414014.17  101.8914083.06  101.3714122.43  101.52
 14194.6  100.8814230.69  101.0314296.29  102.3214378.31  100.9414466.88  101.81
14539.05  103.6314558.73  105.6214575.14  105.0114607.94  106.3614617.78  105.51
14673.55  105.8214716.19  108.1614742.44  106.04 14765.4   105.414929.42  106.61
14981.91  105.2515129.53  105.2115139.38   105.615198.42   104.815293.56  105.25
15405.09  104.8715424.77  105.08 15588.8   104.115615.04  104.7315726.58  104.49
15785.62  104.8215831.55  104.2515861.08  105.48 15890.6  105.0415949.65  105.75
16011.98   105.5 16159.6  105.8916166.16  106.3216244.89  105.5416280.97  106.69
16307.22  105.2816435.17  105.8616451.57  105.5516576.26  105.6816681.26  105.43
16828.92  105.92 16884.7  105.4417075.01   106.217321.11  106.5717376.89  106.13
17458.92  106.0817491.73  107.9217534.39  105.63 17567.2  106.5517629.54  106.08
17695.17  103.4917741.11  103.6417780.48  102.2317793.61  103.0217806.73   99.17
17816.57  103.2517832.98   103.717842.82  102.2517865.79  103.7817888.76  103.05
17915.01  105.04 17934.7  102.4317954.39  102.58 17987.2  105.5118079.07  106.13
18105.32  106.6518134.86  104.9318203.76  105.4118233.29  104.6618252.98  106.15
18282.51  104.9718328.45  105.3918364.54  107.1718397.36  105.9218443.29  105.65
18522.04  106.5918558.14  105.8718590.95   106.218600.79  107.59 18617.2  102.75
18640.17  106.5118695.95  106.2818718.92  106.9218755.01  105.8118840.32  105.85
18965.01  105.11 19037.2  106.9119096.26  106.3319158.61  106.3819204.54  107.56
19260.32  107.4919270.17  106.3119319.39  105.6219424.39  106.8219483.45  106.22
19532.67  107.1219565.48  106.2619608.14  107.44 19667.2  105.0719693.45  105.28
19706.57  110.0219732.82   109.619755.79  114.4819782.04  114.7619798.45  110.38
19811.57  110.6919913.29  108.3719972.36  107.8320001.89  108.39 20034.7  107.61
20123.29  107.8220149.54  107.2920165.95  108.0720202.04  107.4120254.54  108.47
20290.64  107.8620356.26  107.7720412.04  108.5320425.17  106.6320461.26  106.67
20471.11  107.5220579.39  106.9720602.36  107.6120697.51  107.1920730.32  107.76
20766.42  106.9820802.51  107.5720818.92  106.1920956.73  106.6121005.95  105.69
21081.42  105.6821124.07  106.6321163.45  105.2621202.82  107.2521291.42  107.22
21301.26  108.0621337.36  106.9221373.45  107.5921380.01  106.6721412.82  107.21
21494.86  107.3521514.54  106.5221583.45   106.221599.86  105.5721616.26  106.97
21639.23  105.9121649.07  107.1921668.76  105.6421695.01  105.09 21714.7  106.69
21793.45     10621842.67  106.3221852.51  107.0821888.61  106.4521983.76  107.02
22055.95  106.1522101.89   105.222164.23  105.9922242.98  105.8922311.89  106.27
 22344.7  105.0622384.07  105.0822426.73  105.8922469.39  105.97 22502.2  107.28
22551.42  106.3722610.48  107.5922685.95  107.2422708.92  110.8222725.32  107.04
22790.95  106.7522813.92  107.6122833.61   109.622859.86  110.6222866.42  112.63
22879.54  121.4422915.64  126.0522977.98  125.4723000.95   126.123037.04  124.55
23056.73  125.6823115.79  125.8523197.82  125.2823250.32  121.4223279.86  115.87
23315.95  115.7923335.64  105.0423355.32   99.9723368.45   98.0523378.29   90.37
23384.86   90.22

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108   12784    .06612793.84    .01513115.32    .06613249.82    .144

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         1278413115.32           427.09  384.49  366.72             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0   12784  101.33       T
Left Levee      Station=  614.93      Elevation=  119.42
Right Levee     Station=19782.04      Elevation=  114.76
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       010556.56  105.07

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.29    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.20    Wt. n-Val.                0.108      0.017      0.140
  W.S. Elev (ft)            115.09    Reach Len. (ft)          427.09     384.49     366.72
  Crit W.S. (ft)             95.92    Flow Area (sq ft)       115119.60   11734.11   94110.11
  E.G. Slope (ft/ft)      0.000034    Area (sq ft)            115189.20   11734.11   94110.11
  Q Total (cfs)           130000.00    Flow (cfs)              42495.67   61469.49   26034.83
  Top Width (ft)          21779.40    Top Width (ft)          11625.70     331.32    9822.38
  Vel Total (ft/s)            0.59    Avg. Vel. (ft/s)            0.37       5.24       0.28
  Max Chl Dpth (ft)          43.43    Hydr. Depth (ft)            9.90      35.42       9.58
  Conv. Total (cfs)       22432700.0    Conv. (cfs)             7333021.0   10607130.0   4492551.0
  Length Wtd. (ft)          393.06    Wetted Per. (ft)        11628.76     342.65    9863.47
  Min Ch El (ft)             71.66    Shear (lb/sq ft)            0.02       0.07       0.02
  Alpha                      37.66    Stream Power (lb/ft s)      0.01       0.38       0.01
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)    159155.50   58522.54   190045.70
  C & E Loss (ft)             0.00    Cum SA (acres)          20377.57    2485.99   23047.30


Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 161.3

INPUT
Description: RGV-04, New Cross-section, End wall, Updated on left with new
survey to Station 969.97, Bathymetric elevations translated from
IBWC 2008 Cross-sections
Station Elevation Data num= 475

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	117.67	18	114.25	42	108.93	52.99	105.62	66.99	103.55
86.99	103.4	93.99	102.95	103.99	104.87	116.99	106.05	153.99	106.27
194.99	106.71	236.99	106.1	277.99	106.06	315.99	106.28	366.99	106.23
396.99	106.35	439.99	106.27	476.99	106.09	518.99	106.08	559.98	105.84
679.98	105.84	720.98	106.1	760.98	106.03	795.98	106.47	808.97	101.39
841.97	101.57	865.97	101.09	881.97	101.08	922.97	101.35	969.97	101.05
990.66	101.86	1007.06	101.53	1069.38	101.9	1102.19	101.46	1167.79	101.91
1184.19	101.48	1239.96	101.9	1377.73	101.65	1505.66	101.97	1525.34	101.74
1600.79	102.06	1666.39	101.85	1774.64	102.01	1882.89	101.86	1948.5	102.13
2099.39	101.89	2217.48	102.26	2233.88	102.06	2283.09	102.76	2315.89	101.59
2460.22	101.81	2670.16	101.6	2683.28	101.81	2771.85	101.69	2906.34	101.87
2978.5	101.77	3040.83	102.03	3073.63	101.82	3175.32	102.48	3349.17	102.38
3552.55	102.56	3647.68	102.43	3713.28	102.68	3729.68	102.44	3910.1	102.64
4001.95	102.4	4047.87	103.57	4060.99	102.92	4080.67	103.41	4267.65	103.25
4362.78	103.42	4553.03	103.54	4598.96	103.34	4635.04	104.18	4671.12	102.86
4680.96	103.27	4733.45	102.69	4841.7	102.95	4884.34	103.5	4956.51	103.16
4979.47	103.52	5022.11	103.12	5094.28	103.1	5153.32	103.45	5173	103.04
5235.33	103.24	5353.42	103.03	5474.79	103.25	5510.87	102.99	5533.83	103.55
5625.68	103.12	5645.36	105.9	5658.48	102.03	5668.32	100.97	5704.41	99.79
5894.66	99.68	5917.62	100.22	5934.03	99.58	5947.15	94.86	5966.83	80.99
5976.67	79.46	6150.52	79.46	6206.29	84.9	6225.97	91.3	6232.53	92.17
6252.21	91.24	6271.89	94.82	6291.57	97.2	6317.82	97.89	6340.78	97.7
6357.18	99.54	6383.42	100.54	6426.07	97.35	6465.43	98.33	6478.55	99.27
6504.79	99.16	6524.47	100.55	6576.96	102.37	6606.48	105.29	6636	105.43
6665.52	103.21	6675.37	104.43	6701.61	102.74	6718.01	99.43	6754.09	100.25
6800.02	100.25	6868.9	99.69	6908.26	99.77	6950.91	100.68	6993.55	99.02
7042.76	99.42	7072.28	101.88	7098.52	103.34	7134.6	104.51	7167.41	104.98
7213.33	104.59	7285.5	104.88	7311.74	102.88	7351.1	103.04	7370.78	102.41
7400.3	104	7423.27	103.46	7456.07	104.26	7505.28	103.27	7554.48	103.84
7574.16	101.82	7590.57	101.66	7623.37	104.75	7682.42	104.06	7688.98	104.73
7721.78	105.11	7751.31	104.18	7800.51	103.89	7813.64	104.22	7853	103.81
7862.84	104.38	7915.33	105.51	7954.69	105.55	7994.06	106.58	8013.74	105.89
8039.99	107.13	8092.47	107.69	8099.03	106.99	8135.12	107.13	8187.61	108.94
8243.37	110.42	8269.61	111.7	8286.01	113.77	8345.06	118.1	8368.02	117.6
8381.14	116.5	8430.35	116.25	8472.99	113.52	8515.63	106.9	8555	103.91
8594.36	102.48	8610.76	102.77	8640.28	101.88	8679.65	102.75	8725.57	101.34
8755.09	101.65	8778.05	101.18	8801.02	101.7	8830.54	100.9	8856.78	101.4
8922.39	100.42	8945.35	101.44	8974.87	105	9017.51	106.69	9092.96	105.9
9119.2	106.05	9145.45	107.05	9184.81	107.32	9243.85	106.95	9276.66	108.39
9316.02	108.47	9368.5	109.38	9443.95	109.09	9539.08	108.1	9558.76	101.79
9578.44	103.29	9588.28	106.9	9601.4	109.28	9667.01	109.58	9673.57	110.18
9709.65	108.27	9745.74	107.92	9758.86	105.38	9771.98	106.45	9811.34	104.34
9824.46	105.01	9834.3	103.43	9860.54	93.7	9873.67	91.2	9880.23	87.41
9899.91	78.92	9903.19	78.71	9916.19	73.66	9926.19	72.06	9936.19	71.66
9956.19	72.06	9986.19	74.3610006.19		73.6610016.19		75.6610066.19		76.66
10096.19	77.3610106.19		78.3310132.81		78.6810162.33		88.9310168.89		92.77
10178.73	101.5710195.13		100.8610247.62		100.4810306.66		101.510336.18		101.35
10346.03	100.4710362.43		101.5810368.99		103.6810388.67		113.6210398.51		114.77
10405.07	110.3710411.63		108.8110470.68		106.110493.64		104.0110510.04		104.15
10562.52	103.1710595.33		102.9410680.61		101.6610739.66		101.59 10749.5		101.26
10805.26	101.2810870.87		100.6310880.71		100.24 11015.2		100.1811038.16		100.72
11090.65	100.1711103.77		100.5411192.34		100.1511244.82		101.8711261.22		105.32
11280.9	106.3111290.74		108.4111307.15		108.9811323.55		108.3811382.59		108.34
11395.71	106.7611435.08		105.2811477.72		105.0811503.96		105.6511520.36		107.48
11543.33	106.1511549.89		108.1811559.73		106.3511572.85		106.1911595.81		108.03
11618.77	107.0711667.98		106.5211700.78		105.2711720.46		105.4911766.38		103.13
11812.31	102.2411845.11		102.5811900.88		101.25 11963.2		101.0911992.72		101.8
12009.12	103.812068.17		104.6212251.86		104.2712284.67		103.9412402.76		103.89
12448.68	104.4612491.32		103.5412524.13		104.3412550.37		101.8612556.93		100.35
12589.73	99.36 12629.1		100.4612704.54		100.8612766.87		102.6112776.71		105.63
12937.44	106.3912963.68		105.8213006.33		105.7713026.01		106.2113071.93		105.61
13183.46	106.2813212.98		105.1813242.51		105.513262.19		104.7313314.67		105.58
13337.63	105.1513383.56		105.2313419.64		106.113445.88		105.2613586.94		105.19
13629.58	105.5213767.35		105.3413800.15		106.3713836.24		105.313852.64		105.55
13964.17	105.6814062.58		105.55 14174.1		105.6114220.03		105.8714347.96		105.8
14367.64	106.4214387.32		105.3214443.09		106.1614479.17		104.814489.01		103.66
14518.53	104.7114544.78		103.7714584.14		103.8814600.54		98.1414613.66		95.06
14633.34	94.5314659.58		96.0614682.55		101.9114702.23		105.4214725.19		107.59
14751.43	105.65 14823.6		106.7414859.68		106.0814951.53		106.5314974.49		104.58
15007.29	104.9815059.78		104.4315108.98		105.1915148.35		103.7215158.19		104.55
15190.99	105.0615200.83		103.5915210.67		10515299.24		104.7915315.64		106.26
15335.32	105.1715476.37		104.8715551.82		105.3315627.27		105.3815686.31		106.07
15781.44	106.0115886.41		105.5516040.58		105.8716296.44		105.9616306.28		106.3
16355.49	105.8716371.89		106.3616460.45		106.0216519.49		106.2116598.22		105.48
16667.1	105.8816693.34		106.6216703.18		108.07 16716.3		113.7416739.26		114.52
16749.1	111.5816775.34		108.2616811.43		107.4516837.67		108.1816863.91		107.57
16896.71	107.9616916.39		107.3116929.51		108.1316959.03		107.0917018.08		107.2
17037.76	108.0717067.28		107.6117116.48		108.6617152.56		10717185.36		106.89
17201.76	107.617237.85		107.2917293.61		108.0817310.01		106.9917336.25		106.88
17355.93	107.6317411.69		106.2717424.81		106.6917474.01		106.1717503.54		106.6
17578.98	105.9917687.22		106.34 17739.7		105.9517752.82		106.8317795.47		105.87
17847.95	105.9817893.87		107.117903.71		106.2417920.11		106.9717936.51		105.5
17966.03	105.4917972.59		106.1518018.51		106.818100.52		106.33 18136.6		107.32
18189.08	105.9718271.08		105.1718323.56		107.1218333.41		107.9318369.49		108.64
18418.69	106.3818461.33		107.0918546.62		106.2918592.54		106.41 18648.3		105.49
18704.06	105.6818759.82		105.0218792.62		105.4318864.79		105.4318913.99		106.71
18933.67	106.6118956.63		105.2918995.99		105.5519018.95		105.1819051.76		106.59
19133.76	106.34 19160		105.3319245.28		106.15 19274.8		104.8219320.73		105.16
19333.85	106.0919376.49		105.319399.45		106.419428.97		106.6619461.77		105.67
19481.45	106.319520.81		106.3919543.77		105.8519612.66		10619619.21		106.84
19668.42	108.0619707.78		106.61 19737.3		107.11 19753.7		110.7719763.54		110.54
19773.38	107.24 19802.9		106.419838.98		107.9819858.66		107.9919875.06		109.95
19901.3	111.1719947.22		125.0519953.79		125.6820045.63		123.8220071.87		122.87
20157.15	124.2120206.36		123.48 20265.4		123.0720275.24		119.4720294.92		118.76
20340.84	114.9320367.08		115.5520386.77		105.06 20413		98.5320429.41		90.22

Manning's n Values num= 5

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     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108  9834.3    .066 9860.54    .01510178.73    .06610398.51    .144

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9834.310178.73             2822    2844    2893             .1       .3
Left Levee      Station=       0      Elevation=  117.67
Right Levee     Station=16739.26      Elevation=  114.52
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0  9119.2  106.05

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.27    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.20    Wt. n-Val.                 0.108      0.021      0.138
  W.S. Elev (ft)            115.07    Reach Len. (ft)          2822.00    2844.00    2893.00
  Crit W.S. (ft)             95.81    Flow Area (sq ft)       84570.34   12042.34   96324.63
  E.G. Slope (ft/ft)      0.000049    Area (sq ft)            84570.34   12042.34   96324.63
  Q Total (cfs)           130000.00    Flow (cfs)              34498.38   62418.64   33082.98
  Top Width (ft)          19824.66    Top Width (ft)           9675.63     344.43    9804.60
  Vel Total (ft/s)            0.67    Avg. Vel. (ft/s)            0.41       5.18       0.34
  Max Chl Dpth (ft)          43.41    Hydr. Depth (ft)            8.74      34.96       9.82
  Conv. Total (cfs)       18617380.0    Conv. (cfs)             4940534.0  8939013.0  4737834.0
  Length Wtd. (ft)         2853.35    Wetted Per. (ft)         9680.29     356.77    9849.98
  Min Ch El (ft)             71.66    Shear (lb/sq ft)            0.03       0.10       0.03
  Alpha                      28.58    Stream Power (lb/ft s)      0.01       0.53       0.01
  Frctn Loss (ft)             0.13    Cum Volume (acre-ft)    158176.20   58417.61   189244.10
  C & E Loss (ft)             0.05    Cum SA (acres)          20273.15    2483.01   22964.68


Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 160

INPUT
Description: New Cross-Section, Updated on left with new survey to Station
             508.98, Bathymetric elevations translated from New Cross-Section
             161.3
Station Elevation Data    num=     474
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  117.61       4  117.76      22  117.82      29  117.61      30  110.74
      31   101.6      32  101.38      43  101.35      62  100.78      72  100.19
   87.99    99.4   96.99   98.59  104.99   98.06  113.99   97.09  137.99   95.15
  139.99   95.15  157.99    96.7  168.99   98.07  181.99  100.81  201.99  105.29
  216.98  105.56  223.98  105.83  247.98  105.75  305.98  105.87  342.97  105.76
  371.97  105.77  426.97   105.9  466.96  105.75  503.96  105.45  508.96  105.49
  521.58  105.84  537.98  106.68   551.1  102.55  577.34  102.26  623.27  102.53
  656.07  102.22  698.72   102.8  715.12  106.22  724.96  105.27  741.36   97.74
   751.2   95.16   767.6   94.01  780.73   92.03  846.33   92.21  866.01   93.11
  892.26   92.46  928.34   92.79  954.58    92.4  977.55   92.76 1066.12   92.54
 1092.36   93.02 1115.32   92.75 1187.49   94.22 1230.13   93.84 1292.46   93.82
 1331.83   94.12 1492.56   94.35 1522.09   94.62 1613.94   94.52 1659.86   94.98
 1705.79   94.65 1774.67   94.94 1784.51   95.35 1797.64   98.95 1823.88   97.92
 1876.36   98.75 1961.65   98.62 2027.26   98.88 2043.66  100.32 2050.22   102.3
 2092.87  102.55 2102.71  101.91 2165.04  101.77 2227.37     102 2329.06   101.7
  2440.6  102.02 2519.33  101.92 2785.04  101.83 2890.02   101.7  2909.7  102.27
 3037.64  101.95 3073.72  102.18 3142.61  102.01 3254.15  102.01 3283.67  101.46
 3306.63  102.24 3342.72  100.88 3391.93  101.24 3447.69   100.8 3487.06  101.16
 3710.13  100.87 3723.25  101.22 3772.46  100.71  3798.7  102.53 3880.71  102.23
 3962.72  102.53 4110.34  102.33 4244.83  102.56 4595.84  102.44    4668  102.74
 4727.05  102.73 4759.86  103.35 4792.66  105.08 4904.19  104.64  4920.6  105.18
 4940.28  104.67 4973.08  105.04 4992.77  104.46 5022.29   105.2 5045.25  104.55
 5074.78  104.91 5117.42  104.61 5173.19  104.99 5192.87  104.57  5222.4  105.03
 5242.08  104.47 5304.41  104.98 5333.93  104.47 5347.05  104.96 5360.17   103.1
 5383.14  101.65 5396.26  100.07  5422.5   99.84 5576.68   99.68 5688.22   99.84
  5724.3   99.66 5878.48    99.7 5894.88   99.97 5927.69  101.69 5963.77  101.15
 6085.15  101.48 6281.97  101.27 6363.98  101.49 6462.39  101.23 6573.93  101.14
 6593.61  101.45 6685.46  101.46 6724.83  101.78 6744.51  100.11 6777.31   98.99
 6852.76   99.17 6872.45   97.95 6888.85   95.46 6905.25   91.92 6915.09   90.98
  6947.9   90.12 7000.38   92.79 7020.07   96.03 7043.03   98.88 7072.55   97.57
 7088.95  100.58 7102.08  101.66  7115.2   99.97 7121.76  101.26 7141.44  100.07
  7164.4  101.76 7174.25  101.52 7197.21   98.91 7216.89   99.73 7252.98   97.64
 7262.82   93.06 7275.94   88.78  7298.9   79.44 7318.58   78.25 7341.58    71.6
 7371.58    71.6 7401.58    73.9 7421.58    73.2 7431.58    75.2 7461.58    75.9
 7471.58    75.5 7511.58    76.9 7521.58   77.87 7564.62   78.28 7574.46   80.97
 7594.14   94.16  7617.1  102.73  7633.5  106.49 7646.63  107.23 7685.99  106.99
  7718.8  108.03 7754.88  106.77 7781.12  106.42 7804.09  105.27 7869.69  104.55
 7882.82  104.97 7932.02  104.26 8014.03  104.08 8020.59  102.46 8046.84  102.65
 8082.92  101.51 8092.76  102.67 8122.29  103.91 8155.09   102.7 8197.74   102.4
 8312.55  104.42 8342.07  103.67 8358.47  104.14 8391.27  103.28 8404.39  103.63
  8437.2  102.89 8447.04  103.66 8479.84  103.38 8601.21  103.14 8614.33   102.7
 8660.25  103.29  8702.9  102.86  8735.7  103.05 8889.87  102.41 8912.84  101.98
  8968.6  101.83 9027.65  101.36 9050.61  101.54  9116.2   100.8 9230.97  100.57
  9273.6   100.3 9329.35  100.74 9345.75  101.44 9388.38  100.57 9434.29  100.97
 9483.48  100.45 9529.39    99.6 9581.86   99.92 9621.21  102.41 9647.44  104.66
 9686.79  105.66 9735.98  105.13 9745.82  104.58 9778.62  104.99 9817.97  104.33
 9857.32  104.14 9962.26  104.4310063.91  103.9310119.66   104.310168.85  103.89
10244.28  104.2110322.98  103.8410359.05  104.2210513.18  103.9110680.42  103.91
10768.96  103.7810860.78  103.9110932.93  104.22 10985.4  103.7711060.82  104.08
11218.23  103.8911241.18   104.311316.61   104.111457.62   104.311470.73  105.62
11487.13  105.8411500.25  104.4611519.92  104.1311615.02  104.3211651.09  103.81
11680.61  104.0711782.27  103.8811870.81  103.9911883.92  104.2312015.13  103.63
12077.45  103.6812106.97  104.2612129.93  103.9812179.13  104.5512188.97  104.19
12241.45  105.0512303.76   104.612323.44  102.7512333.28  103.0612343.12  105.86
12395.61  105.2812582.58  105.7312641.62  105.4212680.97  106.1212726.89  105.65
12776.09  105.6912802.33  104.8612812.17     10612835.13  104.5512913.86  105.31
12936.82  105.0313008.99  105.4713022.11  104.9213094.27  104.92 13153.3  105.49
13169.71  105.0813215.62     10513241.86  105.4613277.94  105.0313356.66  105.23
13376.34  106.47 13399.3  105.1513491.15  105.3113576.43  105.2713710.91  105.61
13776.51   105.513819.15   105.713937.23  105.5313947.07  106.6913973.32  105.13
14015.96  105.5914055.32  103.9614081.56  103.3414097.96  104.1714117.64  102.09
 14140.6   96.0114150.44   94.9214183.24   94.7714193.08   95.49 14206.2   98.55
14219.32  104.6514258.68  106.4114314.44  106.17 14337.4   106.514363.64  106.01
14442.36   105.4   14485  106.3314521.09  106.5814547.33  105.2614622.77  105.52
14652.29  104.8114717.89  105.6114740.85  105.3414767.09   104.114813.01  104.94
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14947.49  104.1515167.26  105.3215216.46  105.0815245.98  105.5615334.54  106.08
15508.38   105.7 15554.3  105.8815596.95  105.6415642.87  106.0815731.43  105.81
15806.87  106.1215892.15  105.8716003.66     10616059.43  105.8416167.68  105.16
 16213.6  105.1216259.52  105.9516275.92  106.8416292.32  112.6816308.72  114.56
16325.12  113.4216334.96  109.7116367.75   107.616397.27  107.1916449.74  107.15
16462.86  108.4716492.37  109.0716521.88  107.8116531.72   108.216554.68  107.12
16571.07  107.4616594.03  105.3816616.98  105.5716633.38  107.8116698.97  106.77
16751.44  107.9616771.11  108.8316790.79  106.8416826.86  106.6616839.98  107.12
16849.81   106.116882.61  106.1616892.45  107.0116928.52  106.9516958.03  106.21
17007.22  106.7517043.29  106.3317059.69  106.8117148.23  106.1617171.19  106.47
17207.26  106.0117256.45  107.8217276.12  108.1817308.92   107.217335.15  107.86
17348.27  105.82 17390.9  106.3317397.46  107.0617417.13  106.5717456.48  107.09
 17469.6  106.4417499.12  106.9517561.42  106.0717567.98  105.3817607.33  105.48
17627.01  106.2517653.24  105.7217689.31  105.9317708.99  107.0317722.11  106.49
17748.34  107.7417777.86  106.89 17833.6  107.4117876.23  106.5817895.91  105.17
 17928.7  106.18 17945.1  106.0417994.29  107.0918027.08  106.67 18118.9  107.02
18223.84  106.4618282.87  105.4718322.22  105.3818338.62  106.6618358.29  105.45
18417.32  105.4818443.55  105.1318459.95  106.4318486.18  105.6918522.26  105.78
18545.21  106.4118581.28  104.9518614.08  105.2118679.66  107.4718702.62  105.83
18797.72  104.9118830.51  105.0118840.35   105.718889.54  106.3818919.05  105.64
 18958.4  105.4219010.87  105.6719037.11  106.2319063.34  105.89 19069.9  105.01
19115.81  104.8819132.21  105.8119138.76  104.79   19165  105.8519220.75  105.66
 19243.7   106.319276.49   105.919289.61   106.519325.68   106.4 19355.2  107.07
19371.59  110.7519381.43  110.4219391.27  107.07 19417.5  106.2719443.74  107.52
19466.69   107.519489.65  110.21 19512.6  110.6419535.56  113.37 19545.4   121.2
19558.51  125.1719581.47  125.0319610.98  125.7119637.22  124.0819673.29  123.78
19683.13  122.01 19719.2  122.6819801.18  122.5819847.09  123.2719866.77  122.97
19883.16  121.54   19893  118.76 19909.4  116.7419948.75  115.41 19988.1  114.94
20001.22  107.3220014.34  101.1320030.73   97.6520043.85   90.2820217.65   90.22
20224.21   92.1520230.77   97.1520253.72  108.17 20273.4  108.65

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108 7252.98    .066 7318.58    .015 7564.62     .07  7633.5    .066
 10985.4    .144

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7252.98  7617.1          4690.55 4824.53 1212.75             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  7617.1 20273.4  102.73       T
Left Levee      Station=      22      Elevation=  117.82
Right Levee     Station=16308.72      Elevation=  114.56
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0  7164.4  101.76

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.10    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.108      0.037      0.103
  W.S. Elev (ft)            115.06    Reach Len. (ft)          4690.55    4824.53    1212.75
  Crit W.S. (ft)             94.33    Flow Area (sq ft)       91915.71   13043.80   121650.30
  E.G. Slope (ft/ft)      0.000040    Area (sq ft)            91915.71   13043.80   126195.80
  Q Total (cfs)           130000.00    Flow (cfs)              43501.14   34930.71   51568.14
  Top Width (ft)          19804.05    Top Width (ft)           7223.61     364.12   12216.32
  Vel Total (ft/s)            0.57    Avg. Vel. (ft/s)            0.47       2.68       0.42
  Max Chl Dpth (ft)          43.46    Hydr. Depth (ft)           12.72      35.82       9.96
  Conv. Total (cfs)       20570190.0    Conv. (cfs)             6883283.0   5527165.0   8159743.0
  Length Wtd. (ft)         3059.57    Wetted Per. (ft)         7238.33     374.93   12243.75
  Min Ch El (ft)             71.60    Shear (lb/sq ft)            0.03       0.09       0.02
  Alpha                       6.30    Stream Power (lb/ft s)      0.01       0.23       0.01
  Frctn Loss (ft)             0.18    Cum Volume (acre-ft)    152459.50   57598.68   181854.80
  C & E Loss (ft)             0.00    Cum SA (acres)          19725.75    2459.88   22233.43


Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 159

INPUT
Description: New Cross-Section, Bathymetric elevations translated from New
             Cross-Section 161.3
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  117.77   13.11  117.75   19.67  107.37   72.13  105.63    91.8   94.99
  108.19    92.2  118.03   96.32   137.7   94.78  167.21   93.48  206.55   93.28
  298.35   93.59  314.75   93.45  668.84    94.3  685.23   94.12  803.26   94.49
  829.49   94.37  970.47   94.83 1049.16    94.9 1072.11   95.79 1085.23   98.53
 1108.18    99.3 1118.01  101.72  1134.4  103.67 1147.52  101.68 1154.08  102.18
 1163.91  106.72  1196.7  109.88 1203.25  108.15 1213.09  102.47 1229.48  100.62
 1245.88  100.48 1255.71   92.09 1285.22   82.59 1295.06   77.69 1295.06   78.03
 1308.06   72.98 1318.06   71.38 1348.06   71.38 1378.06   73.68 1398.06   72.98
 1408.06   74.98 1438.06   75.68 1445.87   77.69 1455.71   80.27  1472.1   86.64
 1485.21   86.64 1498.33   89.84 1508.16   90.51 1527.83   96.12 1544.23   98.88
 1570.46   98.45 1593.41   97.36 1613.08   95.63 1622.91   94.07 1662.26   91.59
 1681.93   93.63  1701.6    92.3 1711.44   93.28 1727.83   92.97 1754.06   94.69
 1780.29   94.44 1809.79   95.53 1819.63   94.79 1849.14   95.29 1858.97   96.59
  1885.2   96.38 1917.99   97.57 1954.05    97.9 1967.17  100.02    1977   98.96
 2016.34  100.78  2085.2  101.25 2098.31  101.72 2173.72  102.28 2196.67  101.96
 2232.74  102.32 2275.36  102.03 2288.48  101.34 2337.66   101.3  2439.3  101.58
 2449.13  102.13 2626.18  101.25 2658.97  102.21 2681.92  101.95 2721.26  102.66
  2731.1  101.85 2836.06  102.38 2901.66  101.96 2950.86  101.92 2986.94  101.56
 3016.46  101.89  3059.1  101.08 3150.94  101.63 3180.46  102.23  3223.1  101.58
 3282.14  102.41 3357.58  101.85 3380.54  102.84 3390.38  102.18 3423.18  102.53
 3475.66  102.58 3639.66  102.14 3646.22  102.74 3669.18  101.81 3708.54  101.98
 3718.38  101.58 3879.11  101.85 3954.55  102.23 4010.31  101.29 4049.67  101.31
 4069.35  100.82 4095.59  101.02 4111.99  102.66 4138.23  102.38 4167.75  103.14
 4197.27  105.26 4230.07  105.81 4269.44  105.47 4282.56  104.74 4315.36  105.35
 4397.36  104.99 4430.16  105.62 4453.13  105.51 4472.81  106.18 4489.21  104.27
 4610.57  104.54 4692.58  104.26 4745.06  104.56 4758.18  103.62 4790.98  104.53
 4827.06  104.02 4882.83  104.34 4945.15  103.96 5023.87  104.45 5033.71  103.88
 5082.92  104.02 5125.56   104.5 5240.36  104.01 5289.57  103.51 5358.45  103.57
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 5407.65  103.92 5479.82  103.55 5506.06  105.11  5548.7  104.67 5574.94  103.53
 5732.39  103.69 5843.91  103.42 5870.16     105 5883.28  103.84 5916.08  103.82
  5929.2   99.82 5939.04   100.6    5962   99.45 5971.84   97.05 6007.92   94.74
 6053.84   95.68 6099.77   95.54 6109.61   95.06 6129.29   96.44 6145.69    96.6
 6158.81   98.67 6165.37    97.5 6191.61   99.44 6214.57  102.47 6224.41  100.24
 6253.93  103.75 6339.22  103.07  6375.3   102.1 6404.82     103 6463.87  103.12
 6496.67  101.94 6572.13  101.86 6601.65  102.23 6739.45  101.47  6782.1  101.68
 6795.22  101.16 6880.52  100.89 6929.73  101.01 6955.98  100.48 7090.49  100.41
 7133.14  100.96 7274.21   99.52 7333.26  100.24 7346.39  102.74 7362.79  102.85
 7379.19  105.04    7412  104.92 7428.41  105.99 7510.42  105.43 7526.83  104.64
 7553.07   104.5  7582.6  105.14 7618.69  105.02 7644.94  104.33 7654.78  105.21
 7661.34   99.39 7671.18   96.13 7690.87   94.43 7700.71   94.96 7717.11    93.8
 7743.36   95.27 7759.76   97.78 7782.73  103.74 7789.29  104.63 7802.41  103.85
 7815.54   104.5 7871.31  104.19 7887.71  104.59  7923.8  104.39 7959.89  104.92
 7989.42  104.91 7995.98  104.07 8107.52  104.03 8120.65  105.09 8133.77  104.38
 8160.02  104.58 8173.14  103.88 8202.67  103.66  8301.1  104.01 8333.92  103.61
 8402.82  104.29 8409.39     104 8534.07  103.97 8550.48  104.15 8609.54  103.73
 8753.92   103.7 8799.85  103.89 8872.04  103.84  8931.1  104.19 8940.95  103.85
 8973.76  104.38 9029.54  104.43 9150.95   103.9 9269.07  102.96 9321.57   103.1
 9341.26   105.1 9357.67  104.86  9387.2  102.93 9446.26  103.71  9508.6  103.24
 9541.42  103.71 9643.13  103.35 9728.42   103.9 9741.54   103.5 9810.42   104.5
 9918.67  104.57 9958.04   105.410040.04  105.2310076.12  105.5410112.21  105.22
10131.89  105.7910181.09  105.3910210.62  105.67 10279.5  105.6410289.34  105.21
10318.87  105.5710394.31  105.3710410.71  104.9910420.55  106.03 10446.8  104.23
10505.84  104.8210587.85  104.8810604.25  105.8710637.05   104.910673.13  105.41
 10696.1  105.06 10778.1  104.7910810.91  105.3610837.15  104.7610886.35     105
 10961.8  105.0410984.76  105.5611020.84  104.8411115.97  105.31 11243.9  105.27
11316.07  105.5211417.76  105.4711466.96  105.7711555.53  105.4311575.21  106.54
11585.05  105.2711601.45  104.9711627.69  105.5511670.34  104.2811690.02  103.09
 11709.7  104.08 11726.1  102.7911739.22   98.5111755.62   95.8811794.99   95.08
11804.83   96.3911821.23  104.2311831.07  106.4511850.75  105.94   11877  107.24
11896.68  105.6811945.88  105.86 11991.8  105.5812027.89  106.4612093.49  105.99
12168.94  106.9112182.06  105.58 12208.3  106.6412231.26  106.5712241.11  105.44
12270.63  105.1512303.43  105.4812326.39  104.99 12375.6  104.75   12392  105.09
12411.68  104.4412451.04  104.27 12457.6   105.212477.29  105.2412533.05  104.43
12556.01  104.6112664.26  104.1712723.31  104.3512769.23  104.8812834.83  104.88
12956.21  105.6613061.17  105.5313113.66  105.8313212.07  105.9413241.59  105.58
13251.43  106.0513313.75  105.9913369.52   106.213513.85  106.1813602.42  105.73
13651.62  105.7713707.39  105.3513736.91  105.4713815.64  105.0713884.52  105.98
 13887.8  106.46 13904.2  113.8613927.17  114.8813937.01  113.5213946.85  109.64
13959.97  107.6313992.77  106.2914035.42  106.1814114.14     10714199.43  104.79
14238.79  104.2614261.75  104.7814274.88  104.2114291.28  105.5414347.04  106.93
14376.56  107.1214488.09  106.32 14520.9  106.4414534.02  107.03 14570.1  106.42
14638.99  106.5514661.95  106.3114707.87  107.4414747.23  107.1714763.64  106.28
14776.76  106.8114825.96  105.9414862.04  106.1814891.57  105.8914917.81  106.19
14963.73     10614986.69  106.96 15019.5  107.03 15101.5   107.715134.31   106.9
15222.87  106.3115229.43  105.4715265.52  105.3415275.36  106.7815308.16  106.84
   15318  106.0515367.21  106.4315426.25  105.6715452.49  106.8915488.58  106.95
15511.54  106.2115573.86  105.0815586.98   106.115603.39  105.7915629.63  106.41
15646.03  107.4115665.71  107.5915675.55  106.7515698.51  107.5415714.92  106.88
15790.36  106.5715872.37  106.6515898.61  106.0915934.69  106.0215980.62  105.16
 16000.3  105.5416095.43  105.2716115.11  105.9116164.31  104.7916262.72  104.35
 16282.4  105.6216351.29   105.116403.78  105.8216446.44  104.9116489.09  104.93
16525.19  106.9116561.28  105.4716597.37  104.7916643.31  104.4716659.72  105.31
 16731.9  105.3916797.53  105.0116869.72  105.7116876.28  106.5516899.25  105.37
16915.65  105.8616928.78  105.0616964.87  107.0416971.44  106.4316997.69  106.96
17014.09  110.6317023.94  110.5717037.06  107.0117066.59  106.4617073.15  107.26
17112.53  108.0517128.94  109.4417155.19  110.3617174.87   113.317191.28  117.49
17207.69  123.1617230.65  124.37 17240.5  123.8417276.59   123.817286.44  122.64
17319.25  121.05 17345.5  122.0317375.03  121.8517394.72  122.4817434.09  122.52
17460.34  122.0317473.47  121.1317509.56  121.2117529.25  119.2917535.81  117.21
17552.22  116.2917575.19  116.1717614.56  114.73 17624.4  115.4317630.97  113.81
17640.81  107.75 17660.5    99.717673.62   96.6717686.75   90.2217860.65   90.22
17867.22   91.7617873.78   97.2617893.47  108.5317903.31  109.9717913.15  109.67

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108  1196.7    .066 1295.06    .015 1445.87    .066 1544.23    .144

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1245.88 1544.23        11213.4411093.096165.786             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1544.2317913.15   98.88       T
Left Levee      Station=       0      Elevation=  117.77
Right Levee     Station=13927.17      Elevation=  114.88

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            114.91    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.107      0.045      0.144
  W.S. Elev (ft)            114.86    Reach Len. (ft)         11213.44   11093.09    6165.79
  Crit W.S. (ft)            100.41    Flow Area (sq ft)       23140.65   10110.45   140369.80
  E.G. Slope (ft/ft)      0.000100    Area (sq ft)            23140.65   10110.45   143019.30
  Q Total (cfs)           130000.00     Flow (cfs)             22706.03   34264.67   73029.31
  Top Width (ft)          13911.77    Top Width (ft)           1230.94     298.35   12382.47
  Vel Total (ft/s)            0.75    Avg. Vel. (ft/s)           0.98       3.39       0.52
  Max Chl Dpth (ft)          43.48    Hydr. Depth (ft)          18.80      33.89      11.34
  Conv. Total (cfs)       13001520.0     Conv. (cfs)            2270869.0   3426868.0   7303787.0
  Length Wtd. (ft)         9475.66    Wetted Per. (ft)         1242.84     309.01   12396.85
  Min Ch El (ft)             71.38    Shear (lb/sq ft)           0.12       0.20       0.07
  Alpha                       5.97    Stream Power (lb/ft s)     0.11       0.69       0.04
  Frctn Loss (ft)             1.13    Cum Volume (acre-ft)    146264.80   56316.45   178107.20
  C & E Loss (ft)             0.00    Cum SA (acres)          19270.55    2423.19   21891.01


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 157.2

INPUT
Description: New Cross-Section, Bathymetric elevations translated from USIBWC
             XS 115.15
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
      0  115.77    3.28   112.9    6.56  104.54    9.84  101.68   13.12  101.41
  59.05  100.79   72.17  100.42   82.01  100.81  111.53   100.6  144.33  100.91
 203.38  100.82  219.78  101.19  229.62  101.94  252.58   101.2  278.82  100.91
 298.51  101.29  318.19  100.84  380.51  101.28  396.91  101.63   416.6  101.34
 436.28  102.67   449.4  101.88  462.52  103.54   482.2  103.05  492.04  104.41
 505.16  103.13  524.85  102.68  541.25  102.85  551.09  102.34  587.17  102.57
 597.01  103.02  619.97  103.09  642.94   102.6  662.62  103.18  675.74   102.8
  698.7   103.4  721.66  103.01   731.5  103.62  751.19  103.19  774.15  103.61
 780.71  103.21  806.95  103.79  813.51   103.3  823.35  104.06  843.03   103.4
 921.76  104.02  951.28  105.29  957.84  104.76  970.97  101.51  987.37  100.08
1000.49  101.87 1023.45  100.42 1033.29   98.79 1056.25   97.28 1121.86   97.15
1134.98   97.55 1151.38   97.26 1171.06   97.63 1223.55    97.4 1246.51    97.6
1298.99    97.6  1348.2    98.1 1410.52   97.71  1430.2      98 1449.89   97.73
1508.93   97.96 1525.33   98.36 1554.85   97.85 1610.62   98.12  1646.7   98.65
1672.94   98.31 1705.75   98.67  1830.4   99.23  1863.2   99.14    1896   99.79
1915.68   99.41 1961.61   99.59 1974.73   100.2 1997.69     100 2007.53  100.47
2037.06  100.92 2050.18  100.47  2079.7  101.01 2089.54  100.48 2115.78  101.04
2122.34  100.43 2148.58   99.73 2155.14  100.16 2207.63   99.28 2256.83   99.44
2273.23   99.14 2306.03   99.63 2351.96   99.12 2384.76   99.31 2453.64   98.96
2558.61   99.28 2581.57   98.92 2657.02   99.13 2686.54   98.77 2716.06   99.08
2739.02   98.81 2824.31   98.95 2876.79   98.72 2906.31    99.1 2925.99   99.64
2948.95  101.05 2971.92  100.84 2998.16  101.12  3040.8  100.87 3103.12  100.98
3112.97  101.31 3178.57  100.89 3214.65  101.02 3244.17  101.62 3293.38   99.51
3326.18   99.29 3362.26   99.68  3388.5   99.31 3401.62   99.65 3414.75   99.32
3454.11   99.19 3509.87   99.28 3578.76   99.11 3595.16   98.86 3673.88   98.94
3746.05   98.73 3755.89   98.99 3782.13   98.54 3801.81   98.83 3824.77   98.55
3854.29   98.67  3919.9   98.28 3949.42   98.55  3969.1   98.21 4044.55   98.27
4057.67   98.75 4070.79   98.25 4103.59   98.52 4123.27   98.22 4152.79   98.67
4188.88   98.36 4270.88   98.71 4293.84   99.03 4336.49   98.81 4346.33   99.34
4375.85    98.9 4395.53    99.1 4434.89   98.92 4493.94    99.4 4539.86   99.33
4585.78   99.81 4648.11   99.44 4690.75   99.73 4700.59  100.16 4720.27    99.9
4776.04  100.04  4815.4   99.91 4867.88  100.24 4910.53   99.23 4936.77  100.09
4979.41   99.53 4995.81   99.89 5018.78   98.61 5035.18   98.98 5041.74      97
5061.42      95 5077.82   94.83 5087.66   95.54 5094.22   94.78  5130.3    95.9
5136.86   96.58 5186.07   98.78 5212.31   99.73 5228.71   99.35 5251.67   97.65
5271.35   97.31  5281.2   98.19 5291.04   98.06 5304.16   95.83 5310.72   95.65
5323.84   96.81  5346.8   95.13 5373.04   94.13 5386.16   94.17    5396   92.82
5409.12   94.24 5418.97   94.62 5445.21   93.39 5458.33   93.74 5471.45   91.74
5491.13   94.02 5500.97   97.43 5517.37   96.84 5537.05   97.05 5576.42   96.81
5586.26   98.32  5596.1   98.51  5612.5   95.74 5619.06   95.64 5638.74   96.97
5648.58   96.73 5655.14   94.44 5664.98   88.96 5671.54   86.74 5687.95   85.16
5694.51   83.52 5704.35   78.69 5710.91   76.98 5717.47   76.61 5725.47    72.9
5735.47      70 5745.47    68.9 5785.47    70.9 5815.47    70.9 5835.47    71.9
5845.47    71.9 5855.24   76.62 5868.36   86.32 5881.48   94.57  5894.6  103.59
5897.88  104.29 5914.28  105.02 5940.53   105.3 5950.37  105.81 5966.77  105.21
5996.28  105.69 6029.07  105.56 6035.63     106 6061.86  105.22 6094.66  105.29
6114.33  106.12  6150.4  105.88 6222.54  106.38 6252.05  105.72 6268.45  105.95
6284.84  104.16 6297.96  104.44 6327.47  103.84 6334.03  104.72 6363.54  104.95
6379.94  104.49 6484.87   104.1 6517.66  103.58 6570.13  103.71 6599.64   103.5
6638.99  103.52 6704.57  104.31 6743.92  104.33 6750.48  104.69 6845.57  105.02
6861.97  105.31 6940.66  105.53 6973.46  105.89 7035.76  105.86 7065.27  106.17
7098.06  105.91 7114.46  105.12 7147.25  106.04 7183.32  105.78  7248.9  105.71
7291.53  105.83  7327.6  105.57 7360.39  105.71 7376.78  106.26 7386.62  105.77
7422.69  105.74 7429.25  105.49  7468.6  105.34 7507.95  104.74 7527.62  104.81
7563.69  104.44 7603.04  105.16 7629.27     105 7678.46  105.51 7694.86  105.94
7704.69  109.05 7714.53  113.23 7721.09  114.56 7734.21  114.76 7744.04   113.6
 7750.6  110.63    7767  110.43 7773.56  109.63 7780.11  107.24 7786.67  106.43
7809.63  106.69 7822.74  106.35 7832.58  106.86 7875.21  106.51 7921.11  106.84
7944.07  106.13 7980.14  106.19 8009.65  107.65 8026.05  106.35 8045.72  106.92
8055.56  106.16 8091.63  107.14 8157.21  107.03 8180.16  105.96 8219.51  106.19
8258.87  105.86  8268.7  106.37 8304.78  106.04 8324.45   106.1 8334.29  106.65
8357.25   106.1  8396.6  106.26 8422.83  106.71 8435.95  107.51 8452.34  107.62
 8458.9  107.07 8485.14  106.46 8501.53  106.66 8531.05  105.27    8554  105.83
8560.56  106.39 8573.68  105.93  8649.1  106.04 8652.38  106.43 8701.57  106.05
8737.64   106.2 8747.48  105.76 8783.55   105.7 8803.23  106.71 8816.35  105.96
8845.86  106.76 8865.54  106.44 8881.93  105.73 8924.56  105.25 8937.68  105.75
8954.08  105.51 8967.19  106.75 8996.71  106.48 9016.38  107.01 9032.78  106.91
9055.74  105.67 9075.41  106.26  9124.6  106.04 9137.72  105.26 9150.83  105.47
9173.79  105.18 9180.35  105.82  9219.7  106.75 9226.26  106.19 9242.66  106.31
9262.33  105.29  9298.4  105.72 9311.52  105.14 9344.31  105.64 9354.15  106.39
9370.55  106.37 9380.39  105.83 9413.18  105.99 9432.85  105.45 9439.41  105.72
9459.09  104.91 9475.49  104.86 9498.44  105.73 9514.84  105.52 9534.51  106.37
9570.58  106.48 9586.98  105.83  9600.1  106.69 9636.17  106.29 9665.68  106.83
9705.04  106.23 9718.15  106.53 9747.67  106.01 9780.46   106.4 9793.58  105.71
9816.53  105.76 9836.21  106.43 9872.28  106.15 9882.12  105.69 9905.07   105.8
9911.63  105.46 9937.87   106.1 9967.38   105.8 9973.94  105.0210010.01   104.8
10019.85  105.310062.48  104.4110111.67  104.2810144.46  104.5810180.53  105.44
10193.65  104.8910223.17  105.0510262.52  104.6110288.75  104.9510308.43  104.31
10334.66  104.88 10344.5  104.4510377.29  104.9110393.69  104.7610413.36   105.1
10426.48  104.7110449.44  104.8710492.07  106.2810537.98  105.4610577.33  105.71
10603.56  104.7310636.36     10510646.19  104.6210701.94   104.910744.57  105.54
10767.53  106.49 10803.6  106.1710836.39  107.0510849.51  106.4110872.47  106.96
10879.02  107.5210892.14  110.4510901.98  110.48 10915.1  106.7410924.93  106.54
10957.73  107.7210980.68  108.1711013.48  109.6811033.15  109.3511042.99  111.56
11059.39   111.611079.06  114.8611095.46  116.3811102.02  118.7411111.85  123.87
11121.69  123.5311131.53  121.6611147.93  120.1911170.88  119.4411180.72  117.22
 11200.4  117.1211213.51  118.1911236.47  118.7111246.31  119.89 11262.7  120.68
 11279.1  120.2111302.05  120.9411311.89  120.83 11374.2  121.0511400.43  120.02
11416.83  120.5811449.62  117.2311475.86  114.9911498.81  114.4911511.93  115.21
11518.49   113.911528.33   107.811541.44  101.0811551.28   99.311557.84   96.23
 11564.4   91.3711570.96   90.2211744.76   90.23 11754.6   95.5611770.99  100.57
11784.11  106.8911790.67  108.4511807.07  109.6611823.46  108.5511852.98  108.28

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .102  5596.1    .066 5717.47    .015 5855.24    .066  5894.6    .078

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5596.1  5894.6           936.61 4252.55 5284.79            .1       .3
Left Levee      Station=       0      Elevation=  115.77
Right Levee     Station= 7734.21      Elevation=  114.76
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  895.01 5590.36   98.47

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            113.78    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                0.102      0.047     0.078
  W.S. Elev (ft)            113.71    Reach Len. (ft)          936.61    4252.55   5284.79
  Crit W.S. (ft)            102.89    Flow Area (sq ft)       78153.56    9633.44  15520.92
  E.G. Slope (ft/ft)      0.000144    Area (sq ft)            78153.56    9633.44  15520.92
```

Q Total (cfs)	130000.00	Flow (cfs)	79282.30	35908.45	14809.25
Top Width (ft)	7714.54	Top Width (ft)	5593.75	298.50	1822.29
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)	1.01	3.73	0.95
Max Chl Dpth (ft)	44.81	Hydr. Depth (ft)	13.97	32.27	8.52
Conv. Total (cfs)	10817740.0	Conv. (cfs)	6597347.0	2988063.0	1232327.0
Length Wtd. (ft)	2857.31	Wetted Per. (ft)	5602.87	313.41	1824.13
Min Ch El (ft)	68.90	Shear (lb/sq ft)	0.13	0.28	0.08
Alpha	2.89	Stream Power (lb/ft s)	0.13	1.03	0.07
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)	133227.00	53802.43	166886.80
C & E Loss (ft)	0.03	Cum SA (acres)	18392.13	2347.20	20885.69

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 157.15

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	99.7	3.28	100.09	6.55	100.21	13.11	101.93	22.94	105.1
29.5	107.09	36.05	108.98	45.88	112.15	55.72	115.11	58.99	115.87
62.27	116.32	85.21	116.53	88.49	113.57	91.77	105.88	95.05	101.42
98.32	101.32	114.71	101.2	121.27	101.1	131.1	100.81	140.93	100.91
144.21	100.62	150.76	100.47	163.87	100.63	173.7	100.94	180.26	101.28
193.37	100.87	199.92	100.83	209.76	100.66	216.31	100.88	222.87	100.83
235.98	100.91	242.53	100.75	265.47	100.79	275.31	100.91	281.86	100.71
288.42	100.84	294.97	100.81	304.8	101.1	311.36	100.95	317.91	100.9
331.02	100.94	337.58	101.01	347.41	100.91	360.52	101.21	370.35	101.31
376.91	101.82	386.74	101.82	393.29	101.3	399.85	101.41	409.68	101.88
412.96	101.64	422.79	101.98	432.62	102.09	435.9	102.32	449.01	102.69
458.84	102.5	468.67	102.72	475.23	102.38	478.51	102.39	485.06	102.61
491.62	102.44	501.45	102.29	508	102.38	514.56	102.33	521.11	102.51
527.67	102.44	534.22	102.72	544.06	102.55	563.72	102.35	570.28	102.68
576.83	102.61	583.39	102.64	589.94	102.81	596.5	102.75	606.33	102.78
612.88	102.65	625.99	102.52	632.55	102.75	639.1	102.56	645.66	102.6
652.21	103	662.05	102.95	668.6	103.2	675.16	103.14	681.71	103.21
688.26	102.97	691.54	103.1	701.37	102.79	711.21	102.96	724.32	103.47
734.15	103.14	740.7	103.11	747.26	103.28	753.81	103.28	766.92	103.07
776.76	103.21	783.31	103.46	793.14	103.66	799.7	103.59	802.98	103.76
812.81	103.69	816.09	103.89	819.36	103.77	822.64	103.43	829.2	103.56
848.86	103.32	855.42	103.5	861.97	103.43	868.53	103.61	878.36	103.65
884.91	103.87	894.75	103.74	901.3	103.93	907.86	103.92	917.69	103.69
920.97	103.72	927.52	104.01	934.08	103.97	940.63	104.12	947.19	103.86
960.29	104.06	966.85	104.05	973.4	104.25	979.96	104.08	983.24	103.88
989.79	103.21	993.07	103.07	996.35	103.51	999.62	104.28	1006.18	104.85
1009.46	104.99	1019.29	104.6	1022.57	104	1029.12	102.18	1035.68	101.04
1042.23	98.97	1045.51	98.1	1048.79	97.68	1052.06	97.68	1055.34	97.91
1058.62	97.76	1065.17	97.2	1068.45	97.11	1075.01	97.42	1081.56	97.37
1094.67	96.89	1107.78	96.98	1114.34	96.93	1127.45	97.01	1134	96.9
1143.83	96.84	1150.39	97.25	1153.66	97.3	1166.77	97.12	1176.61	97.25
1183.16	97.21	1192.99	97.4	1196.27	97.55	1199.55	97.48	1202.83	97.17
1212.66	97.1	1219.21	97.27	1222.49	97.25	1235.6	97.41	1242.16	97.22
1251.99	97.17	1255.27	97.32	1265.1	97.46	1271.65	97.3	1281.48	97.44
1288.04	97.41	1294.59	97.51	1307.7	97.6	1320.82	97.45	1330.66	97.54
1337.22	97.52	1343.78	97.68	1353.62	98.61	1360.18	99.15	1373.3	99.55
1383.14	99.46	1389.7	99.63	1392.98	99.58	1409.38	99.05	1412.66	99.01
1415.94	99.19	1422.5	99.06	1432.34	99.23	1442.18	99.19	1448.74	99.51
1452.02	99.56	1458.58	99.25	1468.42	99.24	1478.25	99.35	1484.81	99.11
1497.93	99.12	1507.77	99.4	1514.33	99.39	1520.89	99.56	1527.45	99.45
1534.01	99.45	1547.13	99.55	1553.69	99.39	1560.25	99.43	1566.81	99.25
1576.65	99.25	1583.21	99.38	1589.77	99.34	1596.33	99.44	1602.89	99.39
1609.45	99.47	1616.01	99.35	1629.13	99.44	1642.25	99.74	1648.81	99.68
1655.37	99.5	1675.05	99.34	1678.33	99.44	1704.57	99.29	1711.12	99.31
1720.96	99.21	1730.8	99.34	1737.36	99.31	1740.64	99.19	1750.48	99.19
1757.04	99.39	1763.6	99.27	1770.16	99.3	1776.72	99.18	1796.4	99.32
1802.96	99.24	1809.52	99.28	1816.08	99.2	1822.64	99.35	1832.48	99.35
1839.04	99.25	1845.6	99.4	1855.44	99.34	1865.28	99.36	1875.12	99.22
1894.8	99.3	1904.64	99.28	1911.2	99.19	1917.76	99.31	1934.16	99.15
1950.55	99.2	1953.83	99.13	1960.39	99.19	1970.23	99.18	1986.63	98.96
1996.47	99.1	2003.03	99.11	2012.87	99.23	2019.43	99.13	2029.27	99.17
2035.83	99.08	2052.23	99.13	2058.79	99.1	2065.35	99.22	2068.63	99.1
2075.19	99.22	2085.03	99.09	2091.59	99.19	2101.43	99.22	2114.55	99.01
2130.95	99.11	2144.07	99	2150.63	99.12	2163.74	98.94	2173.58	99.02
2189.98	98.75	2206.38	98.67	2212.94	98.78	2219.5	98.75	2229.34	98.53
2242.46	98.49	2249.02	98.52	2255.58	98.4	2258.86	98.46	2268.7	98.36
2275.26	98.41	2281.82	98.24	2298.22	98.16	2308.06	98.89	2314.62	98.52
2324.46	98.07	2331.02	97.91	2340.86	98.17	2350.7	98.11	2357.26	98.48
2360.54	98.46	2367.1	98.13	2376.94	98.38	2386.78	97.95	2393.33	97.82
2409.73	97.87	2419.57	97.75	2429.41	97.73	2435.97	97.96	2442.53	97.75
2449.09	97.67	2458.93	97.74	2468.77	97.65	2475.33	97.83	2481.89	97.63
2491.73	97.66	2508.13	97.55	2514.69	97.62	2521.25	97.49	2531.09	97.49
2537.65	97.6	2540.93	97.46	2547.49	97.57	2557.33	97.6	2563.89	97.55
2570.45	97.63	2580.29	97.57	2590.13	97.87	2596.69	97.79	2603.25	97.96
2609.81	97.88	2613.09	97.71	2619.65	97.56	2622.93	97.71	2632.77	97.73
2649.16	97.64	2662.28	97.71	2675.4	97.72	2678.68	97.77	2698.36	97.71
2704.92	97.61	2714.76	97.68	2718.04	97.78	2724.6	97.64	2731.16	97.67
2737.72	97.84	2744.28	98.12	2747.56	98.14	2754.12	97.92	2757.4	98.05
2763.96	99.2	2770.52	100.02	2777.08	100.71	2780.36	100.7	2783.64	99.72
2786.92	97.73	2790.2	96	2793.48	94.82	2800.04	91.95	2803.32	90.74
2806.6	90	2809.88	89.06	2813.16	87.73	2819.72	83.87	2823	81.82
2826.28	79.03	2829.56	76.69	2832.84	76.05	2840.84	73.64	2850.84	70.74
2860.84	69.64	2900.84	71.64	2930.84	71.64	2950.84	72.64	2960.84	72.64
2970.84	72.14	2980.84	72.64	2990.84	71.64	3000.84	72.14	3020.84	72.14
3026.35	76.05	3029.63	76.07	3032.91	76.33	3036.19	77.15	3039.47	78.68
3042.75	79.46	3049.31	80.35	3052.59	80.68	3055.87	80.38	3059.15	79.46
3065.7	77.12	3068.98	76.76	3072.26	77.02	3075.53	78.12	3078.81	80.23
3082.09	81.89	3085.36	83.27	3088.64	83.64	3095.19	83.95	3101.74	84.98
3105.02	85.78	3108.3	86.87	3111.57	87.64	3114.85	88.15	3121.4	88.53
3124.68	88.56	3127.96	88.8	3134.51	89.7	3137.79	89.87	3144.34	89.52
3147.61	89.67	3154.17	91.1	3157.44	91.67	3164	92.54	3173.83	94.54
3183.66	95.92	3186.93	96.19	3196.76	96.51	3209.87	96.55	3222.97	96.39
3226.25	96.41	3232.8	96.7	3236.08	96.27	3242.63	95.73	3249.19	95.02
3252.46	94.95	3262.29	95.16	3265.57	95.12	3272.12	95.37	3278.67	95.51
3288.5	95.07	3295.06	95.02	3304.89	94.81	3311.44	94.87	3317.99	94.75
3340.93	95.23	3363.86	95.3	3373.69	95.83	3383.52	96.02	3393.35	96.09
3403.18	96.36	3406.46	96.72	3409.73	97.93	3413.01	98.88	3416.29	99.15

```
 3426.11   99.22 3435.94   99.36 3445.77   99.78 3449.05   99.52  3455.6    99.3
 3458.88    99.3 3462.16   99.79 3465.43  100.73 3468.71  102.15 3478.54  106.89
 3481.82  108.68 3488.37  110.92 3491.64  111.56 3494.92  111.61  3498.2  111.47
 3508.03  111.47  3511.3  111.08 3514.58     110 3521.13  106.64 3527.69  102.68
 3530.96  101.73 3534.24  101.43 3540.79  101.65 3547.34  101.64 3557.17  101.42

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .102 2698.36    .102  2724.6    .066 2829.56    .015 3075.53    .066
 3196.76    .078

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2777.08 3183.66          2369.53    2114 2067.51            .1       .3
Left Levee      Station=   85.21      Elevation=  116.53
Right Levee     Station= 3494.92      Elevation=  111.61
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 2777.08  100.71

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            113.20    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.39    Wt. n-Val.                 0.101      0.040      0.077
  W.S. Elev (ft)            112.82    Reach Len. (ft)          2369.53    2114.00    2067.51
  Crit W.S. (ft)             93.60    Flow Area (sq ft)       30899.67   13522.67    5238.61
  E.G. Slope (ft/ft)      0.000264    Area (sq ft)            30899.67   13522.67    5238.61
  Q Total (cfs)           130000.00    Flow (cfs)              37605.27   83148.69    9246.04
  Top Width (ft)           3468.36    Top Width (ft)           2688.27     406.58     373.51
  Vel Total (ft/s)            2.62    Avg. Vel. (ft/s)            1.22       6.15       1.76
  Max Chl Dpth (ft)          43.18    Hydr. Depth (ft)           11.49      33.26      14.03
  Conv. Total (cfs)       8002718.0    Conv. (cfs)             2314957.0  5118581.0   569180.6
  Length Wtd. (ft)         2152.89    Wetted Per. (ft)         2696.08     418.75     390.18
  Min Ch El (ft)             69.64    Shear (lb/sq ft)            0.19       0.53       0.22
  Alpha                       3.62    Stream Power (lb/ft s)      0.23       3.27       0.39
  Frctn Loss (ft)             0.48    Cum Volume (acre-ft)    132054.60   52672.13   165627.50
  C & E Loss (ft)             0.05    Cum SA (acres)          18303.09    2312.78   20752.49


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.93

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14       3  107.74    37.9   94.74      40   93.74    42.3   93.04
      50   90.64      70   89.74      88   90.64     120   90.14     148   68.74
     157   69.24     159    68.6     169   65.38     175   64.34     185   63.94
   188.2   63.94   192.6   63.34     195   62.74     205   62.34     225   62.34
     235   62.24     245   62.04     255   62.04     265   62.34     275   62.04
     285   62.34     295   62.24     305   62.24     315   61.64     325   60.14
     335   59.14     345   59.14     355   59.64     365   58.64     375   57.14
     385   58.84     395   60.94     405   63.64     411   65.38     418   68.14
     420   68.45     425   69.24     432   74.04     468   94.74   488.8   96.74
   493.2   97.14     510   98.74   527.9  102.74     535  108.14     541  108.14

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .14      50     .14      88    .066     159    .015     420    .066
     468     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         120     468              86      86      86            .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=     541      Elevation=  108.14

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            112.67    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.88    Wt. n-Val.                 0.100      0.033      0.140
  W.S. Elev (ft)            111.79    Reach Len. (ft)            5.00       5.00       5.00
  Crit W.S. (ft)             80.83    Flow Area (sq ft)        2118.35   15879.46     896.77
  E.G. Slope (ft/ft)      0.000190    Area (sq ft)             2118.35   15879.46     896.77
  Q Total (cfs)           125000.00    Flow (cfs)               3007.12  121330.70     662.13
  Top Width (ft)            541.00    Top Width (ft)            120.00     348.00      73.00
  Vel Total (ft/s)            6.62    Avg. Vel. (ft/s)            1.42       7.64       0.74
  Max Chl Dpth (ft)          54.65    Hydr. Depth (ft)           17.65      45.63      12.28
  Conv. Total (cfs)       9067808.0    Conv. (cfs)              218144.0  8801631.0    48032.7
  Length Wtd. (ft)            5.00    Wetted Per. (ft)           126.76     365.04      79.10
  Min Ch El (ft)             57.14    Shear (lb/sq ft)            0.20       0.52       0.13
  Alpha                       1.30    Stream Power (lb/ft s)      0.28       3.94       0.10
  Frctn Loss (ft)                     Cum Volume (acre-ft)    131156.50   51958.67   165481.90
  C & E Loss (ft)                     Cum SA (acres)          18226.71    2294.47   20741.89


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

BRIDGE


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.915

INPUT
Description: Reynosa SB
MARCH 2007 - DECK WIDTH CHANGED FROM 76 FT
56 FT (PER
            1964 AS-BUILTS)
Distance from Upstream XS =       5
Deck/Roadway Width        =      56
Weir Coefficient          =    3.05
Upstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0  113.74   59.64       3  113.74  107.74       3  113.74  109.64
```

```
    37.1  114.54  110.44    37.1  114.54  107.74   187.4  116.04  109.24
   337.8  116.04  109.24     488  114.54  107.74     488  114.54  110.44
   521.9  113.84  109.74     535  113.84  109.74     535  113.84  108.14
     541  113.84   59.64

Upstream Bridge Cross Section Data
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14       3  107.74    37.9   94.74      40   93.74    42.3   93.04
      50   90.64      70   89.74      88   90.64     120   90.14     148   68.74
     157   69.24     159    68.6     169   65.38     175   64.34     185   63.94
   188.2   63.94   192.6   63.34     195   62.74     205   62.34     225   62.34
     235   62.24     245   62.04     255   62.04     265   62.34     275   62.04
     285   62.34     295   62.24     305   62.24     315   61.64     325   60.14
     335   59.14     345   59.14     355   59.64     365   58.64     375   57.14
     385   58.84     395   60.94     405   63.64     411   65.38     418   68.14
     420   68.45     425   69.24     432   74.04     468   94.74   488.8   96.74
   493.2   97.14     510   98.74   527.9  102.74     535  108.14     541  108.14

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .14      50     .14      88    .066     159    .015     420    .066
     468     .14

Bank Sta: Left   Right    Coeff Contr.   Expan.
          120     468            .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=     541      Elevation=  108.14

Downstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0  113.74   59.64       3  113.74  107.74       3  113.74  109.64
    37.1  114.54  110.44    37.1  114.54  107.74   187.4  116.04  109.24
   337.8  116.04  109.24     488  114.54  107.74     488  114.54  110.44
   521.9  113.84  109.74     535  113.84  109.74     535  113.84  108.14
     541  113.84   59.64

Downstream Bridge Cross Section Data
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14       3  107.74    37.9   94.74      40   93.74    42.3   93.04
      50   90.64      70   89.74      88   90.64     120   90.14     148   68.74
     157   69.24     159    68.6     169   65.38     175   64.34     185   63.94
   188.2   63.94   192.6   63.34     195   62.74     205   62.34     225   62.34
     235   62.24     245   62.04     255   62.04     265   62.34     275   62.04
     285   62.34     295   62.24     305   62.24     315   61.64     325   60.14
     335   59.14     345   59.14     355   59.64     365   58.64     375   57.14
     385   58.84     395   60.94     405   63.64     411   65.38     418   68.14
     420   68.45     425   69.24     432   74.04     468   94.74   488.8   96.74
   493.2   97.14     510   98.74   527.9  102.74     535  108.14     541  108.14

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      50     .06      88    .066     159    .015     420    .066
     468     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          120     468            .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=     541      Elevation=  108.14

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   116.4
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Abutments =  1

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
     510    98.8     535   108.2
Downstream     num=       2
     Sta    Elev     Sta    Elev
     510    98.8     535   108.2

Number of Piers =  4

Pier Data
Pier Station     Upstream=    37.1    Downstream=    37.1
Upstream     num=       2
    Width   Elev    Width   Elev
      4.5     55      4.5   110.5
Downstream     num=       2
    Width   Elev    Width   Elev
      4.5     55      4.5   110.5

Pier Data
Pier Station     Upstream=   187.4    Downstream=   187.4
Upstream     num=       2
    Width   Elev    Width   Elev
      4.5     55      4.5   109.3
Downstream     num=       2
    Width   Elev    Width   Elev
      4.5     55      4.5   109.3

Pier Data
Pier Station     Upstream=   337.8    Downstream=   337.8
Upstream     num=       2
    Width   Elev    Width   Elev
      4.5     55      4.5   109.3
Downstream     num=       2
    Width   Elev    Width   Elev
      4.5     55      4.5   109.3

Pier Data
Pier Station     Upstream=     488    Downstream=     488
Upstream     num=       2
```

```
    Width   Elev    Width   Elev
     4.5      55     4.5   110.5
Downstream     num=       2
    Width   Elev    Width   Elev
     4.5      55     4.5   110.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =.8006408
           Max Low Cord                =   109.6

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.9

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14       3  107.74    37.9   94.74      40   93.74    42.3   93.04
      50   90.64      70   89.74      88   90.64     120   90.14     148   68.74
     157   69.24     159    68.6     169   65.38     175   64.34     185   63.94
   188.2   63.94   192.6   63.34     195   62.74     205   62.34     225   62.34
     235   62.24     245   62.04     255   62.04     265   62.34     275   62.04
     285   62.34     295   62.24     305   62.24     315   61.64     325   60.14
     335   59.14     345   59.14     355   59.64     365   58.64     375   57.14
     385   58.84     395   60.94     405   63.64     411   65.38     418   68.14
     420   68.45     425   69.24     432   74.04     468   94.74   488.8   96.74
   493.2   97.14     510   98.74   527.9  102.74     535  108.14     541  108.14

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      50     .06      88    .066     159    .015     420    .066
     468     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          120     468          198.66  198.52  198.75            .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=     541      Elevation=  108.14

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            112.17    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.85    Wt. n-Val.                0.062      0.033     0.060
  W.S. Elev (ft)            111.32    Reach Len. (ft)          198.66     198.52    198.75
  Crit W.S. (ft)             80.83    Flow Area (sq ft)       2062.23   15716.74    862.63
  E.G. Slope (ft/ft)      0.000189    Area (sq ft)            2062.23   15716.74    862.63
  Q Total (cfs)           125000.00    Flow (cfs)              4623.18   118927.00   1449.81
  Top Width (ft)            541.00    Top Width (ft)           120.00     348.00     73.00
  Vel Total (ft/s)            6.71    Avg. Vel. (ft/s)           2.24       7.57      1.68
  Max Chl Dpth (ft)          54.18    Hydr. Depth (ft)          17.19      45.16     11.82
  Conv. Total (cfs)       9093620.0    Conv. (cfs)             336331.8   8651816.0  105472.5
  Length Wtd. (ft)          198.53    Wetted Per. (ft)         126.30     365.04     78.64
  Min Ch El (ft)             57.14    Shear (lb/sq ft)           0.19       0.51      0.13
  Alpha                       1.22    Stream Power (lb/ft s)     0.43       3.84      0.22
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)    131153.10   51929.69  165480.50
  C & E Loss (ft)             0.07    Cum SA (acres)          18226.67    2294.35   20741.87


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.87

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14      35  108.14      48  100.44    72.3   98.94    77.3   98.64
      87   98.04   173.3   84.54     175   84.54   178.3   84.44     270   81.54
   274.3   71.44   279.3   70.64     285   68.35     288   67.14     302   65.29
     305   65.04     315   63.54     325   63.04     335   63.04     345   62.74
     355   61.84     365   61.84     375   61.04   375.3   61.04   380.3   61.14
     385   61.34     395   61.64     405   61.84     415   62.34     435   62.34
     445   62.14     455   61.34     465   61.84     475   61.64   481.3   61.64
     485   61.04     495   61.04     505   61.94     515   62.34     525   63.14
     535   62.84     545   62.64     555   61.04     565   62.34     575   65.29
   577.3   66.34   582.3   68.74     600   87.04   678.1   94.04   683.1   94.44
     695   95.54     759   98.54   765.8   99.74   770.8  100.54     813  107.84
   819.9  108.14

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06     270    .066     285    .015   582.3    .066     600     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          270     600              91      91      91            .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=   819.9      Elevation=  108.14
```

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	112.08	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.71	Wt. n-Val.	0.060	0.025	0.060	
W.S. Elev (ft)	111.37	Reach Len. (ft)	25.00	25.00	25.00	
Crit W.S. (ft)	80.12	Flow Area (sq ft)	5147.16	15681.91	3289.57	
E.G. Slope (ft/ft)	0.000088	Area (sq ft)	5147.16	15681.91	3289.57	
Q Total (cfs)	125000.00	Flow (cfs)	8422.31	111987.10	4590.56	
Top Width (ft)	819.90	Top Width (ft)	270.00	330.00	219.90	
Vel Total (ft/s)	5.18	Avg. Vel. (ft/s)	1.64	7.14	1.40	
Max Chl Dpth (ft)	50.33	Hydr. Depth (ft)	19.06	47.52	14.96	
Conv. Total (cfs)	13288180.0	Conv. (cfs)	895336.9	11904840.0	488001.5	
Length Wtd. (ft)	25.00	Wetted Per. (ft)	276.51	347.13	224.38	
Min Ch El (ft)	61.04	Shear (lb/sq ft)	0.10	0.25	0.08	
Alpha	1.71	Stream Power (lb/ft s)	0.17	1.78	0.11	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	131136.70	51858.14	165471.10	
C & E Loss (ft)	0.01	Cum SA (acres)	18225.78	2292.81	20741.20	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE

RIVER: Rio Grande
REACH: Lower Reach RS: 156.855

INPUT
Description: Reynosa NB

MARCH 2007 - PIER DIAMETERS AND HEIGHTS
CHANGED TO REFLECT 1986 AS-BUILT PLANS
DIAMETER CHANGED FROM 8.2
& 5 FT TO 16.42 & 8 FT
PIER HEIGHTS BASED ON ELEVATIONS ON
AS-BUILTS
Distance from Upstream XS = 25
Deck/Roadway Width = 56
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 14

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	117.05	59.64	3	117.05	59.64	3	117.05	109.84
74.8	119.54	112.34	175.8	122.04	114.84	276.8	124.04	116.84
377.8	124.84	117.64	478.8	124.14	116.94	579.8	123.34	116.14
680.6	121.94	114.74	768.3	119.14	111.94	816.9	117.54	110.34
816.9	117.54	59.64	819.9	117.44	59.64			

Upstream Bridge Cross Section Data
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108.14	35	108.14	48	100.44	72.3	98.94	77.3	98.64
87	98.04	173.3	84.54	175	84.54	178.3	84.44	270	81.54
274.3	71.44	279.3	70.64	285	68.35	288	67.14	302	65.29
305	65.04	315	63.54	325	63.04	335	63.04	345	62.74
355	61.84	365	61.84	375	61.04	375.3	61.04	380.3	61.14
385	61.34	395	61.64	405	61.84	415	62.34	435	62.34
445	62.14	455	61.34	465	61.84	475	61.64	481.3	61.64
485	61.04	495	61.04	505	61.94	515	62.34	525	63.14
535	62.84	545	62.64	555	61.04	565	62.34	575	65.29
577.3	66.34	582.3	68.74	600	87.04	678.1	94.04	683.1	94.44
695	95.54	759	98.54	765.8	99.74	770.8	100.54	813	107.84
819.9	108.14								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	270	.066	285	.015	582.3	.066	600	.06

Bank Sta: Left Right Coeff Contr. Expan.
270 600 .2 .5
Left Levee Station= 0 Elevation= 108.14
Right Levee Station= 819.9 Elevation= 108.14

Downstream Deck/Roadway Coordinates
num= 14

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	117.05	59.64	3	117.05	59.64	3	117.05	109.84
74.8	119.54	112.34	175.8	122.04	114.84	276.8	124.04	116.84
377.8	124.84	117.64	478.8	124.14	116.94	579.8	123.34	116.14
680.6	121.94	114.74	768.3	119.14	111.94	816.9	117.54	110.34
816.9	117.54	59.64	819.9	117.44	59.64			

Downstream Bridge Cross Section Data
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108.14	35	108.14	48	100.44	72.3	98.94	77.3	98.64
87	98.04	173.3	84.54	175	84.54	178.3	84.44	267	81.63
270	81.54	274.3	71.44	279.3	70.64	285	68.35	288	67.14
302	65.29	305	65.04	315	63.54	325	63.04	335	63.04
345	62.74	355	61.84	365	61.84	375	61.04	375.3	61.04
380.3	61.14	385	61.34	395	61.64	405	61.84	415	62.34
435	62.34	445	62.14	455	61.34	465	61.84	475	61.64
481.3	61.64	485	61.04	495	61.04	505	61.94	515	62.34
525	63.14	535	62.84	545	62.64	555	61.04	565	62.34
575	65.29	577.3	66.34	582.3	68.74	600	87.04	678.1	94.04
683.1	94.44	695	95.54	759	98.54	765.8	99.74	770.8	100.54
813	107.84	819.9	108.14						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.14	267	.14	270	.066	285	.015	582.3	.066
600	.04								

Bank Sta: Left Right Coeff Contr. Expan.
270 600 .2 .5
Left Levee Station= 35 Elevation= 108.14
Right Levee Station= 819.9 Elevation= 108.14

```
Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   124.9
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  8

Pier Data
Pier Station     Upstream=    74.8    Downstream=    74.8
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   89.63       8   89.63       8   112.5
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   89.63       8   89.63       8   112.5

Pier Data
Pier Station     Upstream=   175.8    Downstream=   175.8
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   89.22       8   89.22       8     115
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   89.22       8   89.22       8     115

Pier Data
Pier Station     Upstream=   276.8    Downstream=   276.8
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   71.28       8   71.28       8     117
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   71.28       8   71.28       8     117

Pier Data
Pier Station     Upstream=   377.8    Downstream=   377.8
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  72.175       8  72.175       8   117.7
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  72.175       8  72.175       8   117.7

Pier Data
Pier Station     Upstream=   478.8    Downstream=   478.8
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  73.167       8  73.167       8   117.1
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  73.167       8  73.167       8   117.1

Pier Data
Pier Station     Upstream=   579.8    Downstream=   579.8
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  72.175       8  72.175       8   116.3
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  72.175       8  72.175       8   116.3

Pier Data
Pier Station     Upstream=   680.6    Downstream=   680.6
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   71.78       8   71.78       8   114.9
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   71.78       8   71.78       8   114.9

Pier Data
Pier Station     Upstream=   768.3    Downstream=   768.3
Upstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42    89.8       8    89.8       8   112.1
Downstream     num=       4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42    89.8       8    89.8       8   112.1

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.84

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      57
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14      35  108.14      48  100.44    72.3   98.94    77.3   98.64
      87   98.04   173.3   84.54     175   84.54   178.3   84.44     267   81.63
     270   81.54   274.3   71.44   279.3   70.64     285   68.35     288   67.14
```

302	65.29	305	65.04	315	63.54	325	63.04	335	63.04
345	62.74	355	61.84	365	61.84	375	61.04	375.3	61.04
380.3	61.14	385	61.34	395	61.64	405	61.84	415	62.34
435	62.34	445	62.14	455	61.34	465	61.84	475	61.64
481.3	61.64	485	61.04	495	61.04	505	61.94	515	62.34
525	63.14	535	62.84	545	62.64	555	61.04	565	62.34
575	65.29	577.3	66.34	582.3	68.74	600	87.04	678.1	94.04
683.1	94.44	695	95.54	759	98.54	765.8	99.74	770.8	100.54
813	107.84	819.9	108.14						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.14	267	.14	270	.066	285	.015	582.3	.066
600	.04								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
270	600	490.49	510	528.74	.2	.5

Left Levee Station= 35 Elevation= 108.14
Right Levee Station= 819.9 Elevation= 108.14

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	112.02	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.76	Wt. n-Val.	0.140	0.025	0.040	
W.S. Elev (ft)	111.25	Reach Len. (ft)	490.49	510.00	528.74	
Crit W.S. (ft)	80.12	Flow Area (sq ft)	5116.68	15644.38	3264.57	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)	5116.68	15644.38	3264.57	
Q Total (cfs)	125000.00	Flow (cfs)	3672.81	114354.50	6972.68	
Top Width (ft)	819.90	Top Width (ft)	270.00	330.00	219.90	
Vel Total (ft/s)	5.20	Avg. Vel. (ft/s)	0.72	7.31	2.14	
Max Chl Dpth (ft)	50.21	Hydr. Depth (ft)	18.95	47.41	14.85	
Conv. Total (cfs)	12961240.0	Conv. (cfs)	380833.4	11857410.0	722996.3	
Length Wtd. (ft)	510.58	Wetted Per. (ft)	276.39	347.13	224.27	
Min Ch El (ft)	61.04	Shear (lb/sq ft)	0.11	0.26	0.08	
Alpha	1.82	Stream Power (lb/ft s)	0.08	1.91	0.18	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	131126.60	51828.29	165464.70	
C & E Loss (ft)	0.09	Cum SA (acres)	18225.32	2292.17	20740.82	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 156.7

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 415

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108.46	3.28	108.74	6.56	108.89	9.84	108.92	13.12	108.94
16.4	109	19.68	109.03	22.96	108.99	26.24	109.07	29.52	109.36
32.8	109.51	36.08	109.57	39.36	109.59	42.64	109.58	45.92	109.49
49.2	109.32	52.48	108.99	55.76	108.73	59.04	108.4	62.32	108
65.6	107.43	68.88	106.57	72.16	105.71	75.44	105.18	78.72	104.7
82	104.19	85.28	103.56	88.56	102.89	91.84	102.14	95.12	101.33
98.4	100.29	101.68	99.27	104.96	98.41	108.24	97.65	111.52	96.71
114.8	95.68	118.08	94.26	121.36	92.44	124.64	90.22	127.92	88.44
131.2	87.47	134.48	86.27	137.76	85.33	141.04	84.35	144.32	84.01
147.6	85.06	150.88	85.23	154.16	85.03	157.44	84.82	160.72	84.58
164	84.32	167.28	84.07	170.56	83.42	173.84	82.37	177.12	81.56
180.4	81.37	183.68	81.33	285.37	81.33	288.65	81.69	291.93	82.44
295.21	83.1	298.49	83.44	301.77	83.22	305.05	82.99	308.33	82.76
311.61	82.57	314.89	82.51	318.17	82.47	321.45	82.39	324.73	82.24
328.01	82.2	331.29	83.09	334.57	84.41	337.85	85.64	341.13	86.96
344.41	88.26	347.69	89.13	350.97	89.88	354.25	91.01	357.53	92.47
360.81	93.99	364.09	95.3	367.37	96.54	370.65	97.85	373.93	99.14
377.21	100.54	380.49	101.74	383.77	102.98	387.05	104.37	390.33	105.49
393.61	106.21	396.89	106.56	400.17	106.73	403.45	106.84	406.73	106.91
410.01	107	413.29	107.03	416.57	107.05	419.85	107.11	423.13	107.19
426.41	107.18	429.69	107.22	439.53	107.31	446.09	107.41	449.37	107.47
452.65	107.46	455.93	107.58	459.21	107.67	462.49	107.92	465.77	108.6
472.33	110.4	475.61	111.35	478.89	112.42	482.17	113.43	485.45	114.46
488.73	115.29	492.01	115.69	495.28	115.75	498.55	115.76	501.82	115.81
505.09	115.78	508.35	115.72	511.62	115.49	514.89	108.5	518.16	105.17
521.43	105.16	524.7	105.18	527.96	105.11	531.23	105.01	534.5	104.98
537.77	104.92	541.04	104.82	544.31	104.78	547.57	104.72	550.84	104.69
554.11	104.63	557.38	104.51	560.65	104.42	563.92	104.41	567.18	104.4
570.45	104.34	573.72	104.38	576.99	104.55	580.26	104.72	583.53	105.17
586.79	105.64	590.06	105.96	593.33	105.91	596.6	105.7	599.87	105.83
603.14	106.06	606.4	105.87	609.67	105.36	612.94	104.8	616.21	104.48
619.48	104.18	622.75	103.71	626.01	103.19	629.28	102.67	632.55	102.35
635.82	102.16	639.09	102.03	642.36	101.81	645.62	101.46	648.89	101.08
652.16	100.87	655.43	100.7	658.7	100.33	661.97	99.94	665.23	99.66
668.5	99.5	671.77	99.25	675.04	99.07	678.31	98.9	681.58	98.8
684.84	98.66	688.11	98.55	691.38	98.52	694.65	98.39	697.92	98.35
701.19	98.3	704.45	98.24	707.72	98.36	710.99	98.44	714.26	98.08
717.53	97.61	720.8	97.41	724.06	97.45	727.33	97.42	730.6	97.41
733.87	97.36	737.14	97.13	740.41	96.59	743.67	96.24	746.94	95.75
750.21	95.31	753.48	94.94	756.75	94.57	760.02	94.16	763.28	93.67
766.55	93.38	769.82	93.25	773.09	93.07	776.36	92.89	779.63	92.68
782.89	92.7	786.16	92.66	789.43	92.48	792.7	92.25	795.97	92.01
799.24	91.82	802.5	91.72	805.77	91.86	809.04	92.15	812.31	92.1
815.58	91.67	818.85	91.28	822.11	91.11	825.38	91.09	828.65	91.22
831.92	91.46	835.19	91.92	838.46	92.52	841.72	93.19	844.99	94.11
848.26	94.55	851.53	94.68	854.8	94.53	858.07	94.14	861.33	93.92
864.6	93.77	867.87	93.5	871.14	93.22	874.41	92.9	877.68	92.69
880.94	92.7	884.21	92.5	887.48	91.34	890.75	89.2	894.02	87.44
897.29	86.41	900.55	85.61	903.82	84.88	907.09	84.13	910.36	83.77
913.63	83.4	916.9	82.84	920.16	82.17	923.43	81.81	926.7	81.17
929.97	79.48	933.24	76.91	936.51	75.91	956.51	75.91	976.51	76.11
996.51	76.11	1016.51	75	1036.51	75.06	1056.51	75.15	1076.51	75.09
1096.51	75.23	1116.51	75.4	1136.51	75.77	1156.51	75.41	1162.61	75.91
1165.89	76	1169.17	77.21	1172.45	79.64	1175.73	81.42	1179.01	82.97
1182.29	83.37	1185.57	83.78	1188.85	84.27	1192.13	85.17	1195.41	86.26
1198.69	87.18	1201.97	87.64	1205.24	87.5	1208.52	87.33	1211.8	87.23
1215.08	87.08	1218.36	86.85	1221.64	86.6	1224.92	86.39	1228.2	86.35

1231.48	86.65	1234.76	87.02	1238.04	87.16	1241.32	87.31	1244.6	87.43
1247.88	87.51	1251.16	87.71	1254.44	87.91	1257.72	88.1	1261	88.35
1264.28	88.55	1267.56	88.75	1270.84	89.01	1274.12	89.45	1277.4	90.16
1280.68	90.71	1283.96	91.45	1287.24	92.33	1290.52	92.97	1293.8	93.22
1297.08	93.52	1300.35	93.88	1303.63	94.52	1306.91	95.32	1310.19	96.25
1313.47	97.48	1316.75	98.54	1320.03	98.77	1323.31	98.8	1326.59	98.77
1329.87	98.75	1333.15	98.54	1336.43	98.22	1339.71	97.98	1342.99	97.98
1346.27	97.97	1349.55	97.89	1352.83	97.89	1356.11	97.82	1359.39	97.76
1362.67	97.73	1365.95	97.61	1369.23	97.55	1372.51	97.5	1375.79	97.42
1379.07	97.37	1382.35	97.32	1385.63	97.24	1388.91	97.17	1392.19	97.11
1395.46	97.05	1398.74	97.05	1402.02	97.06	1405.3	97.09	1408.58	97.15
1411.86	97.14	1415.14	97.11	1418.42	97.55	1421.7	98.44	1424.98	99.11
1428.25	99.7	1431.52	100.15	1434.78	100.61	1438.05	100.99	1441.32	101.33
1444.59	101.4	1447.85	101.6	1451.12	101.96	1454.39	102.52	1457.66	103.08
1460.92	103.51	1464.19	103.87	1467.46	104.17	1470.72	104.33	1473.99	104.55
1477.26	104.89	1480.53	105.28	1483.79	105.5	1487.06	105.5	1490.33	105.52
1493.6	105.56	1496.86	105.58	1500.13	105.57	1503.4	105.58	1506.67	105.61
1509.93	105.64	1513.2	105.64	1516.47	105.63	1519.73	105.57	1523	105.55
1526.27	105.5	1529.54	105.46	1532.8	105.35	1536.07	105.26	1539.34	105.21
1542.61	105.12	1545.87	105.07	1549.14	104.96	1552.41	104.93	1555.68	104.88
1558.94	104.87	1562.21	104.89	1565.48	104.89	1568.74	104.87	1572.01	104.76
1575.28	104.76	1578.55	104.73	1581.81	104.7	1585.08	104.65	1588.35	104.63
1591.62	104.65	1594.88	104.66	1598.15	104.77	1601.42	105.08	1604.69	105.83
1607.95	107.46	1611.22	108.51	1614.49	108.72	1617.76	108.46	1621.02	108.1
1624.29	107.16	1627.56	105.84	1630.82	105.09	1634.09	104.98	1640.63	104.98
1643.89	104.95	1647.16	104.85	1650.43	104.82	1653.7	104.76	1656.96	104.63

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	505.09	.085	884.21	.07	929.97	.025	1179.01	.07
1424.98	.085	1614.49	.06						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
884.21	1201.97	520.54	510.48	507.59	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	884.21	92.5	T
1201.97	1656.96	87.64	T

Left Levee Station= 505.09 Elevation= 115.78
Right Levee Station= 1614.49 Elevation= 108.72

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	111.84	Element	0.085	0.037	0.071
Vel Head (ft)	1.19	Wt. n-Val.	520.54	510.48	507.59
W.S. Elev (ft)	110.64	Reach Len. (ft)	4410.34	10446.10	5135.13
Crit W.S. (ft)	95.13	Flow Area (sq ft)	4447.46	10446.10	5163.10
E.G. Slope (ft/ft)	0.000570	Area (sq ft)	9532.01	101019.50	14448.47
Q Total (cfs)	125000.00	Flow (cfs)	370.32	317.76	454.99
Top Width (ft)	1143.07	Top Width (ft)	2.16	9.67	2.81
Vel Total (ft/s)	6.25	Avg. Vel. (ft/s)	11.91	32.87	11.29
Max Chl Dpth (ft)	35.64	Hydr. Depth (ft)	399109.8	4229738.0	604964.9
Conv. Total (cfs)	5233813.0	Conv. (cfs)	374.46	323.57	464.11
Length Wtd. (ft)	510.79	Wetted Per. (ft)	0.42	1.15	0.39
Min Ch El (ft)	75.00	Shear (lb/sq ft)	1.97	Stream Power (lb/ft s)	0.91	11.12	1.11
Alpha	1.97	Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	131072.80	51675.55	165413.50
C & E Loss (ft)	0.19	Cum SA (acres)	18221.71	2288.38	20736.72

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 156.6

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	105.88	3.28	105.78	6.55	105.78	9.83	106.15	13.11	106.22
19.66	105.78	26.21	105.29	29.49	105	32.77	105.04	39.32	105.24
42.59	105.3	45.87	105.42	49.15	105.65	52.42	106	62.25	108.56
68.81	110.2	75.36	111.92	81.91	113.55	85.19	114.32	88.47	114.99
91.74	115.41	95.02	115.62	101.57	115.62	108.12	115.68	111.4	115.66
114.68	115.14	117.95	111.73	121.23	106.51	124.51	105.08	131.06	105.1
137.61	105.09	140.89	105.05	147.44	104.81	150.72	104.65	157.27	104.06
163.83	103.87	170.38	103.91	176.93	104.2	180.21	104.42	183.48	104.44
190.04	104.72	193.31	104.57	196.59	104.36	199.87	104.27	206.42	104.45
209.7	104.39	212.97	104.27	226.08	104.1	229.35	104.18	235.91	104.16
242.46	104.2	245.74	104.17	252.29	104.2	255.57	104.18	262.12	103.96
265.4	104.09	275.23	104.06	281.78	104.1	285.06	104.01	288.33	103.81
291.61	103.85	298.16	104.03	301.44	104.05	304.71	104.12	307.99	104.07
317.82	104.09	321.1	104.05	327.65	104.08	330.93	104.01	334.2	103.79
340.76	103.74	347.31	103.8	350.59	103.72	357.14	103.41	360.42	103.38
363.69	103.43	370.24	103.42	373.52	103.33	376.8	103.15	380.07	103.21
383.35	103.49	386.63	103.67	389.9	103.74	393.18	103.69	399.73	103.85
406.29	103.56	409.56	103.5	412.84	103.5	416.12	103.42	419.39	103.27
425.95	103.38	429.22	103.28	432.5	103.24	435.77	103.4	442.33	103.56
445.6	103.77	448.88	103.84	452.16	103.74	455.43	103.52	458.71	103.44
465.26	103.57	468.54	103.39	471.82	103.3	475.09	103.31	481.65	103.14
488.2	103.15	494.75	102.96	498.03	103.01	501.3	103.13	504.58	103.14
507.86	103.03	511.13	103.01	520.96	103.28	527.52	103.33	530.79	103.18
534.07	103.17	540.62	103.34	543.9	103.28	547.18	103.32	553.73	103.29
557.01	103.22	566.83	103.29	570.11	103.29	573.39	103.38	576.66	103.41
579.94	103.33	586.49	103.27	589.77	103.16	596.32	103.11	602.88	103.14
606.15	103.1	609.43	103	615.98	102.93	622.53	102.9	629.09	102.63
632.36	102.61	635.64	102.74	638.92	102.33	642.19	101.7	645.47	101.42
648.75	101.62	652.02	102.56	655.3	103.35	658.58	103.64	661.85	103.69
668.41	103.98	671.68	104.44	674.96	104.84	678.23	105.37	681.51	106.42
684.79	107.07	688.06	106.87	691.34	106.45	697.89	104.99	701.17	104.09
704.45	103.71	707.72	103.97	711	104.6	714.28	104.83	717.55	104.71
720.83	104.68	724.11	104.75	727.38	104.89	730.66	105.13	733.94	105.3
737.21	104.91	740.49	103.81	743.76	102.42	750.32	99.32	753.59	98.46

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  756.87   98.17  760.15   98.02  763.42   97.99   766.7   99.56  769.98  101.84
  773.25  103.84  776.53  105.23  779.81  105.75  783.08  105.88  786.36  105.49
  789.64  104.66  792.91  104.18  796.19  104.36  799.46   105.3  802.74   106.1
  806.02  106.26  809.29   106.1  819.12  105.33   822.4  105.35  825.68  105.68
  828.95   105.4  832.23  104.83  835.51   103.8  838.78  102.62  842.06  101.66
  845.34  100.22  848.61   99.03  851.89   97.59  855.16   95.86  858.44   94.22
  861.72   92.96  864.99   91.92  868.27    91.1  871.55   90.36  874.82   89.81
   878.1    89.5  881.38   89.28  891.21   89.08  894.48   89.25  897.76   89.58
  901.04   89.84  904.31   89.92  907.59   89.91  914.14   89.82  917.42    89.8
  920.69   89.89  923.97   89.91  927.25   89.87  930.52   89.98   933.8   90.19
  940.35   90.49  943.63   90.16  946.91   89.01  950.18   87.13  953.46    85.4
  956.74    84.2  960.01   83.23  963.29   82.48  966.57   81.88  973.12   81.11
  976.39   81.05  979.67   81.07  982.95   81.02   989.5   80.63  992.78   80.82
  996.05   81.06  999.33   80.89 1002.61   80.25 1005.88   78.83 1009.16   76.74
 1012.44   75.86 1019.44   63.93 1029.44   58.88 1039.44   58.38 1059.44   58.78
 1069.44   59.18 1079.44   59.18 1089.44   58.88 1099.44   59.18 1109.44   58.88
 1119.44   59.08 1129.44   58.98 1139.44   58.78 1149.44   58.88 1159.44   58.88
 1179.44   59.88 1189.44   60.78 1199.44   60.18 1209.44   59.88 1219.44   60.18
 1229.44   60.38 1238.67   75.86 1241.95   76.07 1245.23   77.79 1248.51   80.03
 1251.79   81.72 1255.07   83.02 1258.35    83.9  1264.9    84.7 1268.18   85.14
 1271.46   85.91 1274.74   86.52 1278.02   86.96  1281.3   87.55 1287.86      89
 1291.14   89.59 1294.41   90.11 1300.97   92.36 1304.25   93.04 1307.53   93.24
 1314.09   93.01 1317.37   93.11 1320.65   93.33 1323.92   93.48 1330.48   93.56
 1333.76   93.57 1337.04    93.7 1340.32   93.67  1343.6   93.84 1346.88   94.07
 1350.16   94.51 1353.43   95.02 1356.71    95.4 1359.99   95.67 1363.27   96.06
 1366.55   96.22 1369.83   96.49 1373.11   96.55 1376.39   96.53 1379.67   96.59
 1382.95   96.73 1392.78      97 1396.06   96.98 1402.62   96.67  1405.9   96.66
 1412.46   96.92 1415.73  97.13 1419.01   97.27 1425.57   97.46 1438.69   97.51
 1441.97   97.44 1445.24   97.25 1448.52   97.14 1455.08   97.31  1468.2   97.31
 1471.48   97.41 1474.75   97.42 1478.03    97.3 1481.31   97.27 1484.59   97.35
 1491.15   97.39 1497.71   97.56 1500.99    97.6 1504.27   97.54 1507.54   97.21
 1510.82   96.64 1517.38   95.41 1520.66   94.95 1523.94   94.95 1527.22   95.47
  1530.5   95.69 1540.33   95.78 1546.89   95.93 1550.17   95.97 1556.73   95.93
 1560.01   96.11 1566.56   97.15 1569.84   97.16 1573.12   96.83  1576.4   96.76
 1579.68   96.78 1582.96   96.89 1596.08   96.99 1609.19   96.83 1615.75   96.67
 1619.03   96.64 1622.31   96.98 1625.59   97.39 1632.14   98.13 1635.42    98.1
  1638.7   97.79 1641.98   97.83 1645.26   97.78 1648.54   97.85  1655.1   97.92
 1658.37   98.02 1664.93   98.01 1674.77   98.14 1684.61   98.31 1687.88   98.46
 1694.44   98.55 1704.28   98.82 1707.56   98.88 1710.84   98.88 1714.12   99.07
  1717.4  100.07 1720.67  100.52 1723.95  100.47 1730.51  100.24 1733.79  100.25
 1737.07  100.44 1743.63  100.73 1746.91  101.06 1750.18  101.46 1760.02  102.16
  1763.3  102.58 1769.86  103.89 1773.14   104.7 1776.42  105.42 1779.69   106.5
 1782.97  107.68 1786.25  108.57 1789.53  108.96 1792.81  109.18 1799.37  109.16
 1805.93   109.2 1809.21  109.06 1812.48  108.52 1819.04  106.53 1822.32  105.73
  1825.6  105.12 1828.88  104.81 1838.72  104.21 1841.99  103.97 1845.27  103.56
 1848.55  103.32 1855.11  102.56 1858.39  102.48 1861.67   102.5 1868.23   102.6
  1871.5  102.57 1874.78   102.6 1878.06  102.51 1884.62  102.21 1891.18  102.04
 1894.46  101.86 1897.74  101.75 1901.01  101.78 1904.29  102.16 1907.57  102.33
 1914.13  102.15 1923.97  101.93 1927.25  101.82 1930.53  101.57  1933.8  101.21
 1937.08  100.94 1940.36  100.93 1946.92   101.2 1953.48  101.35 1956.76  101.51
 1963.31  101.61 1969.87  101.57 1973.15  101.46 1976.43  101.51 1982.99  101.84
 1989.55  102.04 1992.82  102.01 2005.94  102.17 2019.06  102.13 2022.34     102
 2028.89  101.83 2038.73  101.77 2042.01  101.71 2045.29  101.71 2048.57  101.77
 2055.12  101.74  2058.4  101.68 2064.96  101.63 2068.24  101.77 2071.52   101.8
 2078.08  101.64 2091.19  101.67 2094.47  101.62 2101.03  101.39 2104.31  101.24
 2107.59  101.18 2114.14  101.42 2117.42  101.36  2120.7  101.24 2127.26  101.16
 2133.82  101.12 2143.65  101.14 2146.93  101.22 2150.21  101.18 2153.49  101.05
 2156.77  101.05 2160.05   101.2 2169.89  101.23 2173.16  101.21    2183  100.77

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .076  825.68    .076  861.72    .066 1012.44    .015 1238.67    .066
 1497.71     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        940.35 1294.41         2582.86    2000 4032.36             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  940.35   90.49       T
Left Levee      Station=   111.4      Elevation=  115.66
Right Levee     Station= 1805.93      Elevation=   109.2
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0  783.08  105.88

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)           111.48    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.56    Wt. n-Val.                 0.071      0.037     0.062
  W.S. Elev (ft)           110.92    Reach Len. (ft)          2582.86    2000.00   4032.36
  Crit W.S. (ft)            82.38    Flow Area (sq ft)        5538.53   15044.83   9983.10
  E.G. Slope (ft/ft)      0.000205    Area (sq ft)             5589.91   15044.83   9983.10
  Q Total (cfs)           125000.00    Flow (cfs)              7218.29  100463.40  17318.31
  Top Width (ft)            2064.54    Top Width (ft)           821.89     354.06    888.59
  Vel Total (ft/s)             4.09    Avg. Vel. (ft/s)           1.30       6.68      1.73
  Max Chl Dpth (ft)           52.54    Hydr. Depth (ft)           6.74      42.49     11.23
  Conv. Total (cfs)       8735570.0    Conv. (cfs)             504447.1   7020841.0  1210283.0
  Length Wtd. (ft)          2351.91    Wetted Per. (ft)         828.04     376.27    901.81
  Min Ch El (ft)              58.38    Shear (lb/sq ft)           0.09       0.51      0.14
  Alpha                        2.17    Stream Power (lb/ft s)     0.11       3.41      0.25
  Frctn Loss (ft)              0.54    Cum Volume (acre-ft)    131012.80   51526.19  165325.30
  C & E Loss (ft)              0.12    Cum SA (acres)          18214.59    2284.44  20728.90


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.15

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  103.48   13.12  103.55   29.51  103.96   45.91     104   52.47  103.87
   75.42  104.15   85.26  104.52   95.09  104.54   124.6  104.86  137.72  105.22
  144.28  105.19  160.67  105.63  173.79  105.88  183.63  105.96  196.74  106.42
  216.42  106.85  229.54  107.26  242.65  107.31  249.21  107.43  262.33  107.37
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  275.44  106.93  285.28  107.27  291.84  106.92   298.4   106.8  314.79  106.94
  321.35  107.17  324.63  107.55  327.91  108.39  337.74  111.92   344.3  113.98
  347.58  114.75  350.86  114.96  363.98   115.1  367.26  113.07  370.54   106.8
  373.81  103.48  383.65   103.4  393.49  103.71  400.05  103.49  409.88  103.81
  416.44   103.7  419.72  103.46  426.28   102.4  429.56  102.37   439.4  102.95
  449.23  102.79  459.07  102.98  475.47  102.55  491.86  102.36  498.42  102.46
  504.98  102.35  514.81  102.59  521.37  102.39  534.49  102.17  557.44  102.52
  570.56  102.17  593.51  102.63  596.79  102.82  606.63   102.9  613.19  102.75
  619.74  102.41  629.58   102.8  645.98  102.73  649.26  102.55  659.09  102.77
  665.65  102.48  678.77  102.69  698.44  102.75     705  102.58  711.56  102.73
  718.12   102.5  731.23  102.45  741.07  102.88  750.91  102.59  760.75  102.59
  764.02  102.41  770.58  102.73   783.7  102.83  786.98  103.06  796.82  102.52
  803.37   102.3  809.93  102.59  819.77  102.82  829.61  102.56     846  102.28
  852.56  102.49  868.96  102.63  878.79  102.25  882.07  102.25  891.91  102.65
  895.19  102.62   908.3   101.8  918.14  102.09  927.98  102.51  931.26  102.32
  937.82  101.32  944.37  100.66  947.65   100.1  954.21   99.49  964.05   98.27
  973.89   97.23     987   96.09  993.56   95.35 1000.12   94.35 1006.68   93.14
 1009.96    92.9 1019.79   93.64 1042.75   93.79 1059.14   93.74 1062.42   93.86
 1072.26   93.65 1088.65   93.75 1101.77   93.73 1111.61   93.61    1128   93.83
  1144.4   93.65 1150.96    93.8 1157.51   93.77 1170.63   93.89 1177.19   93.75
 1190.31   93.88 1200.14    93.8  1206.7    93.9 1232.93   93.93 1249.33   93.84
 1255.89   93.95    1269    93.8 1272.28   93.93 1282.12   93.83 1291.96   94.03
 1305.07   93.77 1314.91    93.8 1321.47   93.68  1347.7   93.82 1354.26   93.69
 1367.38    93.8 1373.93   93.65 1403.45   93.73 1413.28    93.7 1419.84   93.84
 1436.24   93.63 1446.07   93.78 1462.47   93.68 1469.03   93.87 1478.86   93.68
 1485.42   93.83 1495.26    93.6 1511.66   93.67 1518.21   93.54 1528.05   93.69
 1544.45    93.6    1551   93.71 1564.12   93.59 1580.52   93.87 1590.35   93.77
 1610.03   93.98 1619.87   93.94  1629.7   94.03 1649.38   93.81 1662.49   93.88
 1669.05   93.77 1678.89   93.88 1685.45    93.7 1692.01   93.78 1698.56   93.67
 1714.96   93.84 1721.52   93.67 1734.63   93.83 1744.47    93.8 1751.03   93.98
 1764.14   93.72 1773.98   93.99  1787.1   93.77 1793.66   93.87 1806.77   93.74
 1842.84   93.74 1855.96   93.57 1862.52   93.73  1865.8   93.63 1882.19    93.8
 1895.31   93.71 1901.87    93.9 1914.98   93.86  1928.1   93.72 1944.49   93.71
 1951.05   93.87 1960.89    93.9 1967.45   93.72 1974.01   93.78 1983.84   93.64
 1987.12   93.76 2010.08   93.86 2016.63   93.79 2023.19      94 2029.75   93.85
 2055.98   94.49 2062.54   94.76 2072.38   94.72 2098.61   95.15 2108.45    95.7
 2115.01    96.3 2124.84   96.98  2131.4   97.08 2137.96   96.88 2151.08   96.89
 2167.47   97.37 2180.59   97.67 2187.15   97.62  2193.7   97.22 2203.54   97.06
  2210.1   97.27 2219.94   97.09 2233.05   97.08 2249.45   96.97 2259.28    96.8
 2275.68   96.88 2295.35   96.79 2301.91   96.91 2311.75   96.71 2321.59   96.76
 2328.14   96.93 2341.26   97.08  2351.1   96.97 2357.66   96.64 2367.49   96.96
 2377.33   96.76 2383.89   96.95    2397   96.88 2403.56   96.99 2410.12   96.87
 2429.79   97.03 2436.35    96.9 2456.03   97.05 2465.86   96.92  2475.7    97.2
 2488.82   97.03 2518.33   97.21 2521.61   97.12 2534.72   97.16 2541.28   97.44
 2551.12   97.29 2560.96    97.5 2564.24   97.38 2577.35   97.35 2587.19   97.48
  2600.3   97.39 2603.58   97.27  2616.7   97.46 2623.26    97.4 2626.54   97.56
 2639.65   97.46 2649.49   97.69 2665.89   97.63 2672.44   97.43 2688.84   97.77
 2698.68   97.36 2708.51    97.5 2718.35   97.48 2728.19   97.87 2738.02   97.75
 2751.14   97.84 2760.98   97.67 2767.54   97.85 2780.65   97.83 2790.49   98.05
    2820   98.14 2833.12   98.31 2839.68   98.14 2846.23   98.36 2856.07   98.43
 2862.63   98.25 2885.58   98.06 2908.54   98.24 2915.09   98.36 2924.93   98.29
 2934.77   98.51 2947.88   98.55 2954.44   98.38    2961   98.41 2970.84   98.17
 2990.51   98.29 2993.79   98.06 3000.35   98.04 3006.91   97.67 3020.02   98.11
 3033.14   98.18 3042.98   97.81 3052.81   97.69 3069.21   97.99 3079.05   97.92
 3095.45   98.02 3102.01   97.77 3118.42   97.58 3131.54   97.83 3144.66   98.27
 3154.51   98.25 3161.07   98.46 3174.19   98.06 3184.03   97.95 3193.88   97.63
 3200.44   97.65 3203.72   97.86 3220.12   97.95 3229.96   97.82 3243.09   98.02
 3249.65   97.69 3266.05   97.53 3279.18   97.66 3289.02   97.56 3298.86   97.86
  3308.7   97.82 3318.55   97.61 3334.95   97.73 3338.23   97.89 3344.79   97.74
 3351.35   97.95 3357.92   98.45 3364.48   97.93 3374.32    97.9 3384.16   97.72
    3394   97.81 3403.85   97.72 3416.97   97.86 3433.37   97.66 3449.78   97.75
 3459.62   98.24 3466.18   98.37 3482.59   97.83 3495.71   97.82 3502.27   98.21
 3512.11    97.9 3535.08   97.81 3544.92   97.96 3554.76   97.81 3561.33   98.06
 3574.45   98.14 3587.57   97.76 3603.98   98.15  3617.1   98.22 3630.22   97.94
 3636.78   97.95 3640.06   98.18 3649.91   98.06 3656.47   97.82 3663.03   97.94
 3672.87   97.89 3676.15   98.11 3682.72   98.02 3689.28   98.18  3702.4   97.93
 3708.96   98.33 3715.52   98.46 3725.37   98.13 3731.93   98.66 3735.21   98.72
 3751.61   98.62 3761.45   98.42  3771.3   98.48  3787.7  100.75 3800.82  100.98
 3807.39  100.71 3817.23  100.59 3823.79  101.07 3833.63  100.23 3840.19   99.08
 3846.76  100.37 3853.32  101.44  3856.6  102.15 3866.44   99.54 3869.72   99.28
 3876.28   99.29 3886.13   99.78 3892.69  100.49 3895.97  101.02 3899.25  100.72
 3902.53   99.08 3912.37   94.82 3915.65   93.02 3922.21   88.88 3925.49   87.28
 3938.62    83.6 3945.18   80.97 3948.46    78.9 3955.02   75.73  3958.3   75.66
  3961.3   67.45  3976.3   67.33  4002.3   67.33  4015.3   67.83  4029.3   67.93
  4043.3   68.33  4057.3   68.83  4072.3   69.13  4086.3   68.03  4100.3   68.33
  4114.3   68.83  4128.3   67.93  4141.3   70.03  4148.3   70.25 4151.45   75.66
 4154.72      76 4157.99   77.74 4161.27   79.84 4164.54   81.54 4167.81   82.87
 4171.08    83.6 4174.36   83.26 4177.63   82.31 4184.17   80.03 4187.45   79.47
 4193.99   79.21 4200.54   79.51 4203.81   79.94 4210.35   81.34 4220.17   83.82
 4226.72   84.84 4236.53   86.01 4246.35   87.51 4249.62    87.8 4262.71   88.25
 4282.35    89.4 4292.16   90.18 4308.53   90.25 4315.07   90.17 4328.16   90.27
 4331.43   90.42 4341.25   91.33 4351.07   91.63 4360.89   91.34 4367.43   89.93
  4370.7   89.67 4377.25   89.88 4419.77   89.84 4436.09   89.86 4458.95   89.63
 4465.48   91.11 4472.01   91.44 4488.34    93.2 4498.13   94.37 4520.99   96.86
 4530.78   97.18 4537.31   97.94 4543.84   98.93 4560.17  101.18  4566.7  101.77
  4576.5  102.17 4605.88  103.01 4609.15  103.28    4632  105.55 4645.06  106.53
 4654.86   107.6 4664.65  108.44 4677.71  108.65 4680.98  108.35 4684.24  107.23
 4687.51  105.75 4690.77  104.91 4700.57  103.54  4707.1  103.37  4716.9  102.61

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  363.98    .066 3895.97     .07  3958.3    .025 4154.72     .07
 4351.07    .066 4677.71     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3895.97 4351.07             2250 2000.04    2300             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3895.97  101.02       T
 4351.07  4716.9   91.63       T
Left Levee      Station=  363.98      Elevation=   115.1
Right Levee     Station= 4677.71      Elevation=  108.65

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            110.83    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.17    Wt. n-Val.                 0.066      0.053     0.066
  W.S. Elev (ft)            110.66    Reach Len. (ft)          2250.00    2000.04   2300.00
  Crit W.S. (ft)             91.61    Flow Area (sq ft)       33046.21   14493.75   4512.17
  E.G. Slope (ft/ft)      0.000255    Area (sq ft)            46848.41   14493.75   4696.35
  Q Total (cfs)           125000.00    Flow (cfs)              52698.58   63514.45   8786.98
  Top Width (ft)           4348.38    Top Width (ft)           3527.45     455.10    365.83
```

Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)	1.59	4.38	1.95	
Max Chl Dpth (ft)	43.33	Hydr. Depth (ft)	9.37	31.85	12.33	
Conv. Total (cfs)	7833172.0	Conv. (cfs)	3302376.0	3980157.0	550639.1	
Length Wtd. (ft)	2149.37	Wetted Per. (ft)	3533.80	473.19	375.85	
Min Ch El (ft)	67.33	Shear (lb/sq ft)	0.15	0.49	0.19	
Alpha	1.92	Stream Power (lb/ft s)	0.24	2.13	0.37	
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	129458.10	50848.08	164645.80	
C & E Loss (ft)	0.01	Cum SA (acres)	18085.64	2265.87	20670.84	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 155.7

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	114.87	13.12	115.01	16.4	113.63	19.67	107.13	22.95	103.65
26.23	103.26	39.35	103.28	49.19	102.62	55.75	103.36	81.98	102.99
95.1	103.01	108.21	102.46	121.33	102.34	127.89	102.58	147.56	102.29
200.03	102.24	209.87	102.03	226.26	102.4	239.38	102.12	252.5	102.44
259.06	102.25	278.73	102.23	288.57	102.09	298.41	102.23	311.52	102.09
341.03	102.32	347.59	102.12	367.27	102.4	380.39	102.12	400.06	102.22
409.9	101.89	416.46	102.1	439.41	102.11	449.25	102.4	468.92	102.05
478.76	102.34	485.32	102.07	498.44	102.31	508.27	101.96	534.51	102.04
544.34	101.6	560.74	101.41	570.58	99.81	583.69	98.85	596.81	97.18
606.65	96.17	629.6	95.01	649.28	95.18	659.12	94.83	682.07	94.98
688.63	94.42	701.75	94.44	718.14	94.21	731.26	94.22	744.37	93.87
773.89	94.01	790.28	93.74	813.24	93.89	826.35	93.83	849.31	94.13
862.43	94.03	875.54	94.34	882.1	94.08	901.78	94.14	908.33	94.33
931.29	94.18	941.13	93.94	950.96	94.19	967.36	94.03	980.48	94.2
1006.71	93.86	1032.94	93.99	1046.06	93.69	1059.18	93.94	1095.25	93.68
1118.2	93.72	1128.04	93.92	1134.6	93.75	1160.83	93.76	1167.39	93.49
1187.07	93.42	1210.02	93.48	1223.14	93.4	1278.88	93.6	1298.56	93.4
1331.35	93.44	1347.75	93.3	1380.54	93.36	1400.21	93.2	1423.17	93.45
1433.01	93.19	1446.12	93.33	1452.68	93.17	1462.52	93.83	1472.36	93.86
1478.92	92.23	1492.03	93.85	1505.15	94.05	1518.27	93.66	1531.38	93.76
1554.34	93.68	1564.17	93.86	1574.01	93.7	1593.69	93.81	1606.8	93.72
1613.36	93.88	1646.16	93.74	1655.99	93.92	1675.67	94	1682.23	93.8
1698.62	93.7	1715.02	93.85	1721.58	93.69	1744.53	93.74	1760.93	93.93
1797	94	1810.12	94.24	1823.23	93.95	1836.35	93.94	1856.02	94.15
1878.98	94.01	1905.21	94.22	1918.33	94.11	1947.84	94.48	1970.8	94.29
2013.43	94.41	2033.1	94.73	2042.94	94.59	2049.5	94.76	2069.17	94.53
2082.29	94.67	2105.24	94.6	2115.08	94.7	2138.04	94.6	2154.43	95.1
2170.83	94.65	2203.62	94.97	2216.74	94.84	2226.58	94.96	2246.25	94.8
2272.48	95.41	2279.04	94.88	2292.16	95.57	2305.28	95.28	2328.23	95.28
2338.07	94.76	2354.47	94.57	2357.74	94.74	2387.26	94.58	2393.82	94.78
2416.77	94.6	2439.73	94.62	2459.4	94.24	2475.8	94.84	2498.75	95.2
2508.59	95.08	2534.82	95.13	2547.94	95.29	2597.13	95.47	2616.8	95.45
2639.76	95.64	2652.87	95.46	2669.27	95.73	2675.83	95.61	2688.95	95.75
2702.06	95.66	2711.9	95.88	2721.74	95.71	2744.69	95.84	2761.09	96.19
2790.6	95.91	2810.28	96.1	2813.56	96	2856.19	96.34	2866.02	96.1
2892.26	96.23	2915.21	96.03	2928.33	96.17	2938.17	96.08	2964.4	96.37
2970.96	96.14	2980.8	96.24	2997.19	96	3039.82	95.76	3072.61	95.93
3105.41	95.81	3128.36	95.96	3148.04	95.98	3190.67	95.83	3220.18	95.92
3256.25	96.16	3272.65	95.94	3292.32	96.06	3315.28	95.97	3331.67	96.08
3348.07	95.92	3380.86	96.17	3403.82	96.14	3413.65	96.35	3420.21	96.12
3436.61	96.1	3446.45	96.25	3466.12	96.17	3495.63	96.95	3521.87	96.49
3548.1	96.33	3571.06	96.43	3580.89	96.28	3633.36	96.13	3646.48	96.47
3662.87	96.69	3695.67	96.74	3715.34	97.02	3728.46	97.49	3738.3	98.8
3744.85	99.38	3751.41	99.52	3757.97	98	3761.25	97.66	3767.81	97.8
3777.65	96.84	3787.48	96.61	3794.04	96.75	3800.6	96.51	3807.16	96.65
3823.56	96.32	3843.23	96.64	3849.79	96.95	3869.46	96.12	3882.58	96.05
3905.54	95.22	3918.65	95.74	3931.77	95.84	3944.89	95.46	3958	94.7
3980.96	94.08	4013.75	93.69	4020.31	92.77	4033.43	92.26	4053.1	91.01
4062.94	89.91	4072.78	90.03	4089.17	88.87	4102.29	89.34	4105.57	89.22
4112.13	88.01	4118.69	87.45	4128.52	87.24	4141.64	87.9	4154.76	89.44
4161.31	90.46	4164.59	90.34	4177.71	87.63	4187.55	85.06	4197.39	83.74
4203.94	81.89	4213.78	75.66	4217.06	75.5	4220	70.94	4230	70.94
4240	71.24	4260	70.64	4270	70.64	4290	69.64	4300	69.64
4310	69.14	4340	69.14	4350	68.64	4360	68.64	4370	69.64
4380	70.94	4384.29	75.5	4387.56	75.81	4394.12	78.87	4403.95	83.01
4410.51	84.81	4413.78	86.82	4423.62	94.92	4430.17	99.66	4433.45	100.52
4462.95	100.08	4469.51	99.78	4492.45	100.1	4502.28	100.42	4515.4	100.53
4531.78	100.38	4548.17	99.93	4564.56	100.18	4580.95	99.82	4594.06	100.03
4633.39	99.84	4643.23	99.9	4653.06	99.54	4672.73	99.33	4689.11	98.48
4695.67	98.62	4702.23	98.1	4718.61	97.8	4728.45	97.97	4738.28	97.75
4761.22	97.55	4774.34	97.21	4790.72	97.28	4810.39	97	4830.06	96.95
4843.17	96.54	4859.56	96.5	4872.67	96.76	4912	96.25	4941.5	96.17
4961.17	95.93	4974.28	96.03	4997.22	95.82	5003.78	96.01	5033.28	95.54
5072.61	95.53	5082.44	95.31	5108.66	95.32	5121.78	95.45	5128.33	95.31
5174.22	95.39	5180.77	95.28	5210.27	95.41	5279.11	95.39	5305.33	95.51
5351.22	95.18	5361.05	95.36	5380.72	95.28	5403.66	95.44	5410.22	95.66
5416.77	95.42	5429.88	95.35	5452.83	95.56	5459.38	95.44	5482.33	95.43
5488.88	95.54	5501.99	95.36	5538.05	95.46	5544.6	95.62	5557.71	95.39
5583.94	95.35	5606.88	95.54	5613.44	95.33	5626.55	95.69	5642.94	95.51
5656.05	95.89	5665.88	95.42	5678.99	95.45	5731.43	95.38	5803.54	95.41
5846.15	95.36	5885.49	95.51	5924.82	95.52	5937.93	95.44	5977.26	95.49
5980.54	95.43	6029.71	95.5	6039.54	95.38	6069.04	95.49	6124.76	95.44
6137.87	95.68	6144.43	95.52	6154.26	95.72	6170.65	95.4	6180.48	95.49
6229.65	95.43	6259.15	95.53	6308.32	95.5	6321.43	95.38	6350.93	95.55
6416.48	95.45	6429.59	95.66	6468.92	95.41	6488.59	95.61	6498.42	95.54
6508.26	95.93	6531.2	95.99	6541.03	95.61	6554.15	95.49	6586.92	95.52
6609.87	95.72	6616.42	95.47	6632.81	95.44	6649.2	95.64	6678.7	95.47
6688.53	95.66	6695.09	95.47	6704.92	95.64	6721.31	95.65	6744.25	95.47
6780.31	95.5	6799.98	96.01	6806.53	96.47	6813.09	96.29	6822.92	95.47
6839.31	96.16	6865.53	98.17	6872.09	99.05	6881.92	99.71	6895.03	101.87
6901.59	102.73	6908.14	102.72	6924.53	103.34	6940.92	103.05	6990.08	103.2
6996.64	103.02	7006.47	103.15	7013.03	102.88	7019.58	103.17	7049.08	103.37
7065.47	102.62	7085.14	102.47	7094.97	102.13	7124.47	101.89	7137.58	102.33
7147.42	103.98	7153.97	104.27	7170.36	104.09	7176.92	102.84	7183.47	102.39
7212.97	102.78	7226.08	103.73	7232.64	104.6	7239.19	104.59	7249.03	103.79
7281.8	103.35	7288.36	103.87	7317.86	103.8	7327.69	104	7357.19	103.91
7367.02	103.57	7383.41	103.71	7386.69	104.01	7396.52	106.91	7399.8	108.57
7406.36	113.12	7409.63	114.62	7412.91	115.18	7426.02	115.45	7455.52	115.62

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 7475.19  116.27 7485.02  116.46 7504.69  115.99 7527.63  116.19 7540.74  116.42
 7557.13  117.16  7576.8  116.66 7586.63  116.75 7593.19  117.61 7603.02  117.06
 7616.13  117.12 7622.69  116.15  7635.8  115.19 7642.35  114.98 7645.63   114.2
 7671.85  110.22 7678.41  108.45 7681.69  108.09 7688.24  106.59 7707.91  106.59

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .092 3751.41    .066 4213.78    .015 4403.95    .066 4433.45     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4161.31 4433.45          2226.15    2050 2058.78             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 4161.31   90.46       T
Left Levee      Station=   13.12      Elevation=  115.01
Right Levee     Station= 7593.19      Elevation=  117.61
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 3744.85   99.38 4433.45 7707.91  100.52

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            110.44    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                 0.086      0.035     0.060
  W.S. Elev (ft)            110.30    Reach Len. (ft)          2226.15    2050.00    2058.78
  Crit W.S. (ft)             95.25    Flow Area (sq ft)       45774.34    9353.69   27596.17
  E.G. Slope (ft/ft)      0.000128    Area (sq ft)            45944.09    9353.69   27596.17
  Q Total (cfs)           125000.00     Flow (cfs)             45081.69   45726.72   34191.59
  Top Width (ft)           7384.21    Top Width (ft)           4143.23     272.14    2968.84
  Vel Total (ft/s)            1.51    Avg. Vel. (ft/s)            0.98       4.89       1.24
  Max Chl Dpth (ft)          41.66    Hydr. Depth (ft)           11.05      34.37       9.30
  Conv. Total (cfs)       11040620.0     Conv. (cfs)             3981839.0   4038810.0   3019970.0
  Length Wtd. (ft)         2114.39    Wetted Per. (ft)         4147.91     286.45    2970.88
  Min Ch El (ft)             68.64    Shear (lb/sq ft)            0.09       0.26       0.07
  Alpha                       4.17    Stream Power (lb/ft s)      0.09       1.28       0.09
  Frctn Loss (ft)             0.19    Cum Volume (acre-ft)    127061.60   50300.61   163793.30
  C & E Loss (ft)             0.01    Cum SA (acres)           17887.54    2249.17   20582.80


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 155.36

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  114.01    3.28  114.44    16.4  114.47   19.68  114.15   26.23  102.74
   29.51  101.89   45.91  101.62   55.75  104.12   59.03  104.26   68.86  103.15
    78.7  101.56    95.1   98.23  101.65   97.36  121.33   95.77  134.45   95.42
  150.84   95.46  163.96   94.89  177.08   94.95  193.47   95.32  203.31   94.97
  216.43   95.39  226.26   94.93   252.5   95.53  265.61   95.28  272.17   95.61
  291.85   95.36  318.08   96.03  324.64   95.87  350.87   96.06  396.78   96.72
  403.34   96.54  416.46   96.93  439.41    96.8  445.97   97.14  459.09   97.07
  485.32   97.24  501.72   97.13  518.11   97.85  524.67   97.62  531.23   98.03
   550.9   97.62  564.02   98.01  570.58   97.86  586.98   98.25  603.37   99.82
  619.77  103.12  632.88  104.62  636.16  104.56     646  103.27  652.56  102.78
  672.23  100.67  688.63  100.06  737.82   99.83  773.89   99.96  836.19   99.63
  842.75   99.85  852.59    99.6  878.82   99.61  905.06  100.06  921.45    99.5
  928.01   99.94  954.24   99.52  973.92   99.71  983.76   99.53 1009.99    99.7
 1026.38  100.07 1032.94   99.78 1059.18   99.79 1088.69   99.48 1098.53   99.72
 1111.64   99.58  1134.6   99.98 1147.72    99.5 1154.27   99.72 1183.79   99.72
 1206.74   99.96 1219.86  100.41 1239.53  100.44 1252.65  101.51 1259.21  102.65
 1275.61  104.64 1282.16   103.8 1288.72  101.92 1298.56  101.91 1311.68  100.69
 1328.07  100.22 1347.75   99.24 1360.86   98.98  1370.7   99.41 1380.54   98.99
 1400.22   99.36 1406.77   99.14 1436.29   99.79 1446.12   99.74 1452.68    99.3
 1475.64   99.15 1518.27   99.47 1528.11   99.84 1557.62   99.29 1590.41   99.69
 1600.25   99.34 1613.36   99.56 1646.16   99.42 1665.83    99.8 1672.39  100.36
 1682.23  100.55 1688.79   99.84 1698.62   100.1 1708.46   99.55 1728.14   99.78
 1741.25    99.7 1754.37  100.25 1760.93   99.59 1770.77  100.13 1783.88   99.81
 1790.44  100.07 1810.12   99.76 1819.96   99.88 1823.23  100.38 1846.19  100.31
 1852.75   99.47 1869.14    99.6  1875.7   99.22 1898.66   99.65 1921.61   98.94
 1934.73   99.02 1941.29    98.7 1964.24   98.98  1987.2    99.5 2010.15   99.31
 2033.11   99.41  2049.5   99.82 2072.46   99.42 2088.85   99.86 2105.25    99.6
 2131.48   99.66 2170.83   99.37  2190.5   98.97 2210.18   98.29 2226.57   98.07
 2233.13   97.65 2259.37   96.98 2275.76   96.15 2295.44   95.72 2318.39   95.55
 2324.95   95.24 2357.74    94.8 2383.97    94.7 2397.09   94.89 2452.83   94.86
 2469.23   95.14 2531.53   94.85 2590.56   95.17 2672.54   95.22 2692.21   95.44
 2705.33   95.21    2725   95.27 2757.79   95.57 2790.59   95.59 2797.14   95.36
 2810.26   95.58 2849.61   95.74 2869.29   95.96 2892.24   96.76 2905.36    96.3
 2911.91   95.29 2921.75   94.41 2941.43    93.2 2954.54   92.79 2964.38    92.2
  2977.5   91.99 2997.17   91.97 3013.57   92.26 3043.08   92.11 3066.03   92.14
 3098.83   92.35  3118.5   92.31 3141.45   92.57 3151.29    92.4 3177.52   92.59
 3187.36   92.84 3210.32   93.03 3223.43   92.78 3239.83   92.99 3249.67   92.78
 3262.78   93.05 3298.85   92.95 3334.92   93.54 3380.83   93.35 3400.51   93.75
 3410.34   93.59  3433.3   93.77 3446.41   93.63 3492.32   94.04 3538.23   94.17
 3554.63   94.35 3567.74   94.22 3597.26   94.53 3620.21   94.96 3630.05   94.68
 3646.44   95.29 3656.28   95.01 3675.95   95.59 3689.07   95.45 3698.91    95.7
 3712.02   95.48 3757.93   95.77 3761.21   96.12 3777.61   96.55 3784.17   95.69
    3794   96.28  3810.4    95.2 3813.68   94.69 3830.07   94.04 3843.19   94.11
 3856.31   93.51 3869.42   93.75 3875.98   94.44 3885.82   94.07 3892.38   92.94
 3898.94   93.16 3928.45   93.31 3938.29   92.14 3944.84   89.28  3951.4   85.26
 3964.52   82.25 3977.64   75.58 3980.91   75.43 3984.91   69.65 4004.91   70.15
 4017.91   70.45 4029.91   70.55 4042.91   70.55 4055.91   70.35 4069.91   70.05
 4083.91   70.45 4108.91   70.65 4130.91   70.15 4184.23   75.43 4190.79   75.85
 4197.35    78.8 4210.46   83.54  4220.3   85.84 4230.14   88.63 4239.98      93
  4253.1   98.38 4305.57   99.66 4325.25   99.86 4344.92   99.55  4364.6   99.71
 4384.28   99.56 4394.11  100.11 4400.67   99.58 4430.19   98.86 4440.03   98.94
 4449.87   99.48 4462.98   99.33 4472.82   99.59 4479.38   98.93 4495.78   98.03
 4502.34   98.24 4531.85   97.79 4551.53   98.05 4558.09   98.53 4574.48   97.96
 4590.88   98.06 4600.72   98.38 4640.07   98.65 4649.91   98.48 4656.47   99.26
 4679.43   98.35 4705.66   98.08 4712.22   98.23  4731.9   97.72 4745.02   98.17
 4761.41   97.52 4767.97   97.64 4781.09   96.93 4797.49   96.56 4836.84   96.36
 4866.36   95.84 4915.55   95.74  4938.5   95.53 4974.58   95.43 5004.09   95.49
 5010.65   95.31 5069.68   95.08 5076.24   95.42 5086.08   95.14 5109.04   94.94
 5125.43   95.04 5148.39   94.82 5161.51   95.01 5174.63   94.91 5184.46   95.23
  5194.3   94.88 5213.98   95.19 5223.82   94.86 5246.77   95.18 5253.33   94.96
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 5289.41   95.14 5318.92   94.91    5355    94.8 5381.23    95.1 5420.58   94.77
 5453.38   95.23 5463.22   96.54  5466.5   96.58 5486.17   95.66 5496.01   95.91
 5502.57   95.52 5518.97   95.81 5528.81   95.42    5578   95.33 5607.51   95.55
 5630.47    95.5 5679.66   96.08 5696.06   96.17 5751.81   97.45 5758.37   97.87
 5768.21   97.89  5784.6   98.35    5801    98.1 5814.12   98.44 5823.96   98.31
 5856.75   98.38 5892.83   98.66 5899.39   98.53 5938.74   98.36 5974.81   98.54
 6020.73   98.32 6033.84   98.01 6046.96   98.36 6069.92   98.01 6083.04   98.02
 6109.27   97.71 6158.46   97.36 6187.98   97.45 6220.77   97.06 6230.61   97.15
  6279.8   96.74  6312.6   96.71 6358.51   96.49 6388.03   96.57 6466.73   97.33
 6486.41   98.17 6492.97   98.89 6506.09   99.06 6545.44   98.99 6591.35   99.23
 6614.31  100.07 6630.71  101.94 6643.82  104.08 6653.66  104.41 6673.34  102.87
 6689.74  103.08 6712.69  102.67 6722.53  103.54 6732.37  103.23 6748.77  103.85
 6771.72  104.49 6781.56  105.68  6791.4  106.11 6814.36  105.89 6830.75   103.7
 6847.15  104.53 6870.11  104.24 6879.94  104.95 6889.78  103.33 6896.34  103.55
 6906.18  105.36 6909.46  105.23 6916.02  103.62 6925.86  102.79 6942.25  102.48
 6952.09  102.69 6971.77   102.5 6994.73  102.61 7004.56  102.86 7020.96  102.83
 7060.31  102.19 7086.55  102.65 7122.62  102.82 7148.86  102.59 7165.26  102.74
 7188.21  102.21 7201.33  102.27 7221.01  102.84  7253.8  102.66 7263.64  102.98
 7273.48  102.79  7286.6     103 7299.72  103.59 7309.55  103.63 7316.11  103.26
 7348.91  103.23 7355.47  103.36 7371.86  102.59  7381.7   103.2 7388.26   102.7
 7421.06  102.79 7434.17  102.59 7444.01  103.38 7453.85  103.63 7460.41  103.16
 7473.53  103.49  7509.6  103.54 7519.44  103.69 7532.56  103.33 7545.67  102.54
 7552.23  102.73 7568.63  102.56 7575.19  102.16 7598.15  101.93 7617.82  101.94
 7634.22  102.65 7644.06  103.68 7650.62   103.7 7660.46  102.53 7689.97  102.18
 7712.93  102.92 7729.32  102.52 7752.28  102.49  7765.4   102.8 7775.24  102.46
 7801.47  102.59 7808.03  102.42 7817.87  103.41 7827.71  102.96 7840.83  103.09
 7847.38  103.68  7860.5  102.96 7873.62  102.82 7890.02  103.21 7899.86  102.98
 7912.97  103.38 7926.09  103.11 7935.93  102.28 7949.05  102.43 7968.72  102.18
 7981.84  102.34 7991.68  103.21 8001.52  103.46  8021.2  106.27 8024.48  107.19
 8031.03  111.51 8037.59  111.84 8060.55  110.86 8073.67  110.76 8080.23  108.39
 8090.06  103.78 8103.18  103.19 8113.02   99.19 8119.58   98.39 8303.24   98.39
 8306.52   98.42 8313.07   99.83 8319.63  103.02 8329.47  104.34 8368.82  104.79

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3777.61     .07 3980.91    .025 4230.14     .07 4325.25    .066
 7644.06     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      3777.61 4325.25         1101.32 1093.11 1083.33             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3777.61   96.55       T
 4325.25 8368.82   99.86       T
Left Levee      Station=    16.4      Elevation=  114.47
Right Levee     Station= 8037.59      Elevation=  111.84

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            110.24    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.11    Wt. n-Val.                 0.066      0.030      0.066
  W.S. Elev (ft)            110.13    Reach Len. (ft)          1101.32    1093.11    1083.33
  Crit W.S. (ft)             92.56    Flow Area (sq ft)       44956.25   14130.11   33470.82
  E.G. Slope (ft/ft)      0.000067    Area (sq ft)            48570.67   14130.11   39995.03
  Q Total (cfs)           125000.00    Flow (cfs)              43249.92   54767.16   26982.92
  Top Width (ft)           8006.96    Top Width (ft)           3755.62     547.64    3703.69
  Vel Total (ft/s)            1.35    Avg. Vel. (ft/s)            0.96       3.88       0.81
  Max Chl Dpth (ft)          40.48    Hydr. Depth (ft)           11.97      25.80       9.04
  Conv. Total (cfs)       15286490.0    Conv. (cfs)             5289118.0   6697583.0   3299794.0
  Length Wtd. (ft)         1093.87    Wetted Per. (ft)         3763.38     559.15    3707.36
  Min Ch El (ft)             69.65    Shear (lb/sq ft)            0.05       0.11       0.04
  Alpha                       3.86    Stream Power (lb/ft s)      0.05       0.41       0.03
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)    124646.50   49748.02   162196.00
  C & E Loss (ft)             0.02    Cum SA (acres)          17685.70    2229.88   20425.12


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 155.2

INPUT
Description: RGV-04, New Cross-section, Updated on left with new survey to
             Station 1357.76, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     406
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  107.92   13.99   111.5   41.99  113.37   65.99   113.8   93.98  112.79
  117.98  101.16  144.97    98.9  177.97   98.88  191.97  101.59  221.96  101.98
  252.96  101.73  325.94  101.74  428.93  102.03  436.92   102.4  503.91  101.37
  517.91   99.15  524.91   95.42   547.9   92.64   578.9   94.69  624.89   94.83
  664.88   94.17  698.88   94.96  756.87      95  807.86    94.6  844.85   94.75
  893.84   96.67  934.83   97.84 1088.81   97.86  1139.8   98.12 1357.76   98.79
  1358.2   98.93 1364.76   98.67 1387.73   98.67 1417.25   99.05 1423.81   98.79
 1433.65   98.95 1450.06   98.75  1476.3   98.99 1486.15    98.8 1518.95   99.34
 1528.79   98.84  1545.2   98.86 1581.29   99.11 1607.53   98.78 1623.93   98.81
 1633.78   99.12 1640.34    98.9 1660.02   98.99 1689.55   98.89 1709.23   99.13
 1722.35   98.93  1748.6   99.07    1765   98.99 1781.41   99.18 1797.81   99.01
 1840.46   99.07 1847.02   99.25 1863.42   99.09 1879.83   99.25 1906.07   99.15
 1919.19   99.88 1929.04    99.2 1942.16   99.49 1948.72    99.2 1965.12   99.31
 1974.97   99.07 1984.81   99.46 2001.21   99.53 2007.77   99.29 2034.02    99.1
 2066.83   99.23 2083.23   99.41 2099.63   99.15 2106.19    99.3 2152.12   99.15
 2198.05   99.39 2217.74   99.23 2273.51   99.37 2293.19   99.74 2303.03   99.72
    2326  100.19 2358.81  100.32 2378.49   99.88 2385.05  100.01 2394.89    99.7
  2427.7   99.74 2447.38   99.96 2467.07   99.95 2480.19  100.24 2490.03   99.79
 2522.84   99.84 2542.52   99.68 2565.49   99.86 2585.17  100.38  2598.3  100.15
  2614.7  100.34 2621.26  100.01 2640.95  100.21 2657.35   99.83 2696.72   99.85
 2729.52  100.02 2749.21   99.91 2762.33   99.61 2778.73     100  2785.3    99.9
 2798.42  100.33 2804.98   99.82 2837.79  100.18 2844.35   99.85 2870.59    99.6
 2900.12  100.08 2909.96   99.69 2923.08  100.65 2949.33   97.07 2955.89   96.49
 2972.29   94.39 3001.82   92.54 3014.94   92.34  3021.5   91.83 3031.35   92.11
 3047.75   91.72 3123.21   91.61 3126.49   91.78 3182.26   91.86 3198.66   92.31
 3211.78   91.97 3247.87    92.3 3264.27   92.05 3290.52   92.28 3346.29   92.23
 3382.38   92.51 3392.22   92.38 3415.19   92.61 3474.24   92.55 3533.29   92.69
 3559.54   92.94 3608.75   93.16 3625.15   93.51 3634.99   93.31 3654.68   93.53
 3690.76   94.31 3700.61    93.8 3710.45   94.49 3713.73   94.14 3723.57   91.96
 3730.13   91.23 3743.25   90.33 3749.82   90.55 3762.94   90.08 3779.34   90.15
  3785.9    90.4 3812.15   91.91 3825.27   92.04 3835.11   92.79 3838.39   92.46
 3844.96   89.31 3851.52   84.68 3858.08   82.89 3864.64   82.13 3867.92   81.15
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3877.76	75.65	3881.04	75.39	3929.04	70.85	3953.04	71.45	3966.04	71.75		
3978.04	71.85	3991.04	71.85	4004.04	71.65	4018.04	71.35	4032.04	71.75		
4057.04	71.95	4071.04	71.63	4074.6	75.39	4081.17	76.1	4087.73	79.54		
4097.57	84.06	4104.13	88.55	4117.25	95.92	4123.81	98.68	4127.09	99.5		
4133.66	99.94	4150.06	99	4192.71	99.46	4215.67	99.39	4225.51	99.01		
4251.76	99	4278	99.28	4310.81	99.16	4320.65	99.33	4337.05	98.81		
4360.02	98.61	4373.14	99.18	4382.98	99.12	4392.82	97.87	4405.94	97.17		
4412.51	97.5	4422.35	97.18	4445.31	97.41	4487.96	97.11	4530.61	96.7		
4583.1	96.56	4589.66	96.37	4606.06	96.48	4622.46	96.08	4632.3	96.17		
4638.87	95.89	4661.83	95.96	4688.07	95.79	4697.92	95.46	4720.88	95.68		
4743.84	95.37	4766.81	95.32	4773.37	94.97	4789.77	94.65	4825.86	94.67		
4842.26	94.52	4871.79	94.46	4875.07	94.34	4914.44	94.11	4930.84	94.43		
4940.68	94.08	4960.36	93.88	4973.49	94.15	4993.17	93.84	5009.57	94.04		
5039.1	93.82	5065.34	93.92	5091.59	93.89	5124.39	94.08	5144.08	93.83		
5153.92	94.14	5163.76	93.98	5183.44	94.13	5199.85	93.91	5275.3	94.05		
5321.23	94.22	5331.07	94.49	5347.47	94.58	5367.16	95.19	5377	94.63		
5390.12	94.24	5406.52	94.37	5416.36	94.14	5436.05	94.08	5475.42	94.49		
5521.34	95.18	5557.43	95.5	5616.48	95.73	5623.04	95.33	5636.16	95.77		
5668.97	95.58	5695.21	95.73	5721.46	95.53	5777.23	95.72	5800.19	96.07		
5829.72	97.12	5849.4	98.99	5862.52	99.72	5888.77	100.64	5895.33	100.53		
5915.01	101.02	5928.14	101.78	5941.26	101.47	5947.82	100.72	5957.66	102.42		
5964.22	102.98	5974.06	103.22	5983.91	103.11	5993.75	103.58	6006.87	103.66		
6013.43	103.34	6019.99	104.04	6033.11	103.31	6042.96	104.03	6056.08	103.79		
6062.64	103.23	6075.76	103.34	6088.88	102.96	6141.37	102.94	6157.78	102.81		
6187.3	102.88	6252.91	102.67	6298.84	102.72	6308.68	102.57	6334.93	102.6		
6341.49	102.46	6371.01	102.43	6387.42	102.21	6443.19	102.26	6485.84	102.46		
6498.96	102.32	6538.32	102.5	6580.97	102.27	6597.38	102.43	6623.62	102.46		
6630.18	102.33	6662.99	102.21	6689.23	102.28	6708.91	102.12	6728.6	102.19		
6777.81	102.04	6784.37	102.14	6840.14	101.88	6856.54	101.98	6909.03	101.94		
6915.59	102.2	6925.43	103.24	6931.99	103.58	6958.24	104.29	6964.8	104.68		
7000.89	103.73	7010.73	102.63	7027.13	101.23	7036.97	101.5	7046.82	100.35		
7063.22	99.73	7076.34	100.03	7082.9	100.85	7118.99	102.3	7132.11	102.44		
7145.23	101.78	7155.07	101.92	7161.64	102.59	7174.76	102.68	7194.44	103.14		
7214.12	102.89	7246.93	103	7256.77	102.49	7263.33	102.56	7283.02	101.96		
7299.42	101.66	7312.54	101.74	7335.51	101.61	7378.15	101.59	7388	102.04		
7401.12	102.03	7417.52	101.26	7440.49	101.04	7453.61	101.46	7486.41	101.18		
7509.38	101.27	7535.62	101.65	7542.18	102.21	7568.43	102.47	7584.83	102.28		
7604.51	103.61	7611.08	103.69	7614.36	103.04	7627.48	102.34	7640.6	102.76		
7660.28	103.04	7673.41	102.88	7679.97	102	7693.09	101.57	7709.49	101.49		
7716.05	102.09	7725.9	101.92	7739.02	102.63	7745.58	103.75	7755.42	104.03		
7761.98	103.32	7771.82	102.82	7798.07	102.3	7807.91	103.08	7824.31	101.67		
7837.44	101.38	7844	101.68	7850.56	100.99	7863.68	100.6	7870.24	101.78		
7886.65	101.92	7903.05	101.32	7926.01	101.47	7945.7	101.22	7952.26	100.49		
7965.38	100.48	7978.5	101.33	7994.9	101.75	8001.47	102.21	8030.99	102.42		
8037.55	102.8	8044.11	102.62	8057.24	102.79	8083.48	103.62	8090.04	104.02		
8093.32	104.87	8109.73	111.18	8113.01	111.88	8122.85	112.19	8142.53	110.25		
8149.09	110.19	8168.78	109.38	8175.34	109.8	8185.18	105.63	8195.02	104.89		
8198.3	104.22	8208.14	98.96	8214.71	98.23	8424.68	98.23	8427.96	99.4		
8434.52	103.59	8441.09	104.87	8450.93	105.57	8480.46	105.74	8487.02	106.4		
8496.86	106.07										

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	3710.45	.07	3877.76	.025	4117.25	.07	4133.66	.066
8109.73	.06								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
3710.45 4133.66 959.6 956.88 939.12 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	3710.45	94.49	T
4133.66	8496.86	99.94	T

Left Levee Station= 65.99 Elevation= 113.8
Right Levee Station= 8122.85 Elevation= 112.19

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	110.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.066	0.047	0.066
W.S. Elev (ft)	110.08	Reach Len. (ft)	959.60	956.88	939.12
Crit W.S. (ft)	97.30	Flow Area (sq ft)	43592.27	12212.26	34998.65
E.G. Slope (ft/ft)	0.000107	Area (sq ft)	45097.28	12212.26	42167.88
Q Total (cfs)	125000.00	Flow (cfs)	53467.18	36730.33	34802.49
Top Width (ft)	8007.30	Top Width (ft)	3610.88	423.21	3973.21
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)	1.23	3.01	0.99
Max Chl Dpth (ft)	39.23	Hydr. Depth (ft)	12.07	28.86	8.81
Conv. Total (cfs)	12064350.0	Conv. (cfs)	5160376.0	3545021.0	3358956.0
Length Wtd. (ft)	953.61	Wetted Per. (ft)	3615.59	435.42	3976.48
Min Ch El (ft)	70.85	Shear (lb/sq ft)	0.08	0.19	0.06
Alpha	1.89	Stream Power (lb/ft s)	0.10	0.57	0.06
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	123462.40	49417.49	161174.30
C & E Loss (ft)	0.02	Cum SA (acres)	17592.58	2217.70	20329.66

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 155.01

INPUT
Description: RGV-04, Updated on left with new survey to Station 1494.75,
Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 464

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	109.09	9	113.65	20	114.75	34.99	114.29	42.99	112.04
50.99	107.24	55.99	105.51	109.98	105.51	111.98	105.71	136.98	105.51
159.97	105.72	274.95	105.72	279.95	105.51	357.94	105.51	359.94	105.7
433.92	105.72	435.92	105.51	1153.81	105.51	1160.8	107.63	1168.8	109.11
1182.8	110.87	1201.8	111.66	1222.79	111.76	1250.79	112.25	1316.78	111.92
1338.78	111.91	1357.77	111.58	1400.77	107.77	1453.76	104.64	1494.75	102.6
1501.38	103.8	1514.5	103.59	1534.17	102.5	1540.72	101.89	1553.83	101.21
1589.89	100.23	1599.73	99.84	1612.84	100.16	1635.79	99.56	1645.62	99
1665.29	98.54	1675.13	97.91	1704.63	97.36	1721.02	96.85	1734.13	96.98
1780.03	96.84	1829.2	96.95	1842.31	97.27	1865.26	97.08	1881.65	97.09
1888.21	96.85	1907.88	97.19	1937.38	96.81	1940.66	97	1970.16	96.99
1980	97.15	2002.94	96.88	2039	97.37	2048.84	97.37	2055.39	96.98
2075.06	97.1	2091.45	96.86	2101.29	97.16	2117.68	97	2137.35	97.32
2143.9	97.26	2166.85	97.87	2183.24	98.09	2209.46	98.18	2219.3	97.97

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 2229.13   98.17 2245.52   98.19 2255.36   98.77 2271.75   98.54  2278.3   98.92
 2284.86   98.72 2304.53   98.63  2324.2   99.04 2340.59   98.76 2356.98   98.95
 2363.53   99.35 2376.65   98.89 2393.04   99.05 2419.26   98.85 2435.65   99.12
 2442.21   98.88 2448.76   99.34  2458.6   98.88 2481.54   98.83 2491.38   99.18
 2514.32   99.21 2533.99   98.97 2540.55   99.39 2547.11    99.2 2566.77   99.31
 2583.16   98.86    2593    99.9 2606.11   99.13  2622.5   98.71 2635.61   99.02
 2648.73   98.69 2658.56   98.91 2665.12    98.7 2688.06   98.62 2724.12   99.02
 2760.18   98.66 2796.24   98.71 2806.07   98.94 2838.85   98.41 2845.41   98.77
 2874.91   98.45 2917.53   98.51  2937.2   98.36 2943.75   98.55 2960.14   98.51
 2976.53   98.84 2992.92   98.53 2999.48   98.77 3025.71    98.4  3042.1   98.57
 3058.49   98.45 3078.15   98.83 3084.71   98.61 3097.82   98.87 3104.38   98.57
 3120.77   98.55 3133.88   98.85 3150.27   98.38 3166.66   98.61 3189.61   98.73
    3206   98.65 3212.56   98.91  3235.5   98.93 3242.06   98.45 3255.17   98.52
 3271.56   98.91  3281.4   98.87 3294.51   98.46 3320.73   98.73 3330.57   98.46
 3337.12    98.7 3350.24   98.41  3369.9   98.97 3379.74   98.54 3386.29   98.69
 3438.74    98.4 3455.13   98.53  3474.8   98.27 3501.03   98.64 3507.58   98.43
 3537.09    98.3 3546.92   98.58 3560.03   98.16  3579.7   97.95 3596.09   98.88
 3625.59   97.74 3641.98   97.81 3645.26   98.04  3655.1   97.76 3674.77   95.57
  3684.6   95.27 3700.95    94.2 3717.27   94.26 3733.58   93.97 3766.22   93.75
 3769.49   93.96 3789.07   93.83 3815.18   94.31  3831.5   94.46 3857.61   94.27
 3873.93    94.3 3886.98   94.55 3900.04   95.06 3922.88   95.09 3945.73   96.06
 3962.05   96.07 3978.37   95.59 3991.42   94.71 4007.74   92.62 4033.85   89.76
 4053.43   88.26 4069.75   87.56 4095.86   86.86 4105.65   87.29 4112.18   87.04
 4125.23   85.56 4131.76   83.64 4138.29    81.1 4144.82   76.04 4148.08   75.36
 4148.08   79.52 4152.08   77.74 4161.08   76.28 4171.08   69.98 4181.08   69.28
 4191.08   69.98 4201.08   70.28 4211.08   71.08 4221.08   71.08 4231.08   70.68
 4251.08   71.28 4271.08   71.38 4301.08   72.98 4311.08   73.28 4321.08   72.68
 4328.11   75.36 4331.39   75.57 4337.95   79.44 4344.51   82.13 4354.34    83.6
  4360.9    85.2 4374.02   89.33 4390.41    93.9 4396.97   94.58 4406.81   92.65
 4416.65   91.73 4429.76   91.61 4442.88   92.46    4456    92.6 4469.11   93.34
 4475.67   94.21 4482.23   94.28 4488.79   94.84 4498.63   96.27 4511.74   97.59
 4528.14   98.01 4551.09   98.09 4557.65   98.28 4574.05   98.29 4583.88   97.86
 4590.44   98.28 4626.51   97.77 4639.63   97.22 4649.47   96.49 4672.42   95.97
 4711.77   95.45 4724.89   95.49 4747.84   95.18 4764.24   95.35 4787.19   94.94
 4803.59   94.81 4819.98   94.89 4836.38   94.59 4875.73   94.39 4888.85   94.21
 4898.68   94.36 4938.03   93.97 4951.15   94.12 4977.38   93.72  4990.5   93.77
 5010.17   93.57 5016.73   93.83 5026.57   93.56 5046.25    93.8  5052.8   93.45
  5085.6   93.24 5098.71   93.56 5111.83   93.23 5144.62    93.2 5157.74      93
 5183.97   93.09 5190.53   92.93 5220.04   93.02 5233.16    92.8 5272.51    92.8
 5279.07   92.65 5295.46   92.83 5334.81   92.48  5367.6   92.31 5380.72   92.54
 5393.84   92.34 5403.67   92.49 5416.79   92.36 5426.63   92.53 5443.02   92.41
 5469.26   92.61 5479.09   92.43 5495.49   92.65 5508.61   92.53 5518.44   92.81
 5534.84   92.66 5551.24   93.31 5570.91   92.42 5580.75   92.35 5587.31   92.63
 5600.42   92.45 5610.26    92.6  5620.1   92.32 5636.49   92.56 5669.29   92.31
 5702.08    92.6 5721.75   92.87 5747.99   93.53 5757.82   93.39 5780.78   93.67
 5790.61   94.28 5803.73   94.09 5829.96   94.13 5836.52   94.45 5849.64   94.48
 5862.76   94.99 5872.59   95.07 5882.43   95.95 5888.99   96.86 5905.38  101.18
 5911.94  102.08  5918.5  102.38  5934.9  101.99 5941.46  102.32 5951.29  102.21
 5957.85  102.56 5964.41  102.39 5980.81  102.73 5990.64  104.58  5997.2  103.59
 6003.76  104.63 6007.04  104.28  6013.6  102.14 6016.88  101.71 6033.27  102.92
 6039.83  102.72 6046.39  103.22 6056.23  103.49 6072.62   102.6 6079.18  102.73
 6108.69   102.4 6115.25  102.55 6128.37  102.35  6154.6  102.48 6177.55   102.2
 6184.11  102.33  6216.9  102.04 6223.46  100.59 6226.74  100.38  6233.3  102.77
 6236.58  102.81 6246.42  101.78 6275.93   101.9 6298.88  101.89 6321.84  101.71
 6344.79   101.8 6367.75  101.69 6380.86  101.76 6420.21  101.62 6462.84  101.65
  6564.5  101.38 6584.17   101.5  6610.4  101.29 6633.36  101.24 6653.03  101.01
 6698.94  101.02 6751.41  101.25 6757.97  101.08 6780.92  101.11 6797.32  100.91
 6803.87  101.04 6820.27   100.8 6849.78  100.97 6859.62  100.86 6895.69  101.03
 6915.37  100.83 6951.44  100.84 6964.55   100.7 7007.18  100.83 7017.02  100.76
 7053.09  100.86 7079.32  100.81 7092.44  100.92 7144.91  100.74 7151.46  100.81
 7210.49  100.53 7223.61  100.73 7266.24  100.99 7292.47  101.76 7302.31  101.03
 7315.42  100.78 7331.82  100.86 7338.38  100.69 7351.49  100.94 7374.45  100.79
 7384.29   101.1 7407.24  100.74 7420.36  100.98 7459.71  100.95 7466.26  101.14
 7518.73  101.28 7535.13  101.14 7600.71   101.2 7610.55  100.82 7620.38  101.22
 7640.06  101.18 7653.18  100.95 7669.57  101.12 7685.97  100.99 7692.53  101.18
 7725.32  101.05 7748.27  100.85  7774.5  100.86 7787.62   100.7 7797.46  100.86
 7820.41  100.69 7849.93  100.77 7866.32  100.57 7899.11  100.48 7918.79  100.68
  7931.9  100.36 7941.74  100.66 7958.14  101.74 7971.25  101.73 7984.37  101.43
 7990.93  101.91  8010.6  101.01 8023.72  101.68 8046.68  102.45 8053.23  102.36
 8069.63  101.18 8082.75  101.35 8099.14  102.23  8105.7  103.28 8112.26  103.36
 8118.82  102.37 8135.21  102.07 8151.61  102.39 8158.17  102.81 8171.28  103.18
 8177.84     103 8194.24  103.12 8220.47  102.46 8230.31  101.79 8240.15  101.85
 8256.54  102.93 8269.66  102.48 8282.78  102.56 8289.34  102.23 8318.85  102.41
 8328.69  102.29 8341.81  101.69 8354.92   101.5 8384.44  101.53 8394.27  102.02
 8420.51  102.06 8436.91  102.34 8456.58     103 8463.14  103.88 8476.26  107.41
 8482.82  110.03 8489.37  110.94 8495.93  111.02 8515.61  110.43 8525.45  110.34
 8538.56  107.95 8545.12  105.18 8558.24  104.19 8571.36   98.78 8574.64    98.1
 8761.56    98.1 8771.39   99.03 8781.23  102.52 8791.07  106.66 8797.63  107.35
 8827.14  107.86 8843.54  107.66  8850.1  107.35 8866.49  107.13

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .092 3945.73    .066 4152.08    .015 4331.39    .066 4557.65    .099

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3945.73 4551.09          1629.91    1325  767.57             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 3945.73   96.06       T
Left Levee      Station=      20      Elevation=  114.75
Right Levee     Station= 8495.93      Elevation=  111.02
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   16.39 1203.07  111.67 4626.51 5888.99   98.09

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            110.02    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.30    Wt. n-Val.                 0.092      0.022     0.099
  W.S. Elev (ft)            109.72    Reach Len. (ft)          1629.91    1325.00    767.57
  Crit W.S. (ft)             95.38    Flow Area (sq ft)       28693.39   14822.11  36820.87
  E.G. Slope (ft/ft)      0.000085    Area (sq ft)            29129.25   14822.11  36820.87
  Q Total (cfs)           125000.00     Flow (cfs)             21375.63   80946.81  22677.56
  Top Width (ft)            7103.24    Top Width (ft)          2566.93     605.36   3930.95
  Vel Total (ft/s)             1.56    Avg. Vel. (ft/s)           0.74       5.46      0.62
  Max Chl Dpth (ft)           40.44    Hydr. Depth (ft)          11.18      24.48      9.37
  Conv. Total (cfs)       13544260.0      Conv. (cfs)           2316137.0  8770917.0 2457206.0
  Length Wtd. (ft)          1181.84    Wetted Per. (ft)        2568.15     619.28    3934.71
  Min Ch El (ft)              69.28    Shear (lb/sq ft)           0.06       0.13      0.05
  Alpha                        8.05    Stream Power (lb/ft s)     0.04       0.70      0.03
  Frctn Loss (ft)              0.18    Cum Volume (acre-ft)    122644.80  49120.56  160322.90
  C & E Loss (ft)              0.03    Cum SA (acres)          17524.53    2206.40  20244.45
```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 154.81

INPUT
Description: RGV-04, Updated on left with new survey to Station 1262.78.
Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 449

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	101.13	11.99	100.62	39.99	100.63	80.98	100.42	95.98	100.14
100.98	98.77	104.98	98.48	123.97	98.9	140.97	94.77	148.97	95.24
158.97	98.68	183.96	100.37	201.96	102.71	218.96	108.24	227.96	112.71
238.95	114.16	252.95	113.86	261.95	111.09	269.95	107.16	274.95	105.51
805.86	105.51	811.86	111.26	816.86	113.21	826.86	113.68	835.86	113.37
859.85	111.18	866.85	109.94	873.85	105.95	875.85	105.51	1262.78	105.51
4430.18	106.46	4436.74	106.85	4446.58	110.7	4449.86	111.24	4476.09	113.7
4482.65	114.1	4492.49	115.15	4518.72	115.73	4525.28	115.67	4528.56	115.27
4531.84	113.76	4541.67	107.97	4548.23	105.5	4561.35	102.21	4584.3	100.37
4590.86	100	4600.7	100.14	4613.82	99.84	4636.77	100.17	4643.33	99.88
4649.89	100.45	4659.72	102.34	4669.56	102.52	4682.68	101.89	4702.35	101.62
4708.91	102.04	4725.31	101.65	4748.26	102.01	4754.82	101.85	4764.66	101.97
4774.5	101.64	4781.05	101.88	4800.73	102.04	4810.57	101.98	4817.12	102.27
4823.68	102.19	4833.52	102.52	4856.48	102.94	4879.43	102.81	4899.1	103.12
4908.94	103.02	4915.5	103.25	4925.34	103	4931.9	103.22	4951.57	102.41
4971.25	102.56	4981.08	102.05	4990.92	102.46	5000.76	101.98	5007.32	102.61
5013.88	102.28	5026.99	102.33	5036.83	102.55	5049.95	101.63	5056.5	100.95
5066.34	101.08	5076.18	100.54	5099.13	100.19	5105.69	100.43	5125.37	102.28
5138.48	102.69	5141.76	103.02	5148.32	104.81	5158.16	108.55	5164.72	111.79
5171.28	113.56	5181.11	112.73	5184.39	112.19	5194.23	108.76	5200.79	105.29
5210.63	102.1	5217.18	99.39	5227.02	97.1	5236.86	95.52	5246.7	93.33
5256.53	92.19	5263.09	91.73	5276.21	89.16	5282.77	88.68	5299.16	88.6
5305.72	89.08	5315.56	90.79	5322.12	91.47	5328.68	92.53	5341.79	96.06
5348.33	96.65	5354.85	96.27	5361.37	96.29	5374.41	94	5380.94	92.67
5387.46	91.88	5397.24	91.36	5410.28	91.56	5426.58	92.89	5439.62	92.96
5449.4	91.95	5455.92	90.75	5475.48	89.7	5482	89.07	5498.3	88.98
5508.08	90.29	5521.13	93.36	5530.91	94.22	5543.95	96.62	5556.99	99.81
5563.51	100.85	5573.29	98.85	5579.81	96.47	5583.07	95.76	5589.59	95.29
5592.85	95.56	5599.37	96.91	5609.15	99.84	5615.67	100.89	5631.97	101.59
5638.5	100.4	5645.02	97.79	5651.54	96.05	5664.58	94.01	5674.36	93.21
5697.18	92.53	5703.7	91.53	5710.22	89.23	5716.74	87.52	5723.26	86.32
5729.78	86.03	5736.3	84.14	5749.34	81.36	5755.87	80.71	5762.41	79.07
5768.94	76.31	5772.21	75.51	5778.74	75.27	5821.74	68.86	5826.74	69.05
5838.74	69.15	5866.74	68.55	5880.74	68.65	5892.74	67.49	5893.74	67.35
5920.74	66.95	5933.74	67.65	5946.74	67.45	5948.63	75.27	5951.9	75.58
5955.16	76.98	5961.7	80.99	5974.77	86.56	5984.57	91.47	5987.83	92.4
6004.17	93.55	6020.51	93.91	6027.04	94.36	6040.11	96.1	6046.64	96.69
6059.71	98.44	6069.51	98.41	6089.11	96.16	6095.65	96.14	6108.72	95.45
6121.79	95.55	6131.59	95.04	6138.12	94.96	6160.99	93.21	6167.52	93.48
6183.86	93.51	6190.39	93.15	6203.46	93.07	6219.8	93.36	6236.13	92.86
6255.74	93.03	6262.27	92.46	6281.87	92.32	6304.74	92.58	6337.41	92.21
6360.37	92.22	6373.49	92.06	6389.88	92.19	6396.44	92	6406.28	92.15
6432.51	91.97	6448.91	92.09	6478.42	92.02	6488.26	92.28	6494.82	92
6511.22	92.02	6517.78	91.86	6550.57	92.08	6573.53	92.41	6586.64	93.32
6596.48	93.3	6606.32	92.93	6619.44	92.76	6645.67	92.91	6655.51	92.72
6671.91	92.84	6691.58	92.56	6714.54	92.74	6727.66	92.58	6750.61	92.65
6757.17	92.39	6767.01	92.38	6780.13	92.1	6796.52	92.1	6812.92	92.53
6819.48	92.89	6845.71	93.47	6858.83	93.93	6868.67	95.47	6878.51	96.02
6888.35	95.94	6898.18	95.41	6917.86	94.88	6937.54	95.2	6947.37	95.55
6953.93	96.36	6967.05	99.68	6973.61	101.54	6976.89	101.67	6986.73	100.93
7009.68	101.13	7019.52	100.61	7032.64	101.51	7052.31	101.44	7058.87	102
7071.99	103.97	7081.83	104.19	7091.67	104.74	7098.23	103.81	7104.78	103.55
7111.34	102.87	7124.46	102.3	7144.14	102.46	7150.7	102.12	7163.81	102.33
7180.21	102.39	7193.33	102.23	7199.89	102.67	7209.72	102.43	7235.96	102.47
7255.64	102.02	7262.19	101.5	7268.75	100.6	7272.03	101.17	7278.59	103.67
7288.43	102.22	7291.71	102	7311.38	101.86	7324.5	102.13	7331.06	101.94
7347.46	101.91	7357.3	102.07	7363.85	101.81	7393.37	101.9	7429.44	101.75
7475.35	101.67	7488.47	101.52	7547.5	101.48	7570.45	101.37	7586.85	101.4
7603.25	101.24	7649.16	101.24	7662.27	101.1	7698.35	101.22	7704.91	101.03
7727.86	100.94	7770.49	101.1	7773.77	100.98	7809.84	100.96	7842.64	100.79
7852.48	100.92	7875.43	100.82	7885.27	100.94	7898.39	100.77	7908.23	100.83
7944.3	100.72	7950.86	100.88	7970.53	100.94	8000.05	100.87	8023	100.94
8065.63	100.81	8104.99	100.86	8111.55	101.09	8118.1	100.84	8134.5	100.76
8150.9	100.83	8164.02	100.73	8193.53	100.88	8200.09	100.73	8226.32	100.66
8259.12	100.75	8298.47	101.21	8311.58	101.58	8324.7	100.81	8347.66	101.32
8367.33	100.69	8377.17	101.35	8390.29	101.18	8400.13	101.61	8409.96	101.02
8419.8	101.19	8439.48	100.69	8452.59	100.79	8459.15	101.18	8472.27	101.23
8478.83	101.06	8491.95	101.21	8501.78	101.59	8508.34	100.88	8514.9	101.07
8521.46	100.79	8534.58	100.6	8564.09	100.72	8577.21	100.49	8583.77	100.63
8596.88	100.4	8619.84	100.71	8626.4	100.61	8649.35	100.66	8662.47	100.88
8672.31	100.45	8682.15	100.64	8691.98	100.47	8714.94	100.89	8724.78	100.79
8741.17	100.88	8747.73	100.7	8760.85	100.84	8773.97	100.57	8800.2	100.53
8806.76	100.79	8816.6	100.73	8826.43	100.41	8846.11	100.76	8865.79	100.9
8875.62	100.56	8888.74	100.38	8914.98	100.46	8928.09	101.02	8931.37	100.83
8947.77	100.96	8967.44	100.95	8974	100.8	8987.12	100.88	9010.08	100.57
9036.31	100.77	9042.87	100.7	9059.26	101.34	9075.66	101.27	9085.5	101.84
9098.62	101.52	9115.01	101.6	9121.57	101.38	9141.25	101.34	9154.36	100.81
9164.2	101.45	9170.76	101.27	9177.32	101.76	9183.88	101.79	9190.44	102.79
9200.27	102.91	9206.83	102.06	9216.67	101.78	9246.18	102.13	9252.74	101.96
9262.58	102.46	9272.42	102.05	9282.26	101.95	9298.65	102.52	9315.05	102.01
9321.61	102.15	9328.17	101.25	9334.73	101.09	9344.56	101.5	9364.24	101.49
9374.08	101.36	9400.31	101.4	9410.15	101.14	9426.55	101.05	9442.94	101.67
9456.06	102.69	9465.9	102.41	9485.57	102.84	9501.97	102.81	9518.37	103.26
9528.2	103.87	9531.48	104.33	9538.04	106.38	9544.6	109.47	9554.44	111.18
9561	111.04	9570.83	111.36	9583.95	110.8	9603.63	110.79	9616.75	109.88
9620.02	108.79	9626.58	105.69	9633.14	104.91	9642.98	104.56	9646.26	103.9
9656.1	98.62	9659.38	98.27	9669.21	98.1	9856.13	98.1	9862.69	98.32
9865.97	99.2	9872.53	103.13	9879.09	106.11	9882.37	106.94	9898.76	107.8
9928.28	108.16	9941.4	107.54	9974.19	107.1	9977.47	106.77	9993.86	104.02
9997.14	102.53	10003.7	98.13	10006.98	96.44	10010.26	95.59		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	4518.72	.12	5631.97	.07	5768.94	.025	5955.16	.07
6059.71	.066	8947.77	.06						

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5631.97 6059.71          1120.03 1324.83 1829.96             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5631.97  101.59       T
 6059.7110010.26   98.44       T
Left Levee      Station=  238.95      Elevation=  114.16
Right Levee     Station= 9570.83      Elevation=  111.36
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  826.86 4476.09   113.7

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            109.80    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.19    Wt. n-Val.                 0.106      0.053      0.065
  W.S. Elev (ft)            109.62    Reach Len. (ft)          1120.03    1324.83    1829.96
  Crit W.S. (ft)             94.22    Flow Area (sq ft)       10162.52   12008.58   31434.65
  E.G. Slope (ft/ft)      0.000352    Area (sq ft)            13638.78   12008.58   36114.08
  Q Total (cfs)           125000.00    Flow (cfs)              9396.60   57242.79   58360.61
  Top Width (ft)           5520.31    Top Width (ft)          1606.84     427.74    3485.73
  Vel Total (ft/s)            2.33    Avg. Vel. (ft/s)           0.92       4.77       1.86
  Max Chl Dpth (ft)          42.67    Hydr. Depth (ft)           6.32      28.07       9.02
  Conv. Total (cfs)       6664564.0    Conv. (cfs)             500994.0   3051986.0   3111584.0
  Length Wtd. (ft)         1452.77    Wetted Per. (ft)        1619.53     441.95    3489.91
  Min Ch El (ft)             66.95    Shear (lb/sq ft)           0.14       0.60       0.20
  Alpha                       2.22    Stream Power (lb/ft s)     0.13       2.84       0.37
  Frctn Loss (ft)             0.68    Cum Volume (acre-ft)    121844.70   48712.50   159680.30
  C & E Loss (ft)             0.02    Cum SA (acres)          17446.45    2190.69   20179.11


Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 154.6

INPUT
Description: RGV-04, Updated on left with new survey to Station 1108.94.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     469
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   96.93    5.93    95.3   10.87   94.67   13.84   94.45   19.77   95.26
   22.74   95.74   30.65   97.78   31.64   97.92   35.59   98.11   44.49   98.42
   58.34  100.02   59.33  100.18   68.23   102.1   69.22  102.35   78.12   104.9
   83.06  106.63   84.05  107.03   94.05  112.04   96.05  112.81  100.05  113.31
  105.05  113.79  109.05  113.82  113.05  113.66  121.05  113.53  123.05   112.9
  129.04  110.77  137.04   107.5  142.04  105.66  144.04  105.51 1108.94  105.51
 1113.81  113.53 1123.65  113.37 1136.77  112.85 1166.28  110.63 1176.12  109.69
  1179.4  109.16 1185.96  107.44 1189.24  106.98  1195.8  106.73 1205.64  106.74
 1215.47  106.46 4950.84  106.46 4954.12   106.8 4960.68  108.92 4963.96  109.62
  4973.8  110.18 4980.36  111.14  4990.2  112.24 5000.04  113.02 5009.88  114.05
    5023  114.18 5029.55  114.77 5039.38  115.24 5042.66  114.93 5055.77  109.25
 5062.32   107.3 5072.15  103.49 5075.43  102.67 5085.26  101.37 5091.81   100.9
 5104.92  100.41 5124.58  100.73 5134.41   99.45 5140.97   98.93 5147.52   97.89
 5157.35   97.12 5167.18   97.45 5170.46   98.13 5180.29  100.96 5190.12  101.58
 5199.95  100.98 5216.34  100.29 5229.45   100.4 5249.11   100.2 5258.94   99.63
 5268.77   99.72 5281.88   99.16 5298.26   99.47  5321.2  101.33 5327.75  101.62
 5337.59  101.32 5344.14  100.74 5367.08  100.66 5373.63   99.89 5383.46   97.54
 5393.29   96.33 5403.12   95.68 5412.96   95.98 5426.06   94.83 5432.62   94.59
 5442.45   94.76 5452.28    94.6 5462.11   94.02 5471.94   94.22  5478.5   94.79
 5488.33    96.2 5494.88   97.78 5501.43    99.7 5514.54  101.15  5521.1  102.69
 5537.48  108.68 5553.87  113.22 5560.42  114.02 5566.97  113.13 5573.53  111.49
 5580.08  108.71 5593.19   103.7 5599.74  102.17 5609.57  101.94 5619.41  100.87
 5639.07   99.54 5678.39  101.28 5684.95   101.2 5698.05  100.05 5704.61   99.07
 5717.72   97.96 5730.82   97.71 5740.65    98.4 5747.21   99.38 5757.04   99.97
 5770.15   99.19 5783.25   99.31 5786.53   99.16 5793.09   98.05 5799.64   97.53
 5806.19   97.88 5812.75   97.79 5825.86   96.61 5842.24   96.05 5855.35   96.33
  5861.9   96.19 5875.01   95.34 5888.12   95.33 5894.67   95.64  5904.5   96.86
 5917.61   97.52 5927.44   96.89    5934   95.92 5940.55   95.94 5950.38   97.07
 5973.32   96.51 5999.54   96.17 6022.48    96.2 6051.97   97.36 6071.63   97.55
 6081.46   97.82 6088.02   98.87 6094.57    99.4 6110.95  100.18 6117.51  100.03
 6124.06  100.28 6133.89   99.86 6143.72   99.07 6153.55   97.95 6166.66   96.72
 6179.77   96.39 6183.05   96.53 6192.88   97.92 6199.43   98.43 6205.99   98.28
 6215.82   97.08 6222.37   97.12 6228.92   96.62 6238.76   94.12 6242.03   93.66
 6251.86   92.95 6258.42   92.95 6271.53   93.59 6278.08   93.08 6287.91   90.93
 6294.46   90.31 6304.29   90.21  6317.4   90.46 6327.23   90.34 6340.34   91.11
 6343.62   91.77  6346.9   91.78    6360   89.64 6369.83   88.73 6392.77   88.11
  6402.6   86.43 6405.88   86.11 6415.71   86.22 6425.54   86.96  6432.1   87.98
 6438.65   87.99 6448.48   87.69 6458.31   88.29 6464.87   88.34  6474.7   87.91
  6487.8   88.59 6494.36   88.35 6497.64   87.58 6507.47   84.51 6520.57    80.2
 6527.13   76.57 6530.41   75.26 6533.68    75.1 6538.68   68.77 6541.68    67.1
 6551.68   64.26 6561.68   63.56 6571.68   63.46 6591.68   62.66 6601.68   62.66
 6611.68   62.46 6621.68   61.76 6631.68   61.46 6651.68   60.46 6671.68   59.06
 6681.16    75.1 6684.44   75.16    6691   76.46 6694.28   77.65 6700.83   79.28
 6707.39   81.83 6710.67   83.41 6717.23   85.71 6727.07   87.26 6733.63   88.93
 6743.47   90.22  6753.3   91.27 6759.86   92.95 6766.42   97.94  6769.7  100.13
 6776.26  103.23 6779.54  104.17 6782.82  104.25 6795.94  103.71 6805.77     103
 6815.61  102.91 6828.73   105.2 6838.57  104.04 6851.69  102.76  6864.8  102.07
 6877.92  102.56 6884.48  101.87 6891.04  101.52  6897.6  101.71 6907.44   101.6
 6923.83  102.96 6930.39   102.3 6940.23   102.2 6946.79  102.48 6956.63  101.84
 6966.47  101.45 6979.58  101.26 6989.42  101.68 7005.82  101.53 7015.66  102.95
 7022.21  102.38 7025.49   100.8 7028.77   99.85 7035.33  101.07 7038.61  101.36
 7045.17  102.63 7051.73  103.17 7055.01  103.81 7068.13  103.55 7081.24   103.8
 7097.64  102.55  7104.2  102.56 7114.04     102 7136.99  102.09 7156.67  101.82
 7163.23  101.97 7173.07  101.78 7189.46  102.08 7209.14  101.89  7215.7  102.07
 7225.54  101.68 7255.05  101.82 7261.61  102.35 7268.17  102.04 7281.29  102.66
 7291.12  102.35 7297.68  102.75 7314.08  103.11 7320.64  102.91 7333.76  101.97
  7343.6  102.25 7353.43  101.91 7363.27  101.82 7376.39  102.36 7392.79  102.32
 7396.07  102.44 7412.46  101.83 7425.58   101.9 7458.37  101.74 7481.33  101.94
 7497.73  102.04 7507.57  102.47 7510.85  102.18 7520.68  102.14 7527.24  101.91
  7533.8  102.16 7546.92  101.79 7553.48  102.41 7560.04   106.7 7563.32  108.12
  7566.6  108.78 7573.15  108.61 7576.43  107.04 7586.27   99.38 7589.55   97.87
 7592.83   97.68 7599.39   99.03 7602.67    99.2 7615.79  101.21 7622.35   101.3
 7632.18  101.93 7651.86  102.28 7658.42  102.51 7671.54   102.2 7691.21  102.64
 7701.05  102.65 7714.17  102.24 7724.01   102.3 7737.12  101.35 7746.96   101.2
  7756.8  101.26 7779.76  102.32 7796.15   102.1 7802.71  101.87 7812.55  102.08
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 7819.11  101.83 7828.95  102.56 7838.79  102.07 7848.62  102.76 7861.74  100.87
 7871.58  100.34 7904.37  100.42 7914.21  100.62 7920.77  100.44 7950.29  100.36
 7969.96  100.38 7992.92  100.18 8006.04  100.25 8012.59   100.1 8019.15  100.27
 8028.99  101.81 8035.55  101.74 8042.11  101.23 8048.67  101.72 8058.51  104.51
 8068.34  105.15 8078.18  106.09 8088.02  106.36 8094.58  106.11 8101.14  106.32
 8114.26   106.4 8120.81  106.22 8133.93  106.16 8147.05  106.34 8156.89   105.5
 8173.29  105.53 8179.84  105.71 8192.96  105.65  8219.2  105.87 8242.15  105.75
 8261.83  106.29 8278.23  106.03 8284.79  105.75  8297.9  105.93 8307.74   105.8
  8330.7  105.77 8340.53  105.58 8360.21  106.06 8370.05   104.5 8383.17  104.66
 8396.29  104.66 8402.84  105.12  8409.4  107.54 8412.68  108.44 8415.96  108.58
  8442.2  108.52 8445.48  108.22 8452.03  105.75 8461.87   104.3 8468.43   102.8
 8478.27  102.29 8504.51   102.5 8511.06   102.4 8530.74  102.55  8537.3  102.46
 8547.14  103.03  8553.7  103.09 8563.53  105.84 8566.81  105.91 8573.37  105.41
 8616.01  105.54 8622.56  103.17 8625.84  102.87  8648.8  102.54 8661.92  102.66
 8684.87  101.85 8691.43   101.9 8720.95  101.45 8730.78  100.99 8747.18  100.76
 8770.14  101.07 8779.98  102.35 8783.25  102.55 8796.37  102.69 8806.21  101.43
 8816.05  101.88 8842.28  101.91 8858.68  101.41 8865.24     101 8881.64  101.13
  8888.2  102.06 8894.75  101.36 8901.31   101.4 8917.71  100.54 8927.55  100.97
  8950.5  101.32 8957.06  102.22 8963.62  102.35 8970.18  101.73 8980.02  101.11
 8986.58  100.96 9016.09  101.87 9042.33  101.66 9058.73  101.77 9065.28  102.38
 9075.12  102.34 9101.36  102.65 9114.48  102.49 9127.59  102.85 9140.71  102.61
 9150.55  102.88 9160.39  102.43 9170.22  102.36 9180.06     102  9189.9   102.3
  9206.3  102.06 9219.41  102.55 9278.44  102.77 9291.56  102.88 9294.84  103.62
 9304.67  108.86 9311.23  110.19 9314.51  109.32 9321.07   109.8 9327.63  110.68
 9340.75  110.86 9357.14  110.08 9376.82  109.42  9380.1  108.32 9386.66  105.39
 9389.94  105.14 9399.77  105.06 9403.05  104.71 9409.61  101.97 9412.89   99.32
 9416.17   98.23 9419.45    98.1  9616.2    98.1 9626.04   98.55 9629.32   99.03
 9639.16  103.95 9642.44  105.23 9652.27  106.47 9662.11  106.76 9671.95  106.83
 9688.34  107.15  9694.9  107.55 9701.46  107.12 9717.86  106.96

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .168 5560.42    .168 5566.97    .066 6520.57    .015 6710.67    .066
  6769.7    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6133.89 6779.54          1291.37    1665 1771.03             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6133.89   99.86       T
 6779.54 9717.86  104.17       T
Left Levee      Station=  109.05      Elevation=  113.82
Right Levee     Station= 9340.61      Elevation=  110.86
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1136.77    5000  112.85

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            109.10    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.41    Wt. n-Val.                 0.097      0.053      0.067
  W.S. Elev (ft)            108.69    Reach Len. (ft)          1291.37    1665.00    1771.03
  Crit W.S. (ft)             92.52    Flow Area (sq ft)       11596.60   15902.11   10465.50
  E.G. Slope (ft/ft)      0.000652    Area (sq ft)            13281.33   15902.11   14962.02
  Q Total (cfs)           125000.00    Flow (cfs)              16075.17   93639.61   15285.21
  Top Width (ft)           5176.94    Top Width (ft)           2010.37    645.65    2520.92
  Vel Total (ft/s)            3.29    Avg. Vel. (ft/s)            1.39       5.89       1.46
  Max Chl Dpth (ft)          49.63    Hydr. Depth (ft)            5.77      24.63       4.15
  Conv. Total (cfs)       4894085.0    Conv. (cfs)              629386.1   3666242.0   598456.9
  Length Wtd. (ft)         1636.83    Wetted Per. (ft)         2019.36     668.58    2533.24
  Min Ch El (ft)             59.06    Shear (lb/sq ft)            0.23       0.97       0.17
  Alpha                       2.44    Stream Power (lb/ft s)      0.32       5.70       0.25
  Frctn Loss (ft)             1.02    Cum Volume (acre-ft)    121498.60   48288.06   158607.40
  C & E Loss (ft)             0.00    Cum SA (acres)          17399.94    2174.37   20052.94


Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 154.23

INPUT
Description: RGV-04, Updated on left with new survey to Station 1126.98.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     473
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   97.77    6.93   98.14   10.88   97.29   13.85   96.35   17.81    94.9
   24.73   94.44   29.68   94.78   35.62    95.6   45.51   98.16   56.39   99.24
   59.36   99.69   72.22  100.98   76.18  101.99   89.05  105.75   91.05  106.58
  100.05  111.31  103.05  112.98  104.05  113.32  108.05  113.86  113.05  114.18
  128.05  113.93  129.05   113.8  138.04  110.49  145.04  107.03  147.04  106.33
  150.04  105.55  151.04  105.51 1012.99  105.51 1013.99  105.52 1126.98  105.52
 1314.67  106.46 1317.95  106.74 1321.23  108.35 1334.35  113.09 1337.63  113.74
 1344.19  113.95 1376.99  112.78 1393.39   111.9 1403.22  111.11 1409.78  110.87
  1439.3  108.26 1449.14  106.59  1455.7  106.46 2173.96  106.46 2177.24  107.58
  2183.8  111.71 2187.08     113 2196.92  114.38 2203.48  114.77  2216.6  114.97
 2226.44  114.88 2242.84     115 2252.68  114.68 2262.52  112.88  2265.8  111.83
 2272.36  107.69 2275.64  106.52 2278.92  106.46 4987.52  106.46 4993.96  107.03
 5003.61  110.12 5013.27  111.46 5029.37  113.09 5045.47  114.51 5055.13  114.25
 5064.79  114.73 5068.01  114.54 5071.23   113.3 5077.67  108.31 5084.21  105.14
 5090.76  101.65 5094.04  100.47 5097.31   99.95 5107.13    99.4 5113.68   99.33
  5123.5    98.9 5143.15   95.97  5149.7   94.83 5159.52   94.31 5169.34   94.61
 5172.62   94.96 5179.17    97.2 5185.71   98.47 5192.26   98.88 5218.46   99.71
    5225   99.57 5241.38  100.46 5247.92  100.31 5257.75   99.58 5267.57    98.2
 5277.39   96.43 5287.21   94.17 5293.76   93.91 5303.59   93.89 5313.41   93.11
 5326.51    92.9 5336.33   93.15 5346.15   94.15 5349.42   95.19 5355.97   98.37
 5362.52     101 5369.07  103.18 5385.44     109 5391.99  111.68 5395.26  112.67
 5401.81  112.99 5405.09  112.16 5414.91  106.54 5424.73  102.53  5441.1  100.06
 5447.65  100.29  5454.2   99.79 5473.84  100.28 5480.39  100.71 5490.22  100.31
 5496.76   99.72 5503.31    99.5 5513.14   99.57 5522.96   99.95 5545.88  100.43
  5555.7   99.78 5565.52   99.66 5572.07   99.14 5578.62   98.04 5588.44   97.71
 5601.54   97.64 5617.91   98.25 5624.46   99.24 5631.01   99.76 5637.56    99.7
  5644.1   99.06 5650.65   98.97 5667.02   97.24 5673.57   97.14 5686.67   97.45
 5699.77   97.01 5703.04   96.71 5716.14   96.67 5729.23   97.45 5742.33   97.78
  5745.6   97.53 5752.15   97.64 5765.25    98.6 5775.07   99.12 5781.62   98.81
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 5794.72   99.24 5804.54   98.02 5814.36   95.61 5820.91   94.72 5830.73   94.19
 5843.83   94.39 5853.65   95.29  5873.3   94.77 5879.85   94.07  5886.4   93.94
 5896.22   95.16 5915.86    96.3 5922.41   96.83 5932.23   97.12 5945.33   98.48
 5955.15   98.84 5964.98  100.37  5974.8  100.57 5981.35  100.91  5987.9  100.87
 5994.44   100.5 6010.82   99.27 6033.73   97.23 6043.56   96.06 6053.38   95.62
  6063.2   95.65 6073.03   95.22 6082.85    96.5  6089.4   96.92 6099.22   96.56
 6105.77   95.54 6112.32   93.95 6125.41    91.5 6135.24   91.36 6145.06   92.16
 6154.88   91.69 6161.43   91.61 6167.98   92.39 6174.53   93.58 6181.07   94.07
 6184.35   93.82 6197.45    89.8 6203.99   87.97 6210.54   87.32 6220.36   87.32
 6233.46   86.73 6243.28    87.2 6253.11   87.47 6259.66    88.7  6279.3   88.77
 6285.85   88.07 6295.67   86.31 6302.22   84.15 6305.49   83.54 6312.04   83.22
 6315.32   82.73 6321.87    80.8 6328.41   77.39 6338.24   73.63 6344.78   73.13
 6358.23   68.69 6385.23   50.72 6413.23   50.53 6426.23   49.43 6438.23   49.83
 6449.23   49.23 6460.73   49.13 6471.23   49.23 6482.23   48.83 6493.73   48.83
 6504.23   51.33 6560.91   73.13 6567.46   73.44 6583.86   77.11 6590.42   78.42
  6593.7   79.47 6600.25    82.2 6606.81   83.21 6610.09    82.9 6613.37   84.06
 6619.93   91.14 6623.21   93.61 6629.76   97.69 6633.04   99.38 6636.32   99.81
 6659.28   99.49 6678.95   99.64 6692.06    99.6 6715.02    99.7 6757.64   99.67
 6770.76  100.42 6777.32  100.36 6787.16  102.12 6790.44  101.04 6793.71   100.9
 6800.27  101.72 6813.39  101.62 6823.23  101.18 6833.06  101.11 6839.62  101.37
 6846.18  101.25 6852.74  101.47 6885.53   101.5 6892.09   101.4 6908.48  101.56
 6918.32  101.38 6960.95  101.47 6970.79   101.3  7000.3  101.44 7023.25  101.46
 7039.65  101.29 7049.49  101.43 7085.56  101.31 7101.95  101.41 7124.91   101.4
 7131.47  101.27 7203.61  101.32 7213.45  101.27 7239.68  101.34 7249.52  101.24
 7262.63  101.39 7308.54  101.44 7318.38  101.33 7321.66   101.5  7331.5  101.27
 7347.89  101.33  7377.4  101.13 7416.75  100.96 7426.59  101.07 7439.71  100.85
 7459.38  100.94 7462.66  100.81 7521.69     101 7531.52  100.87 7538.08  101.39
  7551.2  100.53 7561.04  100.12 7567.59   99.59 7580.71   99.43 7593.83   99.61
 7603.66   99.42 7616.78   100.7 7623.34  100.47  7629.9  101.31 7636.46  103.13
 7643.01  105.81 7646.29  106.43 7669.25  106.45 7672.53  105.96 7682.36  103.23
 7685.64  103.15 8033.23  103.15 8046.35  103.46 8052.91  104.54 8059.47   105.2
 8062.75  106.48 8066.02  106.73  8069.3  105.87 8075.86  105.58 8082.42  103.85
  8085.7  103.39 8098.82  102.78 8377.55  102.78  8416.9  102.86 8420.18  103.65
 8426.74  105.88  8433.3  106.03 8439.86  105.15 8446.42  105.86 8456.25  106.27
 8462.81  106.01 8475.93  103.83 8479.21  103.56 8485.77  102.39 8495.61  101.64
 8505.44  101.32 8515.28  101.46 8521.84  101.17 8531.68  100.38  8544.8  100.66
 8548.08   100.5 8574.31  100.76 8587.43  101.43 8603.82  101.35 8613.66  102.08
 8630.06  102.25  8639.9   102.6 8646.45  102.22 8656.29  102.39 8662.85  103.26
 8669.41  102.74 8692.36  102.72 8698.92  102.92 8705.48  102.24 8725.16  102.16
 8738.27  102.31 8748.11  101.94 8754.67  102.16 8761.23  102.71 8771.07  102.47
 8780.91  102.62 8794.02   103.2 8803.86  103.31 8810.42  104.08 8823.54  104.98
 8830.09  105.74 8843.21   106.5 8862.89  105.47 8872.73  103.86 8889.12  102.82
 8902.24  103.16 8905.52  103.04 8925.19  103.26 8935.03  103.62 8941.59  103.65
 8961.27  104.08 8964.55  104.65 8974.38  104.83  8987.5  104.75 8994.06  104.18
 9000.62  104.62 9013.74  104.97 9030.13  104.86 9036.69  105.13 9056.37  104.71
  9066.2  104.79 9072.76  105.08 9085.88  104.76 9095.72  104.86 9102.28  105.52
 9108.83  104.91 9118.67  104.53 9128.51     105 9135.07  105.76 9144.91  105.48
  9161.3   106.1 9167.86  105.93 9187.54  106.77  9194.1  106.54 9200.66  106.83
 9203.93  106.45 9213.77  106.59 9236.73  106.57 9249.84  106.89  9256.4  106.75
 9269.52  106.98 9292.48  106.87 9331.83  107.17 9354.78  107.18 9364.62   107.3
  9384.3  106.96 9403.97   107.1 9436.76   107.1 9443.32  106.84 9449.88  107.03
 9485.95  106.61 9489.23  106.18 9495.79  104.28 9505.63  100.49 9512.19   98.83
 9518.75   98.52 9522.03   99.07  9541.7  105.33 9548.26  106.57 9554.82  106.78
 9571.22   106.6 9584.33  106.69 9600.73  106.24 9607.29  105.24 9620.41  100.23
 9623.68   99.79 9633.52   100.3 9646.64  100.21 9656.48  100.88 9659.76  100.65
 9679.43  100.78 9692.55   99.48 9702.39  100.13 9712.23    99.9  9715.5  100.16
 9725.34  100.29  9731.9  101.18 9741.74  101.32 9751.58  100.55 9758.14  100.44
 9794.21   101.4 9823.72  101.65 9830.28  101.84 9863.07  101.94 9876.19  101.55
 9889.31  101.42 9895.87  100.61 9908.98  100.17 9928.66  100.57 9935.22  100.82
 9941.78  100.62 9948.33  100.76 9971.29  100.77 9987.69   99.92 9994.25    99.9
 10000.8  100.3110010.64   99.7310027.04  100.0510036.88  101.4110049.99   101.6
10056.55  101.9210066.39  102.0810076.23  103.0410089.34  105.5510099.18  108.52
 10112.3  110.3810122.14  109.91 10128.7  109.2810151.65  108.8310161.49  105.24
10168.05  104.2910181.17  103.8810184.44  102.9810194.28   98.4310197.56    98.1
10374.64   98.1110387.76   98.9510391.04  100.06 10397.6  104.1110400.88  105.05
10410.72  105.4110423.83  106.6210440.23  107.02

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5401.81     .12 5981.35     .07 6328.41    .025 6504.23     .07
 6659.28    .066 9505.63     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      5981.35 6659.28          1440.02 1665.03 1862.69             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5981.35  100.91       T
 6659.2810440.23   99.49       T
Left Levee      Station=  113.05      Elevation=  114.18
Right Levee     Station= 10112.3      Elevation=  110.38
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1337.63 5029.37  113.74 6659.28 8843.21   106.5

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            108.08    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.40    Wt. n-Val.                 0.088      0.060      0.062
  W.S. Elev (ft)            107.68    Reach Len. (ft)          1440.02    1665.03    1862.69
  Crit W.S. (ft)             78.20    Flow Area (sq ft)        8178.79   19300.02    7449.27
  E.G. Slope (ft/ft)      0.000595    Area (sq ft)            10817.31   19300.02    7463.31
  Q Total (cfs)           125000.00     Flow (cfs)              9862.23   105447.90    9689.85
  Top Width (ft)           6162.41    Top Width (ft)           2047.36     677.93    3437.13
  Vel Total (ft/s)            3.58    Avg. Vel. (ft/s)            1.21       5.46       1.30
  Max Chl Dpth (ft)          58.85    Hydr. Depth (ft)            3.99      28.47       2.17
  Conv. Total (cfs)       5124070.0     Conv. (cfs)            404278.2   4322580.0   397211.5
  Length Wtd. (ft)         1681.57    Wetted Per. (ft)         2056.49     707.14    3442.19
  Min Ch El (ft)             48.83    Shear (lb/sq ft)            0.15       1.01       0.08
  Alpha                       1.99    Stream Power (lb/ft s)      0.18       5.54       0.10
  Frctn Loss (ft)             1.32    Cum Volume (acre-ft)    121141.40   47615.29   158151.50
  C & E Loss (ft)             0.02    Cum SA (acres)           17339.79    2149.07   19931.82


Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION
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RIVER: Rio Grande
REACH: Lower Reach RS: 153.85

INPUT
Description: RGV-04, Updated on left with new survey to Station 1122.15.
Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 477

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	97.9	6.93	97.92	7.92	97.75	18.82	95.27	20.8	94.92
26.75	94.41	28.73	94.41	37.65	96.29	49.54	99.04	50.53	99.25
64.4	101.43	74.31	103.59	83.23	105.78	85.21	106.53	96.19	112.65
97.19	112.94	103.19	113.83	104.19	113.91	111.19	114.2	113.19	114.24
122.19	113.91	124.19	113.51	132.19	110.34	137.19	107.73	138.19	107.27
142.19	105.92	144.19	105.52	1053.15	105.52	1054.15	105.51	1122.15	105.51
1936.81	106.46	1946.65	107.83	1959.76	111.09	1966.32	113.65	1976.16	113.73
1989.28	112.86	2005.68	111.21	2008.96	109.8	2012.24	107.09	2015.51	106.46
4806.32	106.46	4812.88	106.99	4822.71	109.16	4842.39	110.68	4865.35	114.62
4868.63	114.87	4878.46	114.64	4891.58	115.05	4894.86	114.97	4898.14	114.18
4904.7	109.84	4911.26	107.07	4921.1	105.44	4927.65	103.78	4934.21	101.32
4947.33	93.82	4950.61	92.58	4957.17	91.47	4960.45	91.66	4967.01	94.58
4970.29	95.55	4976.85	96.82	4983.41	99.01	4986.68	99.53	4996.52	100.1
5012.92	100.04	5022.76	99.61	5035.88	98.46	5039.16	98.39	5052.27	99.51
5062.11	99.6	5078.51	100.57	5127.7	101.35	5144.1	102.2	5157.21	101.73
5167.05	101.84	5176.89	101.7	5183.45	102	5196.57	101.67	5209.69	101.64
5216.24	101.46	5226.08	100.38	5242.48	100.52	5252.32	100.92	5265.44	101.19
5275.27	101.7	5285.11	100.7	5298.23	100.35	5324.47	99.03	5337.58	98.89
5350.7	98.57	5357.26	98.13	5360.54	98.32	5367.1	97.9	5386.77	97.53
5393.33	96.99	5399.89	97.04	5406.45	97.42	5413.01	97.24	5429.41	97.92
5439.24	99.16	5452.36	99.76	5462.2	99.18	5472.04	99.13	5485.16	98.53
5501.55	97.29	5508.11	97.21	5521.23	93.12	5527.79	89.45	5534.35	83.56
5537.63	82.31	5544.19	81.12	5550.75	79.58	5560.58	77.74	5567.14	75.65
5573.7	74.28	5590.1	73.05	5593.38	73.03	5598.1	70.94	5599.1	68.64
5629.1	66.54	5639.1	66.84	5659.1	66.44	5669.1	66.44	5679.1	67.04
5699.1	67.04	5709.1	67.44	5719.1	67.44	5739.1	68.24	5749.1	68.94
5759.1	68.44	5769.1	68.44	5769.92	73.03	5776.46	73.79	5796.07	80.83
5799.34	82.31	5812.41	89.47	5815.68	90.23	5825.49	89.27	5828.75	89.24
5838.56	89.86	5851.63	90.36	5861.44	89.92	5871.24	90.05	5877.78	89.4
5884.32	88.33	5890.86	88.73	5900.66	88.81	5907.2	89.6	5920.27	92.31
5926.81	92.56	5943.15	94.15	5949.69	95.72	5956.23	97.86	5962.76	98.42
5982.37	97.84	5992.18	97.91	6001.99	98.27	6015.06	98.49	6031.4	99.06
6047.74	100.02	6067.36	100.39	6073.89	100.36	6080.43	99.28	6090.24	98.87
6103.31	99.58	6116.38	99.63	6122.92	99.46	6139.26	99.75	6162.14	99.9
6168.68	99.76	6198.1	99.95	6237.32	99.81	6243.86	99.98	6266.73	99.79
6289.61	99.86	6319.03	99.74	6325.57	99.58	6335.37	99.81	6348.45	99.64
6354.98	99.76	6368.06	99.48	6381.13	99.53	6384.4	99.38	6397.48	99.61
6410.55	99.36	6426.95	99.48	6430.23	99.38	6459.75	99.43	6469.58	99.25
6476.14	99.43	6485.98	99.31	6512.22	99.4	6522.06	99.54	6531.9	99.37
6561.42	99.4	6574.53	99.24	6590.93	99.4	6600.77	99.25	6607.33	99.37
6617.17	99.21	6633.57	99.23	6659.81	99.03	6709	98.93	6715.56	99.09
6754.92	98.81	6768.04	98.92	6790.99	98.85	6797.55	99.03	6807.39	98.86
6827.07	98.85	6836.91	98.63	6856.59	98.78	6876.27	98.43	6889.39	98.34
6895.94	98.55	6905.78	98.39	6918.9	98.44	6932.02	98.21	6948.42	98.22
6961.54	98.53	6981.22	98.42	7000.9	98.74	7023.85	99.22	7027.13	99.05
7050.09	101.06	7056.65	100.9	7063.21	101.13	7089.45	100.87	7109.13	101.26
7115.68	101.1	7148.48	101.27	7155.04	101.16	7174.72	101.28	7191.12	101.13
7210.8	101.21	7227.19	101.12	7233.75	101.32	7246.87	101.35	7263.27	101.11
7273.11	101.13	7282.95	101.37	7299.35	100.97	7302.63	101.16	7319.03	100.99
7322.31	101.28	7335.42	101.28	7345.26	101.08	7351.82	101.2	7358.38	100.98
7364.94	101.22	7371.5	100.96	7378.06	101.22	7384.62	101	7397.74	101.35
7404.3	101.16	7414.14	101.42	7453.49	101.39	7460.05	101.56	7483.01	101.49
7505.97	101.29	7512.53	101.46	7532.21	101.46	7538.77	101.26	7561.72	101.47
7565	101.65	7584.68	101.46	7617.48	101.63	7627.32	101.31	7643.72	101.47
7647	101.66	7666.67	101.53	7683.07	101.68	7712.59	101.56	7719.15	101.65
7735.55	101.35	7742.11	101.56	7751.95	101.57	7761.79	101.38	7768.34	101.57
7774.9	101.36	7791.3	101.24	7807.7	101.33	7827.38	101.03	7833.94	101.29
7840.5	101.13	7856.9	101.11	7873.29	100.92	7876.57	101.05	7892.97	100.86
7902.81	101.03	7915.93	100.83	7925.77	100.91	7942.17	100.63	7948.73	100.78
7955.29	100.47	7961.85	100.65	7994.64	100.48	7997.92	100.56	8017.6	100.43
8024.16	100.55	8037.28	100.39	8079.92	100.38	8086.47	100.2	8122.55	100.21
8138.95	100.15	8148.79	99.91	8168.47	99.99	8191.43	99.79	8211.1	99.88
8227.5	99.83	8243.9	99.64	8250.46	99.79	8270.14	99.73	8299.66	99.75
8316.05	99.62	8325.89	99.9	8348.85	99.77	8358.69	99.58	8365.25	99.7
8394.77	99.59	8421	99.33	8427.56	99.17	8434.12	99.34	8450.52	99
8460.36	98.62	8463.64	98.8	8476.76	98.37	8496.44	98.59	8506.28	98.07
8516.12	97.33	8525.95	97.54	8548.91	97.24	8562.03	97.81	8598.11	97.84
8611.23	98.31	8617.79	99.54	8621.07	100.61	8624.35	102.43	8640.74	105.57
8647.3	105.87	8686.66	105.29	8722.74	105.51	8752.25	105.53	8798.17	105.72
8837.53	105.51	8860.48	105.25	8876.88	105.29	8922.8	105.63	8945.76	105.41
8971.99	105.41	8981.83	105.55	9017.91	105.49	9040.87	105.71	9050.7	105.64
9070.38	105.81	9106.46	105.61	9126.14	105.69	9132.7	105.57	9158.93	105.43
9185.17	105.37	9214.69	105.5	9260.6	105.24	9267.16	105.39	9286.84	105.44
9322.92	105.77	9372.11	105.51	9385.23	105.63	9391.79	105.84	9424.59	105.9
9454.1	106.02	9486.9	105.77	9572.17	105.73	9578.73	105.8	9604.97	105.69
9624.64	105.74	9634.48	105.9	9677.12	105.79	9719.75	105.49	9742.71	105.49
9749.27	105.37	9801.75	105.41	9844.38	105.67	9867.34	105.64	9913.25	105.71
9926.37	105.57	9946.05	105.5510001.81		105.0210014.92		105.0610024.76		105.26
10060.84	105.0710093.64		105.3210132.99		105.2210139.55		105.0810178.91		105.2
10188.75	105.3910195.31		105.2610221.54		105.3810234.66		105.2610254.34		105.24
10270.74	105.1110303.53		105.0910333.05		104.9610356.01		105.110392.08		104.94
10398.64	105.0210418.32		104.78	10438	104.810451.12		104.610464.24		104.78
10483.92	104.710503.59		104.7510516.71		104.5510529.83		104.7710546.23		104.76
10559.35	104.6210569.19		104.2410582.31		102.8310601.98		101.1910611.82		99.54
10621.66	99.4310638.06		99.8310661.02		100.1110680.69		99.9410687.25		99.65
10697.09	99.5610713.49		99.9310723.33		100.7310736.45		100.4410746.29		100.84
10762.69	100.9810782.36		100.9310795.48		100.7310802.04		100.8910831.56		100.97
10851.24	101.14 10857.8		101.3810874.19		101.1710900.43		101.4610913.55		100.68
10933.23	100.310946.35		100.4110959.47		100.32 10969.3		100.0310982.42		100.58
10998.82	100.6911021.78		101.2811054.58		102.511061.14		102.6511080.81		103.85
11087.37	103.9111107.05		104.6711126.73		104.5911139.85		104.7311156.24		104.43
11189.04	104.2611202.16		104.0211208.72		104.15	11212	103.5611221.84		98.08
11244.8	98.4111254.63		98.111343.19		98.1211346.47		98.6311353.02		102.7
11356.3	103.7111359.58		103.9611369.42		103.4211375.98		103.3811395.66		104.52
11408.78	104.8611415.34		104.3111425.18		104.5811441.58		104.5811451.41		104.71
11464.53	104.4911474.37		104.54						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.132	5462.2	.066	5598.1	.015	5769.92	.066	6047.74	.076

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5462.2 6047.74 1187.43 1110 998.61 .1 .3
Ineffective Flow num= 1

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   Sta L   Sta R    Elev  Permanent
      0  5462.2   99.18       T
Left Levee      Station=  113.19      Elevation=  114.24
Right Levee     Station=11107.05      Elevation=  104.67
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   93.75 4865.35  113.67 4934.21 5078.51  100.57 6073.89 7050.09  100.36
 7768.3411054.58  101.57

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            106.73    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.61    Wt. n-Val.                0.132      0.054      0.076
  W.S. Elev (ft)            106.12    Reach Len. (ft)         1187.43    1110.00     998.61
  Crit W.S. (ft)             91.35    Flow Area (sq ft)       3019.68   13267.74   18264.03
  E.G. Slope (ft/ft)      0.001089    Area (sq ft)            3159.23   13267.74   18264.03
  Q Total (cfs)           125000.00    Flow (cfs)              3506.17   95044.24   26449.59
  Top Width (ft)           6557.37    Top Width (ft)           545.20     585.54    5426.63
  Vel Total (ft/s)            3.62    Avg. Vel. (ft/s)           1.16       7.16       1.45
  Max Chl Dpth (ft)          39.68    Hydr. Depth (ft)           5.54      22.66       3.37
  Conv. Total (cfs)       3787529.0    Conv. (cfs)            106237.7   2879863.0   801428.8
  Length Wtd. (ft)         1083.50    Wetted Per. (ft)         546.53     601.33    5432.09
  Min Ch El (ft)             66.44    Shear (lb/sq ft)           0.38       1.50       0.23
  Alpha                       3.02    Stream Power (lb/ft s)     0.44      10.75       0.33
  Frctn Loss (ft)             0.39    Cum Volume (acre-ft)    120910.40   46992.86   157601.50
  C & E Loss (ft)             0.09    Cum SA (acres)          17296.94    2124.92   19742.31


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 153.61

INPUT
Description: RGV-04, Updated on left with new survey to Station 1284.94.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     466
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  100.43      15  100.42   38.99  100.65   90.99  100.58  107.99   100.7
  111.99  101.06  117.99   102.8  122.99  101.27  127.99   99.42  130.99   99.52
  146.99  100.69  160.99   95.17  167.99   94.09  169.99   94.16  178.99   95.81
  185.99   97.47  191.99   99.51  203.99  100.34  214.99   102.4  220.98  103.84
  230.98  107.04  239.98  111.28  247.98  113.43  255.98  113.89  267.98  113.73
  275.98  110.83  283.98  107.02  288.98  105.52 1249.94  105.52 1284.94  105.51
  1934.7  106.46 1937.98  106.68 1944.53  108.49 1951.09  109.56 1970.77  111.52
 1977.33  112.67 2000.28  113.02 2026.51  112.76 2049.47  111.85  2075.7  109.89
 2101.93  106.46 3816.88  106.46 3820.16  106.71 3826.72  108.89 3829.99   109.3
 3849.67  109.74  3875.9  111.46 3895.58  113.75 3915.25  115.27 3941.48  115.54
 3944.76  114.85 3951.32  111.93 3957.88  109.84 3970.99  104.62 3990.67   99.83
 4000.51   97.21 4013.62   93.33 4020.18    92.3 4030.02   91.65 4049.69   91.76
 4062.81   92.54 4072.64   93.51  4079.2   94.96 4089.04    94.6 4115.27   95.32
 4154.62   95.62 4161.18   95.87 4180.86   95.67 4197.26   96.36 4200.54   96.27
 4216.93   97.13 4266.12   97.41 4275.96   97.28 4295.63    97.9 4328.43   96.74
 4338.27   96.61  4348.1   96.08  4364.5   96.15 4384.18   96.01 4397.29   96.27
 4413.69   96.25 4420.25   96.01 4446.48   96.09  4459.6   96.38 4492.39   96.24
 4505.51   96.54 4531.74   97.64  4538.3   98.51 4551.42    98.4 4577.65   99.35
 4607.17   98.75 4617.01   99.12 4623.56   98.99 4659.64    99.2  4666.2   98.96
 4676.03   99.39 4692.43   98.99 4715.38   99.14 4721.94   98.96  4744.9   99.54
 4758.02   99.52 4764.57   99.81 4777.69    99.3 4797.37   99.05 4813.76   99.49
 4826.88   98.99    4840   99.24 4853.11   99.05 4872.79   99.16  4902.3   99.67
 4908.86    99.4 4925.26   99.92 4931.82   99.34 4948.21   99.13 4961.33   99.34
 4974.45    99.1 4994.12   99.03 5020.36   99.57 5046.59   99.28 5062.99   99.61
 5069.55   99.42 5095.78   99.72 5115.46   99.54  5125.3  100.19 5144.97   99.45
 5167.93   99.81 5177.77   99.49 5200.72   99.88 5223.68   99.49 5230.23   99.66
 5249.91   99.21  5282.7   99.66 5302.38    99.6 5308.94   99.83 5325.33   99.66
 5341.73  100.14 5351.57   99.81 5364.69   99.98 5371.24    99.5 5381.08   99.39
 5387.64   99.76  5394.2  100.82 5407.32  101.46 5413.87  101.32 5420.43  100.31
 5430.27   99.52 5446.67   99.37 5466.34   99.45  5489.3   99.31 5499.14   99.48
 5512.25   99.33 5525.37   99.78 5541.77    99.7 5558.16   98.76 5564.72   98.64
 5574.56    97.7 5594.24   96.31 5600.79   96.16 5610.63   96.57 5627.03   96.04
 5633.59   96.33 5640.15   95.44 5649.98   92.81 5656.54   91.81 5669.66   93.19
 5686.06   94.57 5692.61   92.58 5705.73   84.43 5712.29   81.81 5718.85   78.08
 5728.69   73.25 5731.97      73 5734.97   54.25 5742.97    54.4 5752.97    54.3
 5753.47    54.3 5757.97   54.54 5761.97    54.7 5763.97   54.88 5769.97   55.41
 5772.97    55.6 5776.97   56.53 5876.26      73 5882.81   73.21 5889.37   77.34
 5895.93   80.81 5899.21   81.88 5915.61   83.72 5925.45   83.44 5941.84   83.68
  5964.8   84.59 5974.64   85.67 5994.31    89.3 6007.43   93.08 6020.55   95.36
  6027.1   97.05  6043.5   98.53 6056.62   98.56 6073.01   99.06 6099.25      99
 6109.09   99.19  6122.2   99.02 6132.04   99.19 6145.16   98.84 6191.07   99.06
 6207.47   98.83  6217.3   99.03 6256.66   98.87 6282.89      99 6305.85   98.84
 6322.24   98.94 6351.76   98.73 6368.15   98.85 6391.11   98.62 6404.23   98.78
 6443.58   98.74 6459.97   98.59 6482.93   98.68 6505.88   98.61 6561.63   98.71
 6564.91    98.5 6578.03   98.81 6607.55   98.67 6682.97    98.8 6689.53   98.99
 6705.93   98.81 6761.67   99.13 6778.07   98.94 6810.86   99.14 6823.98   98.91
 6879.73   99.22 6935.48   99.16 6978.11   98.92 6991.23   99.12 7007.62   98.75
 7017.46   98.92 7046.97   98.81 7079.77   98.99    7106   98.91 7128.96   98.65
 7145.36   98.88 7155.19   98.67 7187.99   98.91  7201.1   98.72 7224.06   98.73
 7253.57   98.57 7283.09   98.66 7302.76   98.31 7309.32   98.57 7325.72    98.4
 7342.12    98.6 7358.51    98.4 7388.03   98.56 7404.42   98.29 7420.82   98.56
 7473.29   98.61 7489.69   98.46 7506.08   98.81 7515.92   98.34 7532.32   98.63
 7558.55   98.48 7574.95   98.67 7581.51   98.44 7604.46   98.54 7640.54   98.21
 7663.49   98.35 7683.17   98.03 7699.56   98.46 7712.68   98.15 7735.64   98.31
 7752.03   98.11 7781.55    98.3 7794.67   98.08 7840.58   97.96 7876.65   97.43
 7883.21   96.98 7893.04   96.98 7909.44   96.37 7929.12   96.15 7981.59    96.4
 8007.82   96.26 8030.78   96.36  8106.2    96.2 8171.79    96.2 8207.86   96.05
  8217.7   96.15 8250.49   95.99 8289.84   96.07 8299.68   95.98 8339.03   96.05
 8345.59   95.94 8411.18   96.03 8460.37    95.7    8503    95.6 8516.12   95.24
 8525.95    95.7 8552.19   95.72 8562.03   96.76 8568.58   98.34 8571.86   98.14
 8575.14  100.06 8591.54  100.45  8598.1  100.36 8653.85  100.57 8680.08  100.91
 8706.31  100.48 8719.43  100.74 8745.67  100.86 8768.62  100.74 8840.77  100.56
 8880.12  100.62 8916.19  100.47 8932.59  100.63  8978.5  100.33 9008.01  100.34
 9014.57  100.14 9080.15  100.14 9106.39   99.95 9129.34  100.08 9165.42   99.92
 9181.81  100.15 9201.49   99.86 9234.28   99.97 9253.96   99.82 9273.63   99.93
 9283.47   99.66 9296.59    99.8 9329.38   99.79 9362.17   99.56 9365.45   99.68
 9411.36   99.46 9460.55   99.65 9473.67   99.43 9519.58    99.6 9539.26   99.79
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 9555.65   99.59 9581.89   99.75 9614.68   99.72 9631.08   99.58 9647.47   99.67
 9673.71   99.23 9693.38   99.26 9709.78  100.33  9722.9   99.65 9736.01  100.22
 9755.69  100.47 9768.81  101.33 9775.37  102.24 9781.92  102.49  9785.2  101.73
 9798.32  101.04 9804.88  100.34 9811.44   98.82 9821.28   95.58 9831.11   91.87
 9837.67   90.56 9844.23   90.07  9880.3   89.99 9919.65   90.23 9926.21   91.05
 9939.33   93.76 9945.89    95.6 9955.73   99.75 9962.29  101.53 9981.96   101.3
 9988.52 101.7510004.92  102.3210024.59 101.9210044.27 101.0810054.11  100.92
10077.06 101.0710090.18  100.9210103.29 101.0810109.85 100.5910122.97  100.29
10149.21 100.0210159.04   99.7210198.39    99.110214.79   99.0110224.63   99.29
10241.03   99.3410250.86  100.27 10260.7    99.610283.66    99.210296.77   98.61
10326.29   98.45 10355.8   98.5210378.76   98.2710404.99   98.4710431.22   98.25
10454.18   98.39 10467.3   98.1810503.37   98.2910549.28   98.1310582.07   98.27
10598.47   98.1310618.14   98.2210631.26      9810650.94   98.1610680.45   98.02
10772.27   98.0210811.62    97.910883.77   97.9510913.28   97.8410923.12   97.94
10952.63   97.8310995.26   97.9611008.38   97.8911067.41   97.99 11083.8   97.82
11126.44   97.9611224.81   97.5811300.24   97.5111323.19   97.6211329.75   97.48
11355.99   97.4811365.82   97.3211382.22   97.4911388.78   97.89 11401.9   97.59
11408.46   98.0911437.97   97.0911447.81   97.45 11464.2   98.6611500.28    98.6
11506.83   98.1511513.39   98.3411523.23  100.7711529.79  101.2411539.63   99.64
11552.74   99.1411562.58   97.1711569.14    96.311585.54      96 11592.1   96.14
11615.05   97.6111634.73   97.3511657.68   97.5511674.08    97.311746.22   97.41
11779.02   97.3411798.69   97.5911821.65    97.6   11861   97.9611870.84   98.84
11877.39  100.6911880.67  101.0411887.23    99.611900.35   98.1311906.91    98.4
11916.75  101.81 11923.3  102.8111929.86  102.9211942.98  102.2811949.54   99.22
 11956.1   97.3311962.66   97.1512185.65   97.1512188.93   97.7812198.77  101.94
12202.04   102.812218.44   104.212244.68  104.8512261.07  104.1612290.59   103.6
12300.42  104.78

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5525.37     .07 5718.85    .025 5895.93     .07 6073.01    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      5525.37 6073.01          1342.72    1110     910             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5525.37   99.78       T
 6073.0112300.42   99.06       T
Left Levee      Station=  255.98      Elevation=  113.89
Right Levee     Station=12244.68      Elevation=  104.85
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   229.6 1976.99  112.68 2023.38 3891.89  112.76

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            106.25    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.33    Wt. n-Val.                 0.066      0.030     0.066
  W.S. Elev (ft)            105.93    Reach Len. (ft)          1342.72    1110.00    910.00
  Crit W.S. (ft)             90.14    Flow Area (sq ft)        9447.23   12395.95  40253.86
  E.G. Slope (ft/ft)      0.000179    Area (sq ft)            11952.38   12395.95  46335.25
  Q Total (cfs)           125000.00     Flow (cfs)              9457.20   73493.55  42049.25
  Top Width (ft)           8332.71    Top Width (ft)          1557.66     547.64   6227.41
  Vel Total (ft/s)            2.01    Avg. Vel. (ft/s)           1.00       5.93      1.04
  Max Chl Dpth (ft)          51.68    Hydr. Depth (ft)           6.07      22.64      6.46
  Conv. Total (cfs)       9338528.0     Conv. (cfs)             706530.8   5490573.0  3141425.0
  Length Wtd. (ft)         1063.45    Wetted Per. (ft)         1560.42     574.91   6237.44
  Min Ch El (ft)             54.25    Shear (lb/sq ft)           0.07       0.24      0.07
  Alpha                       5.21    Stream Power (lb/ft s)     0.07       1.43      0.08
  Frctn Loss (ft)             0.20    Cum Volume (acre-ft)    120704.40   46665.88  156861.00
  C & E Loss (ft)             0.07    Cum SA (acres)          17268.28    2110.49  19608.72


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 153.36

INPUT
Description: RGV-04, Updated on left with new survey to Station 993.99.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.21       7   111.1      25  111.21      60   99.26      68   97.64
      77   97.25      87   97.66     118  100.34     150  100.52     189  101.26
     227  101.66     280  101.77     310  101.28     333  101.14     337  100.65
     353  100.84     370   99.69     384   95.05     391   94.14     430   94.82
     478   95.06     561   95.12  589.99   95.02  630.99   95.54  829.99   95.63
  871.99   96.13  910.99    97.3  950.99    99.3  976.99   99.67  993.99   99.65
 1026.53   99.56 1046.21   99.75 1072.44   99.48 1105.24   99.46  1111.8   99.67
 1131.48   99.28 1154.43   99.52 1190.51   99.31 1262.66   99.28  1288.9   99.42
 1318.42   99.94 1361.05   99.88 1410.25  100.05 1429.92   99.93 1488.96  100.18
 1521.75   99.83 1613.58   99.74 1682.46  100.02 1689.01   99.89 1738.21  100.15
 1780.84  100.24 1790.68  100.54 1823.48  100.39 1846.44  100.69 1875.95  100.62
 1905.47  100.85 1921.87   100.7 1944.83  100.94  1997.3  100.67 2046.49  100.85
 2069.45  100.58 2121.93  100.83 2138.33  100.65 2151.45   101.2 2167.84  100.76
 2200.64  101.45  2207.2  100.84 2217.04   97.99 2230.16   95.18    2240   92.19
  2725.4   92.19 2735.24   93.19 2751.64   96.23 2771.31    97.3 2817.23   97.35
 2836.91    97.8 2872.99    97.6 2879.55   97.94  2902.5   97.54  2935.3   97.47
 2964.82   97.99 2991.06   97.61 3017.29   97.63 3030.41    97.9 3053.37   97.82
 3059.93    98.1 3073.05   97.65 3109.13   97.74 3148.48   97.58 3217.36   97.57
 3233.76    97.7 3246.88   97.22 3256.71   97.49 3289.51    97.4 3312.47    97.9
 3328.87   97.49 3345.27   97.75  3371.5   97.58 3378.06   96.98 3397.74   98.65
  3437.1   97.87 3456.78   98.15 3466.62   97.79 3489.57   98.23 3499.41   97.91
 3525.65   98.34 3542.05   97.69 3568.29   97.87 3581.41   98.23 3601.09   97.96
 3620.76   98.36 3640.44   97.94 3686.36   98.05 3706.04   97.75 3758.51   97.98
 3774.91   97.57 3781.47   97.86 3801.15   97.55 3817.55   98.07 3830.67   97.74
  3856.9   97.58 3866.74   97.78 3899.54   97.39 3929.06   97.64 3974.97   97.35
 3991.37    97.7 3997.93   97.36 4011.05   97.75 4034.01    97.6 4043.85   98.18
 4063.53   97.88 4076.65   97.13 4089.76   97.55 4138.96    97.9  4148.8   97.46
 4168.48   98.32 4184.88    97.6    4198   97.95 4230.79   97.75 4237.35   98.03
 4257.03   97.69 4306.23   97.65 4352.14   97.94 4361.98   97.62 4398.06   97.72
 4417.74   97.99 4437.42   97.59 4453.81   97.78 4460.37   97.46 4496.45    97.8
 4525.97   97.47 4555.49   98.05 4578.44   97.59 4598.12   98.07 4644.04   98.12
 4673.56   97.79 4696.51   98.21 4716.19   97.92 4745.71   98.37 4778.51    97.8
 4794.91   97.95 4808.02   98.68 4821.14   98.22 4850.66   98.01 4863.78   98.31
 4873.62   97.94  4909.7   98.14 4916.26   97.77 4939.21   98.36 4972.01   98.03
 5001.53      98 5014.65   97.63 5037.61   97.96 5060.56   97.56 5096.64   98.04
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 5116.32   97.84 5158.96   98.08 5195.03   97.79 5208.15   98.11 5227.83    97.8
 5277.03   98.03 5342.62   98.01 5506.61   98.74  5539.4   99.48 5545.96   99.01
 5559.08   99.61 5575.48   99.27 5585.32   97.23 5598.44   92.84 5611.56   90.53
 5634.52   89.36 5654.19    90.7 5667.31    90.5 5693.55   90.92 5700.11   90.18
 5706.67   88.16 5716.51   86.84 5726.35   86.78 5732.91    84.9 5755.87      73
 5765.87   70.84 5775.87   70.24 5835.87   69.04 5855.87   68.84 5895.87   68.84
 5915.87   68.44 5925.87   68.44 5935.87   69.74 5945.87   69.84 5955.87   72.84
 5955.96      73 5959.24   73.08  5965.8   75.33 5978.92   81.34 5988.76   88.65
  5998.6   94.21 6005.17   97.23 6011.73   98.24 6018.29   97.65 6044.53   98.35
 6087.17   97.88 6201.98   98.16 6234.79   98.12 6283.99   97.84 6326.63   98.17
 6352.88   97.95 6369.28   98.07 6428.32   98.02 6474.25   97.71 6520.17   97.75
 6546.41    97.6 6589.06   97.65 6661.22   97.41 6716.99   97.53 6779.31   97.33
  6831.8   97.39 6890.84   97.18 6949.89   97.16 6959.73   97.28 7035.17   97.14
 7071.26   97.47 7136.86   97.31 7169.67   97.52 7222.15   97.43 7291.04   97.44
 7317.28   97.23 7399.29   97.41 7412.41   97.13 7432.09   97.32 7569.86   97.02
 7599.38   97.27 7664.99   97.15 7678.11      97 7717.47   97.11 7786.36   96.91
 7806.04   97.04 7851.96   96.58 7881.49   95.86 7914.29   92.39 7963.49   91.75
 8058.62   91.54  8078.3   91.63 8173.43   90.95 8196.39   91.03 8225.92   90.75
 8232.48   91.37 8248.88   90.61 8255.44   90.79    8262   89.04 8271.84   88.02
 8298.08    87.7 8304.64   86.13 8334.17   82.62 8344.01   82.85 8347.29   83.72
 8357.13   88.56 8363.69   89.17 8389.93   90.39 8399.77      93 8416.17   99.46
 8432.57   99.87 8448.98   99.04  8478.5   98.86 8537.54   98.73 8563.79   99.85
 8573.63   98.61 8580.19   99.34 8596.59   97.93 8609.71   99.24 8622.83    98.7
 8665.47   98.37    8695   98.71 8721.24   98.11 8750.76   98.58  8793.4   98.29
 8813.09   98.42 8839.33   97.84 8901.65   97.48 8931.18   98.23 8970.54   98.34
 8983.66    97.7 9000.06   92.19  9009.9      91 9032.86   89.63 9387.13   89.63
 9403.54   90.18  9426.5   91.83 9433.06   93.33  9442.9   94.53  9459.3   92.42
 9488.82   93.37  9508.5   96.03 9524.91   96.49 9534.75    95.9 9551.15   95.92
 9580.67   95.21 9600.35   95.11 9620.03   95.43 9682.36   95.67 9711.88   95.58
    9725   95.76 9764.37    95.7 9823.41   95.14 9852.93   95.16 9882.46   94.93
 9938.22   95.06 9993.98   95.0510112.07   94.88 10190.8   94.89   10240   95.08
10308.89   95.0210351.53   95.1810413.86   95.1910433.54   95.4410495.87   95.51
10541.79   96.0410581.15   96.2110600.83    96.510715.64   96.8410761.57   97.23
10791.09   97.2310823.89   97.7610915.74   97.5310974.79   97.1510984.63   97.27
11040.39   97.1111056.79   96.8211073.19   97.1111092.88    96.811128.96   96.96
11184.72   96.7911210.97   96.9211283.13   96.7511361.86    96.111391.38   95.65
 11404.5   95.6811417.62   96.4311424.18   95.6411447.15    94.811470.11   95.04
11479.95   95.7411499.63    95.111516.03   96.6611532.43   93.1611548.83   90.66
11555.39   90.17 11571.8   90.1311578.36   89.6311975.27   89.6311988.39   90.26
12004.79   97.1212014.63   98.0212027.75   97.4612037.59   98.2212047.44    97.7
12067.12   97.7812126.16   97.2812149.12   97.8612162.25   97.3312201.61   97.78
12250.81   97.5112270.49   98.5812283.62    98.412296.74   98.85 12319.7   98.68
12349.22   97.4512365.62   98.5612411.55   98.5312437.79      9612460.75    96.6
12467.31   96.0212490.27   97.2912506.67   96.9912523.08   97.4112555.88    97.2
12582.12   97.3112588.68   97.6212628.04   96.6412651.01   97.5312657.57   96.95
12683.81   97.0412736.29   96.7312749.41   96.9712765.82   96.54 12785.5   96.59
 12818.3   97.4112828.14    96.912841.26   97.5212864.22   97.7812880.62   97.51
12913.43   97.6112923.27   99.0412939.67   97.3112979.03   96.7312992.15   97.15
   13002   96.9313011.84    97.813021.68   97.9813044.64   96.8713077.44   97.78
13103.68   97.9213120.08   97.1413139.77   97.6613156.17   97.7513175.85   95.53
13185.69   95.3413221.77   97.6413261.14   97.9713277.54    97.813290.66   99.28
 13300.5   101.613310.34  101.57 13316.9   99.6113336.58   96.6213352.98   95.07
13362.83   95.0413375.95   96.1113385.79   96.3113412.03   95.2813487.48   94.77
13520.28   94.8713530.12   96.0313539.96   99.24 13549.8  100.5913562.92   100.6
13569.48   99.0413589.16   98.7913605.57   99.2413618.69  100.6713658.05  100.71
13671.17  103.9413690.85  104.0613697.41  103.4513710.53  100.9713723.66  100.99
13743.34  102.3413759.74  102.2913772.86  104.2813789.26  104.94

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .096 5559.08    .066 5755.87    .015  5965.8    .066 6011.73    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5559.08 6011.73          1522.36 1400.85 1430.05             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5559.08   99.61       T
 6011.7313789.26   98.24       T
Left Levee      Station=      25      Elevation=  111.21
Right Levee     Station=13789.26      Elevation=  104.94
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 2181.57 5557.15   99.63 6008.35 8413.97   98.24 8976.1712013.95   98.01

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            105.98    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                 0.096      0.047     0.085
  W.S. Elev (ft)            105.89    Reach Len. (ft)          1522.36    1400.85    1430.05
  Crit W.S. (ft)             92.55    Flow Area (sq ft)       33465.58   11545.86   58321.43
  E.G. Slope (ft/ft)      0.000204    Area (sq ft)            35904.46   11545.86   60777.77
  Q Total (cfs)           125000.00     Flow (cfs)             24592.99   44648.83   55758.19
  Top Width (ft)          13748.67    Top Width (ft)           5518.50     452.65    7777.53
  Vel Total (ft/s)            1.21    Avg. Vel. (ft/s)            0.73       3.87       0.96
  Max Chl Dpth (ft)          37.45    Hydr. Depth (ft)            6.06      25.51       7.50
  Conv. Total (cfs)       8752444.0    Conv. (cfs)             1721990.0   3126291.0   3904163.0
  Length Wtd. (ft)          1428.98    Wetted Per. (ft)         5521.24     465.13    7782.93
  Min Ch El (ft)              68.44    Shear (lb/sq ft)            0.08       0.32       0.10
  Alpha                        4.00    Stream Power (lb/ft s)      0.06       1.22       0.09
  Frctn Loss (ft)             0.17    Cum Volume (acre-ft)    119966.80   46360.83   155742.20
  C & E Loss (ft)             0.04    Cum SA (acres)          17159.22    2097.74   19462.44


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 153.08*

INPUT
Description: RGV-04,
Station Elevation Data    num=     461
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   106.9    8.03  109.22   15.13  110.33   28.67  110.64   56.06  101.31
    67.8   98.44      76   97.72  103.33   99.78  124.66    99.9     176  100.66
  211.33  100.73     260  100.11  271.33   99.34  280.66   96.25  307.91   95.81
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  327.71   96.01  423.82   96.27  437.49   96.55  561.35   96.65  606.39   97.02
  616.04   93.76  622.07   94.85   646.6   94.55  724.52   94.53  753.04   94.88
  891.49   94.95  920.71   95.29  947.85   96.07  975.68    97.4 1005.59   97.64
 1019.53  100.12 1049.18  100.14 1057.19   99.86 1089.23   97.29 1105.24   97.75
 1125.27   97.44 1181.93   97.46    1209   97.81 1248.09   97.78 1293.21    97.9
 1311.25   97.82 1365.39   98.02 1395.46   97.74 1473.66    97.7 1541.73   97.99
 1561.76   97.89 1633.05   98.16 1641.84   98.38 1672.15   98.24  1693.2   98.46
 1720.26   98.43 1783.43   98.72 1831.54   98.56 1876.65   98.75  1897.7   98.58
 1945.83   98.78 1960.87   98.62  1972.9   98.99 1987.93   98.71 2018.01   99.19
 2024.02   98.78 2033.04   96.89 2045.08   95.04  2054.1   93.07 2146.41    93.1
 2178.45   93.19 2278.56   93.19 2366.66   93.27 2499.21   93.32 2508.24   93.97
 2523.28   95.98 2541.31    96.7 2583.42   96.79 2601.47   97.12 2634.56   97.01
 2640.57   97.23 2661.62   96.96 2691.69    96.9 2718.76   97.26 2742.83   97.05
 2778.91   97.29 2818.01   97.08  2939.3   97.15 2959.32    97.7 2967.33   97.64
 2987.36   96.66 3016.51   96.63 3037.56   96.91  3052.6   96.64 3067.64   96.83
 3091.69   96.73 3097.71   96.34 3115.76   97.45 3151.85   96.91  3169.9    97.1
 3178.92   96.86 3199.97   97.16 3208.99   96.95 3233.05   97.25 3248.09   96.82
 3284.18   97.23 3302.23   97.07 3320.27    97.3 3338.31   97.05 3380.42   97.13
 3398.47   96.94 3446.59   97.14 3485.69   96.86 3500.73   97.21 3512.76   96.99
 3545.83   97.02 3575.91   96.81 3602.98      97 3645.08    96.8 3660.12   97.03
 3699.22   96.97 3708.24   97.36 3726.29   97.17 3738.32   96.68 3750.34   96.97
 3795.46   97.23 3804.48   96.95 3822.53   97.53 3837.57   97.06  3849.6   97.31
 3879.67   97.18 3948.85   97.11 3990.95   97.34 3999.97   97.14  4051.1   97.32
  4090.2   97.01 4123.28   97.26 4150.35   97.04 4177.42   97.55 4198.47   97.38
 4216.52   97.76 4258.62   97.88 4285.69   97.69 4306.74   97.95 4324.79   97.73
 4351.86   98.05 4376.91   97.67 4396.97   97.83    4409   98.28 4421.03   97.94
 4469.15   97.83 4502.24   97.96 4508.25   97.72  4529.3   98.11 4559.38   97.82
 4586.44   97.83 4598.48   97.53 4619.53   97.79 4640.58   97.56 4673.66   97.93
 4691.71   97.77 4730.81   97.88 4763.89   97.78 4801.38   97.91 4825.41   98.79
 4841.43   99.12 4865.46   98.12 4921.52   97.72 4945.55    98.4 5013.63   98.62
 5049.61   98.55 5073.69   98.73 5097.72   99.84 5110.01   99.28 5117.38   97.71
  5127.2   94.52 5137.03   92.71 5154.23   91.34 5163.2991.57373 5168.96   91.72
 5198.44   90.85 5215.64   87.36 5223.01   86.92 5227.93    85.4 5245.12   76.41
 5252.61   74.45  5260.1   73.54 5289.7571.04794 5316.46   70.24 5334.65   68.34
 5364.97   67.84 5384.97   67.84 5394.4968.51207 5402.96   69.11 5420.94    69.4
 5437.93   71.33 5452.57   74.65 5471.68   83.29 5485.58   87.47  5494.6 89.5665
 5506.42   91.76 5527.62   96.72 5539.42   98.01  5546.6   97.43 5561.78    97.3
 5575.33   97.58 5622.02   97.23 5747.72   97.29 5837.51   96.96  5884.2   97.09
 5912.94   96.93 5972.74   97.04 6045.83   96.58  6096.1   96.59 6232.73    96.2
 6260.68   96.35 6308.21   97.22 6437.31   97.34 6545.84   97.22 6601.75   97.34
 6659.97    97.2 6699.49   97.41 6761.09   97.23 6807.24   97.39  6864.7    97.3
 6940.12   97.33 6968.85   97.13 7058.65   97.25 7073.01   97.04  7144.1   97.15
 7183.23   97.02  7245.4   96.96 7277.72   97.15  7328.6    97.1 7363.92   96.91
 7407.02   96.97 7482.45   96.76 7503.99   96.84 7554.27   96.53  7586.6   96.01
 7622.52   93.71 7676.38   93.21 7780.54   93.02 7802.09   93.05 7906.25   92.58
 7931.38    92.6 7963.72   92.37  7970.9   92.79 7988.86   92.29 7996.04   92.42
 8003.22   91.25 8013.99   90.56 8042.72   90.33 8049.91   89.28 8082.24   86.95
 8093.01   87.11 8107.38    90.9 8114.56   91.29 8143.29   92.06 8154.06   93.78
 8172.02   98.11 8189.98   98.38 8207.94   97.81 8240.26   97.64 8304.91   97.52
 8333.65   98.22 8344.42   97.38 8351.61   97.88 8369.56      97 8383.93   97.81
 8398.29   97.43 8444.98   97.25 8477.31   97.44 8506.04   97.06 8538.36   97.44
 8578.24   97.41 8622.96   98.65 8656.52   97.77 8715.22   98.23 8723.61   98.68
 8748.78   99.25 8771.14   99.08 8793.36    98.4 8811.32   94.29 8822.09   93.23
 8847.23   92.05 8891.35   92.03 8933.29   91.74  8989.2   91.78 9235.12    91.5
 9253.08   91.83 9278.22   92.86 9296.18    94.7 9314.14   93.27 9346.46   93.92
    9368   95.59 9385.97   95.92 9396.75   95.49  9414.7   95.52 9447.02   94.98
 9503.61   94.75 9605.05   94.97 9648.15   94.93  9712.8   94.56 9783.18   94.63
 9853.07   94.55 9878.23   94.73 9911.78   94.67 9931.34   94.94 9959.31   94.43
 9978.87   94.6210001.24   94.4310037.58   94.4410048.76    94.7 10090.7   94.79
10104.68   94.6710138.22   94.95 10157.8   94.7610171.78   94.9810208.12   94.85
10233.28   95.1810269.63   94.7610305.97   95.2710336.72   94.9810375.86   94.96
10392.64   95.2310437.36   95.3410456.93   95.2410493.28   95.4810518.44    95.8
10542.44   95.8210579.95   96.3110593.92   95.9510630.27   96.1510647.04   95.91
10689.69   96.0510747.68   97.1210784.03   96.89 10800.8   97.3210842.74   96.77
10907.04   96.6110943.38   96.7810968.54   96.2910988.12   96.5211010.48   96.13
11081.17   96.7211108.33   96.1111153.06   96.2411175.42   95.88   11195   96.06
11259.29   96.2611290.05   95.8511345.96    95.6 11385.1    95.611421.44   95.23
11443.92   95.2911458.29   95.6211465.47   95.1111490.62   94.5811515.76   94.76
11526.53   95.1211548.08    94.511566.03   95.5211583.99   93.1911601.95   91.52
11609.13   91.19 11627.1   91.1711634.28   90.8312008.54   90.83 12033.7   91.64
12053.27   91.6212083.22   91.9312101.17   96.6612111.95   97.2512126.31   97.16
12137.09   97.7612147.87   97.3912181.87   96.9412234.06   96.48 12259.2   96.79
12273.58   96.3712316.67   96.5312370.54   96.2912392.09    96.912406.46   96.83
12420.83   97.1912445.97   97.1112478.29    96.412496.24   97.1312522.94   97.24
12546.53   97.1112575.26    95.3 12600.4   95.7112607.58   95.3312632.72   96.22
12650.68   96.0712668.65   96.2812733.29   96.2812740.47   96.4912783.57   95.77
12808.71   96.29 12815.9    95.912844.45   96.1312902.09   96.0912916.45    96.3
12955.97   96.1412991.88    96.713002.65   96.4213017.02   96.9413042.16   97.19
13096.04    97.313106.81   98.2313124.77   97.0813140.79   96.9513167.86   96.15
13193.01   96.0913214.56   96.73 13239.7   95.9513258.21   96.3913304.34   96.36
 13322.3   95.8413361.81   96.2513383.36   94.7713394.13   94.6413433.64   96.17
13476.74   96.39 13494.7   96.2813509.06   97.2713519.84   98.8113530.61   98.79
13537.79   97.4913557.34   95.6813588.08   95.7313602.45   96.4913613.22    96.6
13641.95   95.8513694.33   95.6513716.69   95.3913760.47   95.4913771.25   96.39
13782.02   98.4813792.79   99.4713807.16   99.6313814.34   98.6613834.11   98.48
13850.89   98.6713870.46  100.5513878.85   99.8813895.62   99.9413911.32   99.48
13925.68  101.4213954.41  101.1813968.78  100.1613983.15  100.27 14004.7  101.28
14021.42  101.5114029.81  102.92 14038.2  105.7414046.59  107.3314054.98  107.94
14070.28  106.9814081.22   107.814088.87  104.7114095.43  103.9114099.81  102.21
14127.14  102.21

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .096 5097.72    .066 5117.38    .015 5539.42    .066 6761.09    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5097.72 5539.42          1522.36 1400.85 1430.05             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 5097.72   99.84       T
Left Levee      Station=   28.67      Elevation=  110.64
Right Levee     Station=14054.98      Elevation=107.9367
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  982.21 5094.66   99.78 5535.2813815.26   97.99

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 152.81*
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INPUT
Description: RGV-04,
Station Elevation Data    num=     455
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   105.6   17.06  109.53   32.33  110.08   41.32  107.42   57.03  101.68
   74.99   98.18   88.66   99.21  142.66   99.69  166.99   99.38  177.33   97.45
  183.64   98.08  195.55   97.55   234.1   97.47  259.34    97.8  381.31   97.96
  426.87   97.88   450.7   98.39   666.6   98.35  715.67   98.63  745.11   99.03
  752.12    95.3  761.93    92.5  772.45   94.68  795.58    94.2  815.21   94.04
   875.1   94.22     953   94.27  969.44   94.44 1000.36   95.51  1017.2   95.63
 1023.43   95.59 1059.84   95.47 1099.58   95.69 1192.58   95.71 1241.82   95.86
 1285.65   95.59 1303.87   95.72 1340.29   95.66 1354.86   95.86  1402.2   95.97
 1420.41   95.82 1460.48   95.89 1485.25   96.07 1602.87   96.36 1649.87   96.54
 1657.15   96.43 1706.81   96.65 1725.96   96.59 1769.73   96.73 1808.02   96.65
 1835.37   96.92 1840.84   96.73  1868.2   93.94 1952.16   94.01  1981.3    94.2
 2010.42   94.14 2035.92   94.27 2152.47   94.36 2203.45   94.32  2250.8    94.5
 2273.03   94.44 2294.91   95.73 2311.32    96.1 2349.62   96.23 2366.03   96.43
 2448.09   96.32 2472.71   96.53 2494.59   96.49 2527.41   96.69 2562.98    96.5
 2625.89   96.69 2673.28   96.72  2691.5   97.74 2698.78   97.66 2716.99   95.84
 2762.66   95.92 2776.33   95.79 2811.89   95.89 2817.36    95.7 2833.77   96.25
  2866.6   95.95 2918.57   95.99 2940.45   96.15 2954.13   95.95 2986.96   96.23
 3036.19   96.17 3055.71   96.26  3090.9   96.13 3134.66    96.3 3170.22   96.17
  3183.9   96.35 3216.72   96.19  3276.9   96.36 3315.19   96.25 3364.43   96.33
 3372.64   96.54 3399.99   96.23 3476.58   96.75  3501.2   96.66 3591.47   96.57
 3629.76   96.74 3720.02   96.56 3750.12   96.72 3774.74   96.62 3809.62   97.27
 3824.19   97.21 3842.39   97.56 3933.38   97.54    3958   97.72 3980.79   97.45
 4009.97   97.88  4024.5   97.62 4056.47   97.84 4064.68   97.71 4119.38   97.87
 4151.96   97.59 4166.53   97.71  4182.3   97.42 4220.59   97.57 4246.67   97.82
 4312.22   97.61 4366.85   97.99 4381.42    98.8  4388.7   99.61 4403.27  100.21
 4425.13   98.21 4446.98   97.72 4461.55   97.77 4476.11   97.31 4487.04   97.55
 4497.96   98.57 4516.18   98.44 4559.89   98.68 4614.51   98.13 4636.37  100.08
 4644.53   99.29 4655.97   96.19 4673.94   93.31 4683.74   92.74  4700.391.08401
 4703.34   90.78 4722.94    85.9 4734.38   79.82 4739.36   78.07 4761.97   72.93
 4768.59   72.03 4781.81   71.58 4793.91   67.84 4814.06   67.24 4844.06   67.24
 4870.04   68.49 4896.02   68.96 4920.54   69.98 4925.7771.40977 4931.66   73.02
 4941.69   74.77 4954.23    80.7 4961.76    83.7 4969.29   87.45 4979.32   90.22
 4989.35   91.47 5019.45   92.25  5023.492.62392 5039.52   94.15 5050.06   96.21
 5059.58   97.44  5067.1   97.78  5091.4   96.57 5109.63   96.82 5156.86   96.59
 5209.89    96.6 5246.34   96.42 5316.22   96.41 5364.82   96.14 5441.77      96
 5462.04   95.88 5510.64   96.09 5537.98   96.03 5580.51   95.65 5641.27   95.39
 5656.46   95.47 5723.29   95.29  5820.5   94.93 5850.88   95.28 5902.52   96.91
 5929.86   97.15 6024.04   97.24 6081.76   97.36 6160.75   97.28  6221.5   97.43
 6284.78   97.26 6327.72   97.35 6394.66   97.13  6437.2   97.25 6513.14   97.16
 6586.05   97.23 6634.66   96.98 6671.11   97.17 6733.61   96.95 6810.86   97.07
 6853.39    96.9  6911.1   96.89 6953.64   97.03 6980.98   96.89 7011.36   97.02
 7049.74   96.81 7078.19   96.86 7172.37   96.62 7201.95   96.65 7256.58   96.48
 7291.72   96.17 7330.74   95.02 7389.28   94.68 7448.82   94.61 7457.93   94.51
 7525.88   94.47 7558.18   94.32 7618.94   94.29 7701.51   93.99 7709.32    94.2
 7736.64   94.04 7756.15    93.1 7787.37   92.96 7795.17   92.42 7830.31   91.28
 7842.02   91.37 7857.63   93.24 7896.65   93.73 7908.36   94.57 7927.87   96.76
 7947.38   96.89 7966.91   96.57 8029.05   96.34 8072.27   96.31 8103.51    96.6
 8115.21   96.15 8123.02   96.41 8142.53   96.07 8158.14   96.37 8177.91   96.13
  8256.9   96.19 8275.12   95.97 8311.58   96.02 8341.95    96.5 8369.29   96.48
 8393.59   97.71 8402.71   97.94  8417.9    99.2 8454.36   97.82 8466.51   97.88
 8499.92   98.61 8518.15   98.72 8527.26   99.42 8554.61  100.23 8578.92   99.83
 8603.06   99.11 8622.57   96.38 8630.56   95.62 8657.91   94.57 8673.09   94.37
 8688.28   94.54  8697.4    94.2 8709.55   94.44 8727.77      94 8755.12   93.86
 8815.88   93.93  8873.6    93.8 9022.46   93.58 9052.84   93.38 9102.63   93.48
 9129.95   93.88 9149.46   94.86 9168.97   94.11 9204.09   94.47 9241.19   95.39
 9258.74   95.07  9329.3   94.73 9374.86   94.03 9383.98    94.1  9485.1   94.19
 9531.94   94.17 9602.18   93.98 9651.32      94 9678.66   94.32 9699.93   93.93
 9715.12   94.14 9754.62   94.03 9781.96    94.4 9797.14   94.17 9818.41   94.31
 9827.52   94.82 9839.67   94.86 9870.06    93.9 9891.32   94.29 9915.62   93.94
 9936.89   94.18 9955.12      94 9967.26   94.5110012.84    94.710028.03   94.45
10049.29   94.5810064.48   94.9410085.75   94.4810100.94   94.8810140.43   94.65
10167.77   95.32   10186   94.6510207.27   94.4210246.76   95.3610280.18   94.78
10292.33   94.9810304.69   94.6310322.72   94.5510340.94      9510389.55   95.19
10410.81   94.8810438.16   95.1910450.31   94.9910477.65   95.4910501.95   95.41
10544.49   96.0810559.68   95.3210599.17   95.6310617.39    95.110666.01   95.28
10678.16   95.8110726.76      9710744.99   96.8610766.26   96.3710784.49   96.98
10830.05   95.8510863.48   95.8710899.93   95.6810939.42   96.2410966.76    95.4
10988.03   95.7811012.33   95.0711036.64   95.4511070.05   96.4411094.36   96.25
11118.66   95.3911139.93   95.6411167.27   95.5411191.57    94.911212.84   95.31
11246.26    95.411282.71   95.6611316.13   94.9111376.89   94.7211419.43      95
11434.62   94.7211458.92    94.711477.14   95.0711506.76   94.5711534.09   94.37
11573.11   94.5111596.53    93.911616.04   94.3811635.55   93.2111655.06   92.38
 11690.2   92.0412096.89   92.0412115.12   93.3312124.23   93.65 12145.5   93.61
12157.65   94.0212178.04   93.6112197.56   96.2112236.58   97.3112285.24   96.19
12341.96   95.6712369.28   95.73 12384.9   95.4212467.53    95.112529.31   95.26
12544.92   95.5212572.23   95.5412607.36   95.3512655.88   95.9312681.51   95.68
12712.73    94.612740.05   94.8112747.86   94.6412762.21   95.1612819.93   95.09
12892.26   95.3512939.09    94.912966.42   95.0612980.95   94.8413005.25   95.22
13067.89   95.4513093.35    95.813126.43   95.6813165.46   95.9813177.17   95.93
 13193.6   96.3813263.47   97.0513278.64   96.9913290.35   97.4213309.86   96.85
13327.27    96.813356.69   95.5613375.88   95.0713395.73   95.4913434.76   95.03
13454.87   95.4413476.13   94.76   13505    94.813524.51   94.5413567.45   94.74
13590.87      9413602.58   93.94 13645.5   94.7113711.86   94.7613727.47   95.25
13739.17   96.0313750.88   96.0213758.69   95.3613779.93   94.46 13801.2   96.33
13840.65   96.8913871.87   96.4313928.79   96.3413953.09   95.9513974.37   96.14
14000.67   96.1214035.79   98.34 14051.4   98.65 14059.2   98.2914098.92   98.18
14108.03   98.7814120.19  100.42 14129.3   99.0914138.41   98.7514147.52   99.19
14164.58   98.2514180.19    98.914199.17   98.6314223.48    99.414256.89   99.79
14284.23  100.7214293.34  102.5514302.46  107.1514311.58  110.0314320.69  110.93
14338.19  110.1714351.31  109.01 14368.8  109.9214373.17  110.6514377.55  109.43
14388.48  104.4914392.86  103.5514401.61  102.8714410.35   99.4914465.02   99.49

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .169 4636.37    .066  4700.3    .015  5067.1    .066 5441.77    .102

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4636.37  5067.1          1522.36 1400.85 1430.05            .1       .3
Left Levee      Station=   32.33      Elevation=  110.08
Right Levee     Station=14320.69      Elevation=110.9333
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 4636.37  100.08  5067.114465.02   97.78

CROSS SECTION


RIVER: Rio Grande
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REACH: Lower Reach RS: 152.53

INPUT
Description: RGV-04, Updated on left with new survey to Station 1028.80.
Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 449

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	104.29	11	105.58	19	108.72	36	109.51	44	107.39
57.99	102.05	73.99	98.65	82.99	99.65	99.98	98.97	115.98	99.17
154.97	99.13	190.97	99.58	278.95	99.69	329.94	99.55	364.93	99.67
429.92	99.49	463.91	100.22	645.87	100.05	686.87	100.2	771.85	100.05
841.84	100.45	872.83	101.32	883.83	101.04	893.83	95.45	907.82	91.24
922.82	94.5	942.82	94.67	955.81	93.78	983.81	93.53	1028.8	93.62
1095.41	93.61	1115.09	93.71	1157.72	93.48	1174.12	93.68	1206.92	93.61
1220.04	93.9	1262.67	93.95	1279.07	93.75	1315.15	93.75	1344.66	94.07
1351.22	93.89	1426.65	94.1	1485.69	94.42	1492.25	94.29	1538.16	94.55
1597.2	94.69	1607.04	94.55	1669.35	94.7	1689.03	94.88	1757.9	94.92
1784.14	95.2	1810.37	95.12	1833.33	95.31	1866.13	95.18	1879.25	95.32
1938.28	95.44	1984.19	95.38	2026.83	95.66	2072.75	95.45	2148.18	95.84
2217.05	95.73	2272.81	96.1	2302.32	95.92	2341.68	95.98	2364.64	96.25
2407.27	96.3	2423.67	97.79	2430.23	97.68	2446.63	95.01	2463.03	95.17
2489.26	94.91	2541.74	95.07	2587.65	94.98	2663.09	95.08	2705.72	95.31
2718.84	95.19	2751.64	95.39	2771.31	95.28	2817.23	95.46	2905.78	95.5
2938.58	95.72	3023.85	95.68	3161.59	96.04	3250.15	96.02	3276.38	96.19
3319.02	95.97	3364.93	96.18	3404.29	96.19	3417.41	96.37	3430.53	97
3443.65	96.94	3460.04	97.3	3515.8	97.5	3548.59	97.31	3558.43	97.45
3584.67	97.23	3597.79	97.62	3624.03	97.34	3630.59	97.59	3712.58	97.62
3738.81	97.37	3751.93	97.56	3765.05	97.31	3824.09	97.74	3883.12	97.42
3896.24	97.8	3912.64	97.68	3932.31	98.06	3945.43	99.24	3951.99	100.44
3965.11	101.3	3978.23	99	3984.79	98.31	4004.47	97.58	4017.59	97.63
4030.7	96.91	4040.54	97.23	4050.38	98.74	4066.78	98.5	4106.14	98.73
4145.49	97.98	4155.33	97.53	4168.45	99.87	4175.01	100.31	4188.13	97.02
4211.08	89.81	4220.92	84.94	4237.32	74.63	4240.6	73.41	4247.16	72.93
4253.16	67.34	4263.16	66.64	4303.16	66.64	4323.16	67.44	4343.16	68.04
4363.16	68.44	4383.16	68.64	4403.16	68.64	4417.7	72.93	4430.81	74.9
4447.21	82.82	4457.05	86.66	4466.89	91.62	4480.01	94.88	4493.13	95.46
4532.48	92.74	4558.72	93.55	4575.12	96.1	4584.95	97.27	4594.79	97.55
4621.03	95.85	4640.71	96.07	4670.24	95.96	4748.96	95.9	4788.32	95.6
4863.77	95.54	4916.25	95.22	4932.65	95.26	5021.22	94.81	5073.7	95.11
5103.22	95.03	5149.14	94.51	5214.75	94.22	5231.15	94.33	5303.31	94.13
5355.79	93.81	5408.28	93.66	5441.08	94.2	5496.84	96.6	5526.36	96.99
5591.97	97.17	5628.05	97.18	5690.37	97.41	5749.42	97.44	5775.66	97.33
5841.26	97.53	5883.9	97.33	5969.19	97.28	6028.23	97.03	6074.16	97.13
6156.16	97.03	6234.88	97.12	6287.37	96.84	6326.73	97.1	6415.29	96.78
6477.62	97	6523.54	96.78	6559.62	96.93	6585.86	96.82	6631.79	96.92
6661.31	96.72	6694.11	96.94	6730.19	96.71	6766.27	96.75	6822.04	96.6
6838.44	96.74	6867.96	96.47	6966.37	96.42	6972.93	96.23	7022.13	96.42
7077.89	96.16	7166.46	96.09	7176.3	95.95	7225.5	95.99	7284.54	95.76
7350.15	95.9	7396.07	95.79	7425.59	95.58	7478.07	95.67	7553.52	95.55
7592.88	95.64	7665.04	95.34	7694.57	95.44	7792.97	95.11	7806.09	95.24
7891.38	94.9	7911.06	95.23	7924.18	94.97	7953.7	94.86	7983.22	95.06
8038.99	94.94	8058.67	94.75	8078.35	94.98	8098.03	94.84	8130.83	95.5
8160.35	95.56	8186.59	97.37	8196.43	97.72	8212.83	99.76	8252.2	97.86
8265.32	97.99	8301.4	99.16	8321.08	99.2	8330.92	100.16	8340.77	100.19
8360.45	101.21	8386.69	100.59	8396.53	100.08	8419.49	99.7	8442.45	97.74
8455.58	97.62	8471.98	96.94	8488.38	96.74	8504.78	96.99	8514.62	96.49
8527.74	96.84	8547.42	96.18	8576.95	95.97	8642.55	96.08	8668.79	95.9
8685.19	96.11	8704.88	95.88	8750.8	95.82	8816.41	95.61	8865.61	95.56
8898.41	95.25	8941.06	95.22	8980.42	94.9	9009.94	95.07	9042.74	94.81
9062.43	95.03	9088.67	94.69	9101.79	94.91	9114.91	94.64	9147.71	94.74
9154.27	94.52	9196.92	94.52	9246.12	93.3	9255.96	93.4	9521.66	93.4
9544.63	93.47	9574.15	94.01	9597.11	93.4	9613.51	93.7	9656.16	93.52
9685.68	94.08	9702.08	93.73	9725.04	93.95	9734.88	94.72	9748	94.79
9780.81	93.36	9803.77	93.96	9830.01	93.45	9852.97	93.83	9872.65	93.56
9885.77	94.33	9934.98	94.6	9951.38	94.23	9974.34	94.41	9990.74	94.92
10013.71	94.210030.11		94.7810072.75		94.4510102.27		95.4710121.95		94.46
10144.92	94.0710187.56		95.4510223.64		94.5710236.76		94.8810249.88		94.36
10269.57	94.1310289.25		94.7810341.73		95.0310364.69		94.5310394.22		94.85
10407.34	94.510436.86		95.18 10463.1		95.0210509.03		95.8510525.43		94.69
10568.07	95.110587.75		94.2910640.24		94.4910653.36		95.24 10679.6		95.95
10686.16	96.4610705.84		96.8910725.52		96.6710748.49		95.8510768.17		96.65
10817.37	94.9410853.46		9510892.82		94.7610905.94		95.210935.46		95.69
10964.98	94.5110987.95		95.0411014.19		9411040.43		94.611076.51		96.24
11102.76	95.85	11129	94.6711151.96		95.0111181.48		94.8511207.72		93.91
11230.69	94.5611266.77		94.6511306.13		95.0611342.22		93.9611407.82		93.84
11453.75	94.4111470.15		94.0511496.39		94.1711516.07		94.7711535.75		93.99
11604.64	94.2511647.28		93.2412185.25		93.2412195.09		93.9112204.93		95.18
12214.77	95.6612237.73		95.612250.85		96.2212263.97		95.3412280.37		95.23
12290.21	95.7612306.62		95.71 12326.3		96.69 12342.7		96.9612388.62		95.44
12424.71	95.0412483.75		94.6312516.55		94.1812585.44		93.8412614.96		93.84
12634.64	93.5212674.01		93.9112710.09		93.9912739.61		94.3312762.57		94.24
12788.82	94.6312798.66		94.2412821.62		94.2612838.02		93.912887.22		93.92
12903.63	94.412913.47		94.0412942.99		94.2612965.95		93.9512998.75		94.28
13077.48	94.1813113.56		93.8513139.81		93.7813166.05		94.3113195.57		94.62
13248.05	94.8913261.18		95.3213313.66		95.1913343.18		95.2813369.42		95.8
13398.95	96.0313428.47		96.6913444.87		96.7913474.39		96.613513.76		96.65
13536.72	95.3713566.24		94.0613576.08		94.4413615.45		94.113635.13		94.12
13651.53	94.4913674.49		93.2414002.52		93.2414015.64		95.6414025.48		96.94
14051.72	97.2614114.05		96.9414163.25		97.0314189.49		96.5214212.46		96.81
14245.26	96.7314251.82		97.1214268.22		96.9314310.86		98.114327.26		97.83
14337.11	98.1514346.95		97.6914356.79		98.2814363.35		99.8214369.91		100.3
14379.75	98.2914389.59		97.7814399.43		98.4314405.99		97.5914428.95		96.5
14455.2	95.9314468.32		96.6214481.44		98.3414491.28		98.8414517.52		98.78
14547.04	99.9414556.88		102.1914566.72		108.5714576.57		112.7314586.41		113.93
14599.53	113.0814612.65		112.7814632.33		111.0514642.17		111.3314658.57		112.41
14665.13	113.5114671.69		111.6814688.09		104.2614694.66		102.85 14704.5		102.54
14707.78	101.8414717.62		97.24 14720.9		96.76 14802.9		96.76		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.169	4175.01	.066	4237.32	.015	4430.81	.066	4457.05	.102

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4175.01 4594.79 1576.77 1533.33 1581.16 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	4175.01	100.31	T
4594.79	14802.9	97.55	T

Left Levee Station= 36 Elevation= 109.51
Right Levee Station=14586.41 Elevation= 113.93
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev

```
    9.01  3966.2  101.43 4597.1814224.23   96.85

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            105.21    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                0.169      0.061     0.102
  W.S. Elev (ft)            105.13    Reach Len. (ft)         1576.77    1533.33    1581.16
  Crit W.S. (ft)             91.80    Flow Area (sq ft)       15464.73   10154.97   74815.31
  E.G. Slope (ft/ft)      0.000367    Area (sq ft)            15876.20   10154.97   81137.45
  Q Total (cfs)           125000.00     Flow (cfs)              6283.01   38703.29   80013.70
  Top Width (ft)          14511.48    Top Width (ft)          4125.08    419.78    9966.62
  Vel Total (ft/s)            1.24    Avg. Vel. (ft/s)           0.41      3.81       1.07
  Max Chl Dpth (ft)          38.49    Hydr. Depth (ft)           3.75     24.19       7.51
  Conv. Total (cfs)       6526647.0    Conv. (cfs)             328055.7   2020822.0   4177769.0
  Length Wtd. (ft)         1558.20    Wetted Per. (ft)        4126.65    433.16    9969.02
  Min Ch El (ft)             66.64    Shear (lb/sq ft)           0.09      0.54       0.17
  Alpha                       3.38    Stream Power (lb/ft s)     0.03      2.05       0.18
  Frctn Loss (ft)             0.25    Cum Volume (acre-ft)    117216.10   45333.61   149253.20
  C & E Loss (ft)             0.05    Cum SA (acres)          16653.75    2055.66   18589.16


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 152.25*

INPUT
Description: RGV-04,
Station Elevation Data    num=     451
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  102.61    6.41  104.23   16.03  104.67    39.1  109.06      50  109.27
   72.95  101.56   89.66    98.4   99.03    99.2  173.97   98.88  211.46   99.14
  303.06   99.16  392.59   99.13  460.26   98.99  495.65   99.44  650.24   99.39
   663.2   99.65  714.17   99.69   746.6   99.39  779.95   99.44  813.31   95.98
  889.15   95.71  921.42    96.2  932.87      96  943.29   92.25  957.85   89.42
  967.85   91.59  981.19   91.71  989.85   91.11 1008.51   90.95 1038.51   91.01
  1051.3    96.1 1062.88   93.83 1066.74   93.59 1082.74   94.24 1110.47   93.87
 1124.67   94.02  1150.8   93.73 1191.13   93.98 1203.74   93.52 1218.87   94.06
 1228.95   93.76 1279.37   93.63  1307.1   94.24 1347.43   93.51 1418.02   93.53
 1430.62   93.97 1460.87   93.62 1478.52   93.95 1496.17   93.59 1564.89   93.54
 1599.63   93.74 1607.36   93.61 1723.04   93.96 1778.51   93.92 1806.23   94.09
 1821.36   94.64 1844.05   96.79 1866.74   95.19 1889.42   96.43 1902.03   96.54
 1912.11   97.53 1919.68   97.62 1939.85    96.2 1960.01   96.06 1972.61   95.58
 2002.86   95.23 2048.24   94.95 2081.01   95.06 2101.18    95.4 2147.97   95.27
 2254.96   95.79 2315.46    96.3 2328.07   96.06 2363.35   95.94 2386.05   96.14
 2451.59   95.92 2496.97    96.1 2595.28   96.01 2607.89   96.32 2633.09   96.25
 2653.26   95.17 2698.64   94.99 2773.54   94.98 2800.58   95.15 2839.81   95.17
 2857.46   96.03  2877.8   96.13 2897.11   94.36 2916.42   94.47 2955.77   94.39
 2968.38   94.86 2988.54   94.68 3018.79   95.03 3071.73   94.89 3114.59   95.08
  3127.2   94.95 3217.62   95.29 3256.24   95.62 3296.09    95.5 3389.37   95.72
  3454.9   95.39 3467.51   94.64 3475.07   94.92 3495.24   94.58 3535.57   94.75
 3738.92   95.11 3775.06   95.09 3893.54   95.22 3903.62    95.1 3978.34   95.29
 4024.68   95.29 4055.57   95.84 4097.73    96.1 4206.17   96.16 4237.06   96.02
 4252.51    96.3 4283.41   96.16 4291.13   96.34 4329.65   96.46  4359.9   97.41
 4448.13    97.1 4463.26   97.78 4473.34   96.95 4503.59   96.68 4518.71   97.09
 4541.41   97.08 4561.57   96.37 4594.34   96.47 4611.98   97.06 4646.38   97.19
 4661.83   97.84 4669.55   98.58    4685   99.19 4700.45   97.61 4712.83    97.1
 4740.55   97.45 4762.23   96.03 4773.81   96.26 4788.45   97.54 4813.66   97.18
 4833.83   97.14 4848.95   97.42 4881.72    96.4 4908.97   95.81 4924.42   97.42
 4932.14   97.73 4964.62   93.94 4972.74    91.9 4982.49   91.75 5001.6887.73074
 5016.59   86.02 5026.34   85.65 5034.46   82.32 5047.67   75.19 5059.29   72.41
 5065.99   71.63 5079.38   71.17 5091.62   67.21 5112.03   66.54 5137.76   66.54
    5180   67.83 5199.2868.68822 5218.19   69.53 5229.75    72.9 5240.17    74.4
 5261.03    83.5 5268.86   87.58 5279.29   90.68 5289.72   91.75    5321   90.49
 5341.86    91.5 5362.71   95.65 5370.53   96.79 5394.55   95.86 5430.93   95.83
 5438.98   95.27  5459.1   95.07 5511.62   95.12 5547.64    94.8 5616.68   94.72
 5748.99   94.06 5777.18   94.12 5801.33    93.2 5877.83   92.69 5937.87   92.49
 5952.88   92.57 6018.91   92.43 6066.94   92.22 6095.25   92.24 6114.97   92.86
 6151.61    94.8 6196.02    96.3 6223.03    96.6 6280.45   96.86 6320.71   96.79
 6373.05   96.54 6413.31   96.84 6451.17   96.66  6511.2    96.7 6550.22   96.52
 6628.27   96.44  6682.3   96.24 6724.33   96.27 6832.04   96.17 6871.41   96.25
 6919.44      96 6955.46   96.12 7021.28   95.82 7033.36   95.99 7057.51   95.77
 7069.59   94.91 7129.98   94.55 7150.12   94.95 7210.51   94.87 7234.63   95.05
 7261.64   94.92 7291.66   95.17 7324.68   95.03 7423.74   94.96 7476.24   94.54
 7516.49   94.63 7546.81   94.46 7591.83    94.6 7637.28   94.49 7661.44   94.15
 7732.92    93.7 7806.38   93.75 7874.83   94.19 7943.28   94.23 7961.05    93.8
 7999.64   93.44 8078.12   93.37 8114.14   93.43 8180.17   93.23  8207.2    93.3
 8297.24   93.08 8309.25   93.16  8387.3   92.94 8405.31   93.16 8444.33   92.91
 8471.34   93.04 8540.39   92.84 8576.41    92.9 8606.43   93.34 8633.44   93.38
 8666.46   94.82 8681.46   96.18 8717.49   94.91  8729.5      95 8762.52   95.78
 8780.53    95.8 8816.55   97.14 8849.57   96.39 8870.58   96.14 8891.59   94.83
 8933.63   94.16 8948.63   94.33 8957.64      94 8969.64   94.23 8987.65   93.79
 9014.68   93.65 9074.71   93.72 9233.81   93.41 9278.84   93.38 9308.85   93.17
 9347.88   93.15  9383.9   92.94 9410.92   93.05 9440.93   92.88 9458.95   93.02
 9482.96    92.8 9536.99   92.83 9582.02   92.68 9627.05   91.87 9636.05   91.94
  9879.2   91.94 9900.22   91.98 9927.23   92.34 9948.24   91.94 9963.25   92.14
10000.67    92.210032.87   93.16 10044.3   93.1810086.33   94.2510116.35   93.61
10137.36   94.2910161.38   93.7910182.39   94.02 10200.4   93.81 10212.4   94.31
10257.44   94.5610272.44    94.310308.46   94.7410329.48   94.2510344.49   94.63
10383.51   94.4110410.52   95.1310428.53   94.4510449.55   94.1810488.58   95.09
10521.59   94.49 10533.6   94.6910563.62   94.1810581.63   94.5910629.66   94.69
10650.67   94.3610677.69   94.57 10689.7   94.3510716.71   94.8310740.73   94.74
10782.76   95.2710797.77   94.4910836.79    94.7 10854.8   94.1510902.83   94.25
10914.84   94.7310962.86   95.7510980.87   95.5511001.89   94.98 11019.9    95.5
11064.93   94.3311097.95   94.3511133.97   94.1711172.99    94.811200.01   93.96
11221.03   94.2811245.04   93.5811269.05   93.9811302.07   95.0811326.09   94.82
 11350.1   94.0211371.11   94.2311398.13   94.0411422.14   93.3211443.16   93.75
11476.18   93.81 11512.2   94.0811545.22   93.3511605.26   93.2711647.29   93.65
 11662.3   93.4111686.31   93.4911704.32   93.8911722.33   93.3711785.37   93.54
11824.39   92.8711909.09   92.8711933.24   93.1812001.69   93.31   12050   93.14
12086.23   93.2712134.56   92.9512178.84   93.2212211.05   92.87 12316.7   92.87
12343.71   94.4812364.72   94.4412376.73   94.8612388.73   94.2712403.74    94.2
12427.76   94.5212445.77   95.1712460.78   95.3512496.91   94.4812521.07   94.75
12541.21    94.312577.44   95.6912625.75   95.0412653.94   94.5212682.12   94.42
12710.31   94.0712718.35    93.212727.94   93.0612763.97   93.3212796.99   93.37
   12824    93.612845.01   93.5412869.03    93.812878.04   93.5412914.06   93.31
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12959.08   93.32 12974.1   93.64 12983.1    93.413010.12   93.5513031.13   93.34
13061.14   93.5613133.19    93.513177.34   93.2613214.24   94.1313241.26   94.34
13338.39   94.2113350.46   94.4813398.79   94.5513427.38   94.7313454.39   95.17
13532.44   95.1413580.46   93.4213589.47   93.6713640.35   93.4513648.41   93.85
13660.49   95.3913688.66   93.2513704.77      9313732.96   92.9913757.11   93.39
13789.33   92.8913809.45   92.9313829.59   94.9313849.72   94.6713894.01    94.7
13938.29   95.1613979.71   95.0914000.72   97.5214024.74   97.81 14123.5   97.69
14139.61   98.1614155.71   97.2714163.76   97.2114187.92   98.1814207.85   98.51
14224.15   98.4614232.21   97.0814261.88   97.6114294.91   97.3314303.91   97.73
14315.92   99.0714324.92   97.7314333.93   97.3914342.93   97.8314348.93   97.27
14369.95   96.5414393.97   96.1614405.97   96.6214417.98   97.7714426.99    98.1
   14451   98.0614465.73   98.4814477.81   99.3714485.86  102.4514496.02  107.23
14505.04  110.0114514.04   111.114531.53  110.3414544.65  109.1814562.15  110.09
14566.52  110.8214570.89   109.614581.83  104.6614594.95  103.04 14603.7   99.66
14658.37   99.66

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .169 4932.14    .066 5001.68    .015 5268.86    .066 5370.53    .102

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4932.14 5370.53          1576.77 1533.33 1581.16             .1       .3
Left Levee      Station=      50      Elevation=  109.27
Right Levee     Station=14514.04      Elevation=111.1033
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     775 4929.43   97.71 5379.23 14246.7   96.77

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.98*

INPUT
Description: RGV-04,
Station Elevation Data    num=     453
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  100.92    8.21  103.62   20.51  103.55   31.18  104.32   41.03  106.22
   50.04  108.97   63.99  109.03   78.41  103.97   93.79   99.59  105.32   98.16
  135.19   99.08  174.67   98.68  231.95    98.7  490.59   98.49  527.38   98.66
  608.14   98.67  664.97   98.87  688.09    98.7  701.57   99.22  754.55   99.23
  788.27   98.62  822.94   98.76  857.62   91.91  906.75   91.12  981.92   90.95
  992.74   89.05 1007.89    87.6 1012.89   88.69 1033.22   88.36 1048.21   88.39
 1071.28   95.63 1079.98   96.41 1114.79   97.17 1126.39   96.57  1152.5   96.61
    1167   97.05  1175.7   96.44 1196.98    96.6 1219.21   95.46 1230.81   94.33
 1259.83   93.87 1274.33   94.29 1291.73   93.97 1314.94   94.26 1338.14   93.92
 1364.25   93.93 1384.55   94.41 1399.06   93.48 1416.46   94.54 1428.06   93.95
 1448.37   94.05 1457.08   93.75 1474.48   93.98 1486.08   93.66 1497.69   94.44
 1512.19   94.18 1517.99   94.86 1538.29   94.06  1564.4    93.4 1590.51   93.75
 1616.61   93.34 1645.62   93.41 1660.13   94.32 1677.53   93.54 1694.94   93.32
 1715.24   93.98 1735.55   93.23 1752.95   93.46 1814.62   93.33 1883.49   93.33
  1958.9   93.65 1982.11   93.48 1996.61    93.7 2037.22   93.52 2043.02   93.87
 2060.43   93.53 2092.34   93.74 2109.75   94.75 2135.85   98.99 2141.65   99.04
 2147.45   97.39 2156.16   96.94 2161.96   95.75 2170.66   96.08 2188.06   98.18
 2202.57   98.45 2214.17  100.51 2222.87  100.66 2246.08   97.78 2257.68   97.21
 2269.28   97.47 2283.79   96.49  2318.6   95.59 2370.81   94.99 2391.12    95.4
 2408.52    95.2 2431.73   95.75 2440.43   95.57 2518.76   95.38 2527.46   95.75
 2608.68   96.22 2640.58   96.83 2663.79    96.7 2678.29   97.18  2692.8   96.72
 2733.41   96.45 2759.52   96.72 2834.94   96.37 2887.15   96.57 2916.16   96.23
 2971.28   96.27 2977.08   96.52 3000.28   96.25 3014.79   96.89 3026.39   96.58
 3043.79   96.73 3055.39   96.15    3067   94.45 3119.21   93.91 3148.23   94.12
 3174.33   93.97 3281.65   94.05 3301.96   95.25 3347.59    93.7 3394.79   93.59
 3415.09   93.84  3429.6   94.75  3441.2   94.86  3452.8   94.34 3487.61      95
 3548.53    94.8 3597.84   95.12 3623.95   94.96 3696.46   95.19 3745.77   95.77
 3774.79   95.89  3806.7   95.67 3861.81   95.75 3890.81   95.62 3914.02   95.95
 3963.34    95.6 3989.44   95.19 4003.95    93.6 4012.65   94.12 4035.85   93.46
 4082.26   93.81  4224.4   94.08 4296.92   94.17 4357.83   94.14 4494.17   94.34
 4505.77   94.15  4598.6   94.42 4645.07   94.39 4680.62   94.68 4729.12   94.87
 4775.54   94.72 4804.55    94.9 4889.45   94.81 4942.78   94.98    4996   95.32
  5016.3   96.15 5030.81    97.2 5042.41      97 5132.33   96.86 5149.73   98.16
 5161.33   96.45 5196.15   95.72 5213.55   96.43 5239.66   96.52 5262.86   95.19
 5294.77   95.53 5300.57   95.37 5320.87   96.37 5332.48   96.22 5378.23   96.44
  5407.9   97.06  5416.6   96.45 5436.91   96.04 5468.81    97.3 5486.22   95.55
 5494.92   95.12 5515.22    95.4 5523.93   96.38 5541.33   96.29 5552.93   95.81
 5564.53   96.02 5576.14   95.63 5593.55   96.13 5613.85   95.49 5631.26   94.57
 5662.61   94.09 5689.27   95.16 5716.25   93.19 5726.06   91.95 5738.32   91.74
 5750.58   88.91 5757.1189.44713 5765.29   90.12  5775.1   88.03 5794.72   84.95
 5806.98   85.43 5816.79   84.86  5821.7   86.54  5831.5   86.51 5843.77   82.37
 5856.03   75.63 5863.71   72.16 5871.19   70.92 5891.38   69.86 5903.62 69.5814
 5911.59    69.4 5930.08   67.09 5960.89   66.44 5974.23   66.44 6004.88   67.39
 6033.22   70.43  6041.8   72.86 6049.54    73.9 6055.81   75.66 6070.82   83.54
 6078.56   86.47 6089.5688.05505 6109.52   88.25 6121.14   88.73 6136.22   92.34
 6146.28   96.04 6164.53   96.05 6193.76   95.34 6201.07   95.67 6208.38   94.58
 6226.63   94.19 6274.27   94.33 6306.95      94 6409.28   93.84 6416.58   93.56
 6460.41   93.44 6467.72   93.63 6489.63   93.25 6515.21   93.32 6537.12   91.33
 6544.42   91.06 6606.52   90.86 6734.51   90.74 6796.46   90.61 6818.38   91.73
 6843.95   94.39 6854.91   95.08 6895.19      96 6946.22   96.23  6971.8   96.56
 7008.32   96.38 7055.81   95.68 7081.38   95.87 7092.33   96.26 7143.48   95.91
 7238.45   95.66 7421.08   95.31 7472.22   95.27  7512.4   95.39 7584.19   95.14
  7643.9   94.79 7654.86   95.19 7676.77   94.69 7687.73   92.91  7720.6   92.27
 7742.53    92.3 7760.79   93.05 7815.59   92.87 7841.15   93.21 7861.97   93.11
 7903.25   93.48 7925.17   93.33 7987.26   93.36 8056.66   92.63 8093.19   92.82
 8133.38   92.68 8202.77    92.8 8224.69   92.15 8264.87   91.57 8323.32   91.37
 8356.19   91.62 8381.76   92.12 8418.29   92.51 8480.38   92.73 8491.34   92.15
 8531.52   91.22  8635.4   91.22 8883.22   90.97 8899.56   91.08 9022.11   90.92
 9106.53   91.19 9136.48   91.91  9150.1   92.59 9182.79   91.96 9239.97   92.41
 9272.66   93.08 9321.68   92.57 9340.74   91.92 9365.26   91.65 9411.55   91.62
 9452.41   91.33 9506.87   91.37 9692.06   91.19 9787.38   90.97 9855.47   91.02
 9877.25    90.9 9967.13   90.8510016.14   90.4710236.74   90.4710280.32   90.68
10299.38   90.4710346.94   90.8810354.25    91.510368.85   91.6910376.16   92.33
10405.38    93.410445.56   94.0210452.87   93.8610467.48   94.6810482.09   94.25
10528.14   94.0610573.41   94.5110593.51   94.3810626.18   94.5610645.25    94.3
10658.87   94.4810694.27   94.3610718.78   94.7910754.19   94.2910789.59   94.72
10857.68   94.2210874.02   94.3910972.06    94.210996.57   94.4811056.49    94.7
 11070.1   94.29 11105.5    94.311121.84   94.0111165.42   94.0111219.88   94.62
11255.29   94.1111271.63   94.3511312.48   93.7211375.12   93.5811410.52   93.91
11435.03   93.41 11454.1   93.5111475.89   93.1711527.63   93.9111571.21   93.37
11614.78   93.2311636.56   92.7211655.63   92.9411718.27   93.1111748.23   92.74
11802.69    92.711840.83   92.8911876.23   92.8111892.57   93.0111908.91   92.75
 11966.1   92.84 12001.5    92.512078.35    92.512100.26   93.1312162.35   93.37
12206.19   93.0312217.15   93.3412239.06   93.29 12282.9   92.6612304.81   93.19
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12323.08   93.1912352.29    92.512448.14    92.512472.65   93.3112502.61   93.49
 12513.5    93.212548.91   93.3212578.86   93.7412611.64    93.312633.56   94.27
12651.83   93.61 12684.7   96.6512728.53   95.94 12754.1   95.0512779.67      95
12805.24    94.312812.54   92.7112821.24   92.5912949.25   92.9612990.09   92.72
13077.25   92.84 13188.9   92.8113228.95   92.6913250.87   93.7613276.45   94.12
13320.28   93.8513342.19   93.1913375.07   93.1913386.02   93.76 13411.6   93.78
13429.86   93.3413480.31   93.6513551.12   93.6413594.69   92.7713602.86    92.9
13649.02   92.7913656.33   93.4613667.29    96.4 13674.6   95.8913692.85   93.26
13707.47   92.7513733.04   92.7413754.95   93.5413765.91    93.413784.18   92.53
13802.44   92.63 13820.7   96.6113838.97   96.1113871.84    96.413879.15   96.15
13919.33   97.09 13956.9   96.9513975.97   98.1113997.75   98.3614061.78    98.6
14087.36   98.3514101.97   99.5514116.57   97.9614123.88   97.73 14145.8    99.6
14156.76   99.5514175.02  100.2114178.67   99.9514185.98   96.94 14212.9   97.11
14242.86   96.9814261.92   97.8514270.09   97.1814286.43   97.2214310.94   96.58
14332.73   96.3914362.69   97.3614397.84   97.55 14408.8   98.8114416.11  102.99
14425.32  105.8914441.67  108.2814456.98  107.3214467.91  108.1414475.56  105.05
14482.13  104.25 14486.5  102.5514513.83  102.55

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0      .1 5689.27    .066 5863.71    .015 6070.82    .066 6146.28    .082

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5689.27 6146.28          1576.77 1533.33 1581.16             .1       .3
Left Levee      Station=   63.99      Elevation=  109.03
Right Levee     Station=14441.67      Elevation=108.2767
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     754 5691.34   95.13 6150.3214044.75   96.02

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.7

INPUT
Description: RGV-04, Updated on left with new survey to Station 1057.92.
             Extended block obstruction, Bathymetric elevations translated from
             IBWC 2008 Cross-sections
Station Elevation Data    num=     450
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0   99.24       10  103.02       20  103.42       25  102.43       38  102.4
      50  104.88    60.99  108.88    77.99  108.79    92.99  103.26  108.99   98.94
  120.99   97.91  151.99   99.13  192.98   98.44  275.98   98.19  434.97   98.03
  482.96    98.1  555.96   97.88  642.95   97.93  701.95   98.25  725.95   98.01
  739.94    98.8  794.94   98.77  817.94   98.48  829.94   97.84  849.94   98.32
  865.93   98.09  901.93   87.84  952.93   86.53 1007.92   86.02 1057.92   85.78
  1082.6   93.07 1105.57   92.95 1138.37    93.1 1177.74   92.89 1223.67   93.15
 1233.51   94.32 1243.35   94.18 1249.91   94.97 1263.04   94.85 1272.88   95.58
    1286    94.6 1315.53   94.48 1318.81   94.14 1331.93   95.04 1341.77   94.02
 1390.98    94.2  1404.1   93.87 1413.94   94.33 1427.07   94.17 1436.91   93.51
 1453.31   94.42 1472.99   94.07 1499.24   94.53 1525.48   94.11 1548.45   94.49
 1555.01   94.12 1577.97   94.83 1594.38   93.44 1614.06   95.03 1627.18   94.14
 1650.15   94.29 1659.99   93.83 1679.67   94.17 1692.79   93.69 1705.92   94.86
 1722.32   94.47 1728.88   95.49 1745.28   94.97 1751.84   94.25 1768.25   94.09
 1781.37   93.29 1801.05   93.32  1810.9   93.87 1840.42    93.2 1873.23   93.29
 1889.63   94.67 1909.31   93.43    1929   93.03 1951.96      94  1961.8   93.16
 1974.93   92.88 1994.61   93.26  2030.7   93.15 2142.24   93.03 2198.01   93.36
 2211.13   93.08 2227.53   93.43 2253.78   93.13 2270.18   93.44 2316.11   93.09
 2322.67    93.6 2342.36   93.14 2378.44   93.38 2391.57   94.79 2398.13   94.87
 2427.65  101.19 2434.21  101.27 2440.77   98.78 2450.62    98.1 2457.18   96.31
 2467.02    96.8  2486.7   99.93 2503.11  100.36 2516.23  103.49 2526.07   103.7
 2532.63  102.94 2552.32   99.37 2565.44    98.5 2578.56   98.87 2594.96   97.39
 2634.33   95.95 2670.42   95.36 2683.54   95.46 2693.38   95.04 2716.35   95.64
 2736.03   95.34 2762.28   96.09 2772.12   95.79  2860.7   95.42 2870.54   95.99
  2893.5   96.06 2916.47   96.45  2962.4   96.65 2998.48   97.54 3024.73   97.33
 3041.13   98.06 3057.54   97.38 3090.34   97.29 3103.46   96.95 3132.99   97.29
 3146.11   96.96 3169.08   97.17 3185.48   96.91 3218.29   96.82 3241.25   97.11
 3277.34   97.04 3310.14   96.48 3326.55   96.91 3333.11   96.59 3372.48    96.5
 3379.04   96.88 3392.16   96.41 3405.28   96.49 3421.69   97.46 3434.81      97
 3454.49   97.21 3467.61   96.32 3480.74   93.74 3497.14   93.08  3503.7   93.41
 3539.79   92.83  3572.6   93.21 3602.12   92.98  3723.5   92.93 3736.63   94.23
 3746.47   94.46 3756.31    93.5 3769.43   93.02  3825.2   93.07 3851.45   92.89
 3874.41    93.3 3890.82   94.65 3903.94   94.79 3917.06      94 3956.43   94.98
 3972.83   95.06 4025.32    94.7 4081.09   95.16  4097.5   94.76 4110.62   94.91
 4192.63   95.14  4248.4   95.99 4281.21   96.17  4317.3   95.83 4379.63   95.89
 4412.43   95.69 4438.68   96.19 4494.45   95.65 4501.01   95.78 4523.97   94.98
 4540.38   92.57 4550.22   93.32 4566.62   92.45 4576.46   92.33 4628.95   92.86
 4665.04   93.02  4789.7   93.19 4852.03   93.14 4871.72   93.26 4940.61    93.2
 5045.59   93.42 5058.71   93.22  5094.8   93.46 5107.92   93.19 5140.72   93.44
 5153.85   93.33  5212.9   93.54 5278.51   93.47 5360.52   93.64 5413.01   93.35
 5445.82   93.62 5531.11   93.56 5649.22   93.96 5662.34   94.18  5685.3   95.42
 5701.71      97 5714.83    96.7 5806.68   96.81 5816.53   96.63 5829.65   97.51
 5836.21   98.54 5849.33   95.94 5875.58   95.43 5882.14   95.74  5888.7   94.76
 5908.38   95.78 5937.91   95.96 5964.15   94.02 5973.99   93.95 6000.24   94.58
  6006.8   94.27 6029.76   95.68 6042.89   95.49 6082.25   95.43 6098.66   94.91
 6118.34    94.7 6128.18   95.13 6138.02   94.78 6160.99   94.98 6183.95   96.54
 6197.07   97.14 6216.76   94.71  6226.6   94.21 6233.16   94.55 6249.56   94.03
 6259.41   95.22 6279.09   95.18 6292.21   94.45 6305.33   94.74 6318.46   94.13
 6338.14   94.83  6361.1      94 6380.79   92.74 6393.91   92.84 6413.59   92.35
  6446.4   92.58 6466.08   91.24 6482.49   90.73 6495.61   89.26 6512.01   89.54
 6521.85   86.84 6528.41   85.92  6548.1   88.48 6561.22   85.85 6571.06   84.94
 6587.46   82.23 6603.87   83.77 6610.43   83.04 6616.99    83.7 6623.55   86.62
 6630.11   87.72 6636.67   87.37 6643.23    84.9 6653.08   82.41 6659.64   79.54
 6669.48   73.56 6672.76   72.73 6679.76   69.14 6689.76   68.04 6709.76   67.94
 6729.76   68.34 6749.76   67.34 6769.76   66.94 6789.76   66.94 6809.76   66.34
 6829.76   66.94 6839.76   69.04 6855.76   73.34 6862.99   73.47 6876.11   81.54
 6882.67   84.31 6895.78   85.88 6905.62   86.42 6915.46   90.31 6922.02   95.28
 6938.41   96.01 6964.65      95 6971.21   95.51 6977.77   93.89 6994.16   93.32
 7036.79   93.55 7056.47   93.23 7141.73   93.03 7158.13   93.13 7164.69   92.73
 7204.04   92.63  7210.6   92.94 7230.27   92.43 7253.23   92.52 7259.78   91.91
  7272.9   89.46 7279.46   89.04 7505.73   89.04 7512.29   89.27 7525.41   90.76
 7548.36   94.54  7558.2   95.37 7607.39   95.81 7640.18   95.81 7663.14   96.26
 7695.93   95.97 7738.56   94.81 7761.52   95.09 7771.35   95.67 7817.27   95.17
 7902.53   94.83 7994.35   94.66 8066.49   94.43 8079.61   94.63  8112.4   94.37
 8148.47   94.54 8233.74   94.04 8266.53   93.77 8276.37   94.39 8289.48   94.23
 8296.04    93.6 8305.88   90.91 8335.39   89.94 8355.07   90.04 8371.47   91.15
 8420.66   90.88 8443.61   91.37 8460.01   91.28 8499.36    91.8 8519.04   91.63
 8574.78   91.72 8637.09   90.71 8669.88   91.01 8705.96   90.87 8768.26    91.1
 8787.94   90.16 8824.01    89.3 8876.48   89.07 8905.99    89.5 8928.95   90.29
 8961.74   90.84 9017.49   91.24 9027.33   90.42  9063.4   89.0110673.53   89.01
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10693.21   89.5510699.77   90.4310712.88   90.5410719.44   91.4910745.68   93.12
10758.79   92.9510781.75   94.1810788.31    94.110801.43   95.0910814.54   94.53
10867.01   94.2510896.53   94.4910998.18   94.2711024.42   94.4511149.03   94.28
11204.78   94.0211240.85      9411290.04   94.1911339.23   94.1111368.74   93.91
11421.21   93.8111473.68   93.5211496.64   93.2611634.37   92.9511644.21   93.05
11683.56   92.7511785.21   92.7511821.29   92.6111847.52   92.13 12247.6   92.13
12267.27   93.0712283.67   93.3112323.02   93.4412362.37   92.9312372.21   93.39
12391.88   93.3212408.28   92.7212431.24   92.3712450.91   93.1612467.31   93.17
12493.54   92.1312726.37   92.1312736.21   93.3512746.05    93.812762.45   92.91
12778.84   95.7612791.96   97.6212831.31   96.8312854.27   95.5712877.22   95.58
12900.18   94.5412906.73   92.2212910.01   92.1313280.57   92.1313300.25   93.63
13323.21   93.9313362.56   93.3613382.23   92.1313411.75   92.1813421.58   93.04
13444.54      9313460.94   92.1313657.69   92.1313664.25   93.0713674.09   97.41
13680.65   96.8913697.04   93.2713710.16   92.5113733.12   92.4913752.79   93.69
13762.63   93.4813779.03   92.1813795.42   92.3213801.98   94.1813811.82    98.3
13828.22   97.5413857.73   97.9813864.29   97.6113880.69   98.4713900.36   99.01
13952.83   98.68 13988.9   99.1314028.25   99.4114051.21   99.0214064.33  100.95
14070.88  100.5314077.44   98.64   14084   98.2414103.68  101.0114113.52  100.96
14129.91  101.8414133.19  101.4414139.75   96.8114143.03   96.6214329.95   96.62
14339.79   98.2514346.35  103.5414349.62  104.5314366.02   104.6 14369.3  105.45

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0      .1  6446.4      .1 6521.85    .066 6669.48    .015 6862.99    .066
 6922.02    .082

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        6446.4 6922.02          1340.35    1235 1164.92             .1       .3
Left Levee      Station=   60.99      Elevation=  108.88
Right Levee     Station= 14369.3      Elevation=  105.45
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   18.03   766.2   99.11  839.84 5705.92   96.75 6949.8613935.77   96.05

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)           104.49    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.04    Wt. n-Val.                 0.100      0.056      0.082
  W.S. Elev (ft)           104.45    Reach Len. (ft)          1340.35    1235.00    1164.92
  Crit W.S. (ft)            91.49    Flow Area (sq ft)       47585.78   12187.49   61134.18
  E.G. Slope (ft/ft)      0.000157    Area (sq ft)            47585.78   12187.49   61134.18
  Q Total (cfs)           125000.00    Flow (cfs)             33838.55   34686.01   56475.44
  Top Width (ft)          14259.58    Top Width (ft)          6356.63    475.62    7427.33
  Vel Total (ft/s)            1.03    Avg. Vel. (ft/s)           0.71       2.85       0.92
  Max Chl Dpth (ft)          38.11    Hydr. Depth (ft)           7.49      25.62       8.23
  Conv. Total (cfs)       9990536.0    Conv. (cfs)             2704522.0  2772254.0  4513760.0
  Length Wtd. (ft)         1235.90    Wetted Per. (ft)         6361.37     488.01    7433.19
  Min Ch El (ft)             66.34    Shear (lb/sq ft)           0.07       0.24       0.08
  Alpha                       2.59    Stream Power (lb/ft s)     0.05       0.69       0.07
  Frctn Loss (ft)             0.17    Cum Volume (acre-ft)    113237.00   44173.61   141693.30
  C & E Loss (ft)             0.00    Cum SA (acres)          16084.70    2008.38   17642.11


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.49

INPUT
Description: RGV-04, Updated on left with new survey to Station1013.88.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     465
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   103.1       5  103.99      17  108.44      32  108.59      35  108.28
      42  105.48      67   97.55   80.99   95.28   90.99   94.49   99.99   95.54
  105.99   97.25  123.99   97.53  129.99    96.6  169.98   96.75  243.97   96.61
  277.97   96.94  337.96    96.8  404.95   96.94  451.95    96.9  486.94   96.98
  607.93   97.09  648.92   96.88  701.92   96.92  768.91   96.89   809.9   97.32
   863.9   97.27  890.89   97.16  949.89    97.2  970.88   97.28 1013.88   97.27
 1059.61   96.87 1102.26   97.07 1135.06   96.94 1190.83   97.28  1246.6   96.91
 1285.97   97.11 1299.09   96.98 1351.58   97.13 1361.42   96.92 1417.19   97.12
 1433.59      97 1459.84   97.23 1515.61    97.1 1614.02   97.05 1646.83   97.25
 1666.51   97.08 1709.16    97.2 1741.96   97.01 1850.22   97.21 1886.31    97.1
 1928.95   97.23 1978.16    97.1 2030.65   97.13 2050.33   97.03  2106.1   97.26
 2112.66   97.15 2197.96   97.24 2339.02   97.15 2388.22   97.37 2417.75   97.19
 2473.52   97.36 2506.32   97.32 2522.72   97.79 2545.69   98.04 2555.53   98.58
 2571.93    98.8  2594.9   98.46 2621.14   98.55 2680.19    98.4 2703.15   98.69
 2716.27   98.45 2739.24   98.65 2768.76   98.46 2831.09   98.45 2837.65   98.84
 2850.77   98.46 2860.62    98.7 2893.42   98.44 2939.35    98.4 2955.75   98.79
 2962.31    98.4 2995.12   98.43 3027.92   98.28 3070.57   98.56 3083.69   98.36
 3109.93   98.57 3152.58   98.34 3185.39   98.51 3231.31   98.35 3247.71   98.51
 3326.45   98.32 3336.29    98.7 3365.81   98.93 3392.06   98.33 3444.54    98.5
 3480.63   98.34 3506.87   98.54 3523.28   98.43 3542.96   98.68 3556.08    98.4
 3592.17   98.28 3634.81   98.49 3661.06   98.32 3746.35   98.49 3759.47   98.82
 3769.31   98.47 3795.56   98.52 3844.76   98.29 3854.61   98.52 3903.81   98.27
 3936.62   98.43 3953.02   98.71 3975.98   98.45    4058   98.32  4107.2   98.58
 4130.17   98.27 4136.73    98.5 4179.37   98.44 4199.06   99.09 4218.74   98.65
 4231.86   96.51  4241.7   95.74 4274.51   95.09 4297.47   95.63 4304.03   95.38
 4330.28   95.59  4343.4   95.39 4395.89   95.63 4415.57   95.46 4448.37   95.58
 4550.07   95.54 4615.68    95.7 4641.92   95.94 4674.73   95.91 4700.97   96.44
 4717.37   95.89 4733.77   92.77 4753.46   89.79 4786.26   89.39 4819.07   89.26
 4871.55    89.5 4992.93   89.53 5035.58   89.59 5097.91   89.37 5137.27   89.45
 5150.39   89.32 5209.44   89.55 5268.49   89.67 5294.73   89.54 5347.22   89.62
 5363.62   89.76 5455.48   89.72 5504.68   89.91 5563.73    89.9 5609.66    90.1
  5635.9   90.37 5655.58   91.35 5665.43   92.27 5681.83   92.45 5691.67   92.11
 5783.52   92.54 5809.77   92.49 5826.17   92.69 5849.13   92.54 5865.53   92.73
  5888.5   92.56 5940.98   92.82 5980.35   92.63 6016.44   92.83 6065.64    92.9
 6131.25   92.69 6154.22   92.87  6206.7   93.01 6229.67   93.28 6239.48   93.88
 6252.49   93.94 6278.51   97.31 6301.28    96.9 6311.03   97.23 6324.04   96.92
  6333.8   97.49 6350.06   97.27 6356.57   97.68 6366.32   97.04 6379.33   95.17
 6385.84   95.03  6402.1   96.16 6411.86   94.79 6431.37   88.93 6437.88   87.99
 6447.64   87.62 6457.39   88.02  6463.9   87.51 6480.16   87.87 6496.42   87.68
 6522.44   89.24 6535.45   90.43 6554.97   90.42 6567.98   90.96 6577.77   90.73
 6590.83   89.41 6603.88   91.05 6613.68   93.94 6623.47    95.3 6633.26   94.13
 6652.85   85.44 6656.12   84.36 6678.97   73.04 6682.23   72.25 6690.23   57.26
 6696.23   57.54 6710.23   57.54 6723.73   57.64 6736.23   57.99 6747.23   58.24
 6752.23   58.39 6758.23   58.63 6771.23   58.84 6781.23   59.07 6855.24   72.25
 6858.51   72.68  6868.3   76.52 6884.62   83.84 6904.21   95.86 6907.47    96.2
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 7002.14   96.06 7024.99   96.22 7070.69   95.89 7096.81   96.12 7139.25   95.59
 7149.04   94.79 7168.63   97.66 7184.95   98.56 7214.41   98.33 7234.09   98.45
 7273.45   98.06 7293.13   98.29 7322.66   97.82 7342.34   97.83 7358.74   97.02
  7365.3   95.74 7378.42   94.21  7398.1   93.61  7414.5   94.27 7434.18   94.51
 7453.86   94.42 7529.31    94.4 7571.95   94.29 7621.16   94.38 7634.28   94.23
 7670.36   94.29 7742.52    94.1 7791.73   94.19 7847.49   94.03 7926.22   94.06
  8044.3   93.84 8080.39    93.9 8096.79   93.77 8178.79   93.93 8195.19   93.74
 8231.28   93.84 8237.84   94.08 8306.72   93.93 8323.12    94.1 8365.76   93.95
 8401.85   94.11 8418.25    93.9 8441.21   94.03 8526.49   93.87  8657.7   93.93
 8664.26   93.78 8706.91   93.87 8815.15   93.88 8851.24   93.77  8890.6   93.88
 8929.96   93.78 8969.32   93.48 8992.28   93.63 8998.84   93.41 9008.69   95.02
 9028.37   95.42 9044.77   94.43 9077.57   93.75 9130.05   93.04 9175.98   91.61
 9192.38   91.42 9225.18   91.47  9254.7   90.57 9280.94   90.29 9294.06   90.63
  9303.9   91.42 9313.75   92.79 9323.59    95.1 9336.71    97.4 9349.83   97.67
 9362.95   97.38 9389.19   97.47 9395.75   97.74 9431.83    97.5 9458.07   97.09
    9504   96.67 9530.24    96.6 9615.53   96.04 9700.81   95.85 9727.05   95.67
  9786.1   95.62 9822.18   95.26 9832.02   95.47 9871.38    95.4 9904.18    95.6
 9930.43   95.37 9969.79  95.6710130.52   95.56 10199.4   95.8110212.52   96.04
10265.01   96.3110314.21  96.0710356.85   96.3110379.81  96.6410412.62   96.43
10442.14  96.7210474.94   96.3710501.18    96.310563.51  95.3410619.27   94.85
10645.51   94.82 10730.8  95.3510737.36  95.2310786.56   95.3810832.48   95.22
10894.81   95.6110904.65  95.4610940.73   95.6411052.26  94.4811068.66   94.42
11088.34  94.7411104.74   94.5811153.94  94.9711206.43   95.6811275.31   96.23
11294.99   96.0511311.39  96.2511324.51    95.911357.32    95.511373.72   95.03
11390.12   94.9811406.52   94.32 11426.2     9211436.04    89.3 11442.6   89.01
11819.83   89.0111849.35  89.5211872.31   90.4111885.43   93.2711891.99   95.32
11901.83   96.7211924.79    96.411931.35  95.9511954.32   96.0211977.28   95.57
12003.52   94.7812036.32   95.3112059.28   94.56 12072.4    94.412131.45   94.69
12154.41   94.4512160.97   94.6512174.09  94.1812223.29   93.7712259.38   93.66
 12288.9   93.2912344.66   93.2612410.27  92.5912452.91   92.6412475.87   92.36
12485.71   92.5512541.47  92.4312590.68   92.2112649.72   92.2712695.64   92.42
12715.32   92.8712761.25  92.9312787.49    93.312876.06   95.45 12918.7   96.16
12941.66   96.22 13000.7  95.4713030.22   95.6513056.47   95.2213085.99   95.41
13125.35   94.8613145.03  95.1113164.71   94.9813190.96   95.1213230.32   95.78
13253.28   96.5413269.68  97.3913295.92   97.79   13332   98.6713345.13   98.74
13371.37   99.3213423.85  98.9213430.41   98.2913443.53   99.2913459.93   99.53
13489.45   97.2413509.13  97.4213522.25   97.8613555.06   97.5213584.58   97.43
13617.38   97.8513627.22   97.613660.03   97.5113669.87   97.8913682.99    97.7
13689.55   98.2513699.39  97.7613728.91   97.6313738.75   98.0513781.39   98.05
13804.35    98.513820.75  98.1513827.32   98.3613853.56   98.1113869.96   97.69
 13896.2    98.213906.04  97.9513922.44   98.1613932.28   97.7313978.21   97.39
14007.73   97.3614027.41  97.6114050.37   97.0414073.33   96.8314079.89   96.27
14093.01   97.0114112.69  97.1314119.25    95.914138.94   95.2114148.78   96.27
14168.46  100.25 14178.3  99.9614184.86   98.3314207.82   97.4414217.66   98.37
14230.78  101.8614240.62 106.7514247.18  109.27 14260.3  112.5314266.87  113.64
14276.71  114.3714299.67 117.3314319.35  116.3414339.03  116.9314345.59   115.6
14352.15  112.6314361.99 110.0514368.55  107.5914378.39  102.7514384.95  101.53
14398.07  102.6414404.63 101.3814414.47   96.5214463.68   96.46 14575.2   96.46

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4700.97    .085 6623.47     .07 6723.73    .025 6781.23     .07
 6907.47    .06614299.67     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6623.47 6907.47          1074.69 1235.01 1212.32             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6623.47    95.3       T
 6907.47 14575.2    96.2       T
Left Levee      Station=      32      Elevation=  108.59
Right Levee     Station=14299.67      Elevation=  117.33
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
11311.3911901.83   96.25

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            104.32    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.072      0.063      0.066
  W.S. Elev (ft)            104.28    Reach Len. (ft)          1074.69    1235.01    1212.32
  Crit W.S. (ft)             86.83    Flow Area (sq ft)       48847.91    9605.47   56807.98
  E.G. Slope (ft/ft)     0.000126    Area (sq ft)            56806.30    9605.47   65507.97
  Q Total (cfs)          125000.00     Flow (cfs)             43286.04   25445.79   56268.18
  Top Width (ft)         14189.88    Top Width (ft)           6577.69     284.00    7328.18
  Vel Total (ft/s)           1.08    Avg. Vel. (ft/s)            0.89       2.65       0.99
  Max Chl Dpth (ft)         47.02    Hydr. Depth (ft)            7.43      33.82       7.75
  Conv. Total (cfs)      11124930.0     Conv. (cfs)            3852434.0   2264662.0   5007838.0
  Length Wtd. (ft)          1163.76    Wetted Per. (ft)         6582.67     304.74    7332.05
  Min Ch El (ft)              57.26    Shear (lb/sq ft)            0.06       0.25       0.06
  Alpha                        1.82    Stream Power (lb/ft s)      0.05       0.66       0.06
  Frctn Loss (ft)              0.13    Cum Volume (acre-ft)    111630.90   43864.68   139999.90
  C & E Loss (ft)              0.00    Cum SA (acres)           15885.71    1997.61   17444.80


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.27

INPUT
Description: RGV-04, Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      82
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  103.64      34    93.7      74   93.29      90   95.73     658   96.08
     694    96.1    1352   96.51    1388   96.53    2046   96.94    2082   96.96
    2719   97.35    2740   96.33    2776   94.92    3434   95.14    3470   95.15
    4128   95.37    4164   95.39    4822   95.61    4858   95.62    5194   95.73
    5371   96.75    5454   89.74    5516   89.92    5552   90.02    6210   91.89
    6246   91.99    6813   92.84    6846    93.7    6904   96.54    6908    94.6
    6951    73.7  6997.2   66.88  7001.2   66.29    7004   65.88  7090.4   68.61
  7094.4   68.72    7154   71.67    7182   77.76  7183.6   77.86  7187.6   78.12
    7201   78.98    7232   90.66  7276.8   91.59  7280.8   91.67    7359   93.29
    7370   95.83    7374   96.75  8100.1   97.17  8136.1   97.19    8414   97.35
    8651   95.73    8674   90.86  8862.2   97.69  8898.2   97.74    9614   97.35
  9624.3   96.91  9660.3   95.35    9774   90.45    9834   90.45   10334   94.11
 10386.4   96.77 10422.4   98.15 11148.5   96.18 11184.5   96.08   11614   94.92
 11910.6   95.17 11946.6   95.19   12594   95.73 12672.7   93.07 12708.7   91.85
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   12714   91.67   12750   91.67   12834   98.98 13434.8    98.1 13470.8   98.04
 14196.9   96.97 14232.9   96.92   14762   96.14   14784  101.41   14798  101.01
   14826   97.76   14959  113.29

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    6813     .06    6846    .066    6951    .015    7201    .066
    7374    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          6904    7374              90      90      90             .2       .5
Left Levee      Station=       0      Elevation=  103.64
Right Levee     Station=   14959      Elevation=  113.29
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    6904   95.64    8414   14959   97.35

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            104.19    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.060      0.043      0.067
  W.S. Elev (ft)            104.15    Reach Len. (ft)            10.00      10.00      10.00
  Crit W.S. (ft)             89.83    Flow Area (sq ft)       56089.66   11664.75   49794.75
  E.G. Slope (ft/ft)      0.000094    Area (sq ft)            56089.66   11664.75   49794.75
  Q Total (cfs)           125000.00    Flow (cfs)              54490.22   32633.13   37876.65
  Top Width (ft)          14880.70    Top Width (ft)           6904.00     470.00    7506.70
  Vel Total (ft/s)            1.06    Avg. Vel. (ft/s)            0.97       2.80       0.76
  Max Chl Dpth (ft)          38.27    Hydr. Depth (ft)            8.12      24.82       6.63
  Conv. Total (cfs)       12865350.0    Conv. (cfs)             5608287.0   3358694.0   3898372.0
  Length Wtd. (ft)           10.00    Wetted Per. (ft)         6905.77     479.19    7507.84
  Min Ch El (ft)             65.88    Shear (lb/sq ft)            0.05       0.14       0.04
  Alpha                       2.33    Stream Power (lb/ft s)      0.05       0.40       0.03
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)    110238.30   43563.15   138395.40
  C & E Loss (ft)             0.00    Cum SA (acres)          15719.40    1986.92   17238.37


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

BRIDGE


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.255

INPUT
Description: Pharr

Distance from Upstream XS =      10
Deck/Roadway Width        =      40
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      28
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0  125.18  103.64       0  125.18   117.1     694  119.06  110.98
    1388  118.99   110.9    2082  118.99   110.9    2776  118.99   110.9
    3470  118.99   110.9    4164  118.99   110.9    4858  118.99   110.9
    5552  118.99   110.9    6246  118.99   110.9    6908  118.95  110.87
  7001.2  118.86  110.78  7094.4  118.86  110.78  7187.6  118.86  110.78
  7280.8  118.93  110.85    7374  118.97  110.88  8136.1  118.99   110.9
  8898.2  118.99   110.9  9660.3  118.99   110.9 10422.4  118.99   110.9
 11184.5  118.99   110.9 11946.6  118.99   110.9 12708.7  118.99   110.9
 13470.8  118.99   110.9 14232.9  124.87  116.79   14959  134.32  126.24
   14959  134.32  113.29

Upstream Bridge Cross Section Data
Station Elevation Data    num=      82
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  103.64      34    93.7      74   93.29      90   95.73     658   96.08
     694    96.1    1352   96.51    1388   96.53    2046   96.94    2082   96.96
    2719   97.35    2740   96.33    2776   94.92    3434   95.14    3470   95.15
    4128   95.37    4164   95.39    4822   95.61    4858   95.62    5194   95.73
    5371   96.75    5454   89.74    5516   89.92    5552   90.02    6210   91.89
    6246   91.99    6813   92.84    6846    93.7    6904   96.54    6908    94.6
    6951    73.7  6997.2   66.88  7001.2   66.29    7004   65.88  7090.4   68.61
  7094.4   68.72    7154   71.67    7182   77.76  7183.6   77.86  7187.6   78.12
    7201   78.98    7232   90.66  7276.8   91.59  7280.8   91.67    7359   93.29
    7370   95.83    7374   96.75  8100.1   97.17  8136.1   97.19    8414   97.35
    8651   95.73    8674   90.86  8862.2   97.69  8898.2   97.74    9614   97.35
  9624.3   96.91  9660.3   95.35    9774   90.45    9834   90.45   10334   94.11
 10386.4   96.77 10422.4   98.15 11148.5   96.18 11184.5   96.08   11614   94.92
 11910.6   95.17 11946.6   95.19   12594   95.73 12672.7   93.07 12708.7   91.85
   12714   91.67   12750   91.67   12834   98.98 13434.8    98.1 13470.8   98.04
 14196.9   96.97 14232.9   96.92   14762   96.14   14784  101.41   14798  101.01
   14826   97.76   14959  113.29

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    6813     .06    6846    .066    6951    .015    7201    .066
    7374    .067

Bank Sta: Left   Right    Coeff Contr.   Expan.
          6904    7374            .2       .5
Left Levee      Station=       0      Elevation=  103.64
Right Levee     Station=   14959      Elevation=  113.29
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    6904   95.64    8414   14959   97.35

Downstream  Deck/Roadway Coordinates
    num=      28
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0  125.18  103.64       0  125.18   117.1     694  119.06  110.98
    1388  118.99   110.9    2082  118.99   110.9    2776  118.99   110.9
    3470  118.99   110.9    4164  118.99   110.9    4858  118.99   110.9
    5552  118.99   110.9    6246  118.99   110.9    6908  118.95  110.87
  7001.2  118.86  110.78  7094.4  118.86  110.78  7187.6  118.86  110.78
  7280.8  118.93  110.85    7374  118.97  110.88  8136.1  118.99   110.9
  8898.2  118.99   110.9  9660.3  118.99   110.9 10422.4  118.99   110.9
 11184.5  118.99   110.9 11946.6  118.99   110.9 12708.7  118.99   110.9
 13470.8  118.99   110.9 14232.9  124.87  116.79   14959  134.32  126.24
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   14959  134.32  113.29

Downstream Bridge Cross Section Data
Station Elevation Data    num=      82
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  103.64      34    93.7      74   93.29      90   95.73     658   96.08
     694    96.1    1352   96.51    1388   96.53    2046   96.94    2082   96.96
    2719   97.35    2740   96.33    2776   94.92    3434   95.14    3470   95.15
    4128   95.37    4164   95.39    4822   95.61    4858   95.62    5194   95.73
    5371   96.75    5454   89.74    5516   89.92    5552   90.02    6210   91.89
    6246   91.99    6813   92.84    6846    93.7    6904   96.54    6908    94.6
    6951    73.7  6997.2   66.88  7001.2   66.29    7004   65.88  7090.4   68.61
  7094.4   68.72    7154   71.67    7182   77.76  7183.6   77.86  7187.6   78.12
    7201   78.98    7232   90.66  7276.8   91.59  7280.8   91.67    7359   93.29
    7370   95.83    7374   96.75  8100.1   97.17  8136.1   97.19    8414   97.35
    8651   95.73    8674   90.86  8862.2   97.69  8898.2   97.74    9614   97.35
  9624.3   96.91  9660.3   95.35    9774   90.45    9834   90.45   10334   94.11
 10386.4   96.77 10422.4   98.15 11148.5   96.18 11184.5   96.08   11614   94.92
 11910.6   95.17 11946.6   95.19   12594   95.73 12672.7   93.07 12708.7   91.85
   12714   91.67   12750   91.67   12834   98.98 13434.8    98.1 13470.8   98.04
 14196.9   96.97 14232.9   96.92   14762   96.14   14784  101.41   14798  101.01
   14826   97.76   14959  113.29

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    6813     .06    6846    .066    6951    .015    7201    .066
    7374     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          6904    7374           .2       .5
Left Levee      Station=       0      Elevation=  103.64
Right Levee     Station=   14959      Elevation=  113.29
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    6904   95.64    8414   14959   97.35

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Abutments =  2

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
       0  117.16      50    93.2
Downstream     num=       2
     Sta    Elev     Sta    Elev
       0  117.16      50    93.2

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
   14936     111   14959   126.6
Downstream     num=       2
     Sta    Elev     Sta    Elev
   14936     111   14959   126.6

Number of Piers =  24

Pier Data
Pier Station     Upstream=     694    Downstream=     694
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60       36  119.42
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60       36  119.42

Pier Data
Pier Station     Upstream=    1388    Downstream=    1388
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60       36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60       36  119.35

Pier Data
Pier Station     Upstream=    2082    Downstream=    2082
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60       36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60       36  119.35

Pier Data
Pier Station     Upstream=    2776    Downstream=    2776
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60       36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60       36  119.35

Pier Data
Pier Station     Upstream=    3470    Downstream=    3470
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60       36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60       36  119.35

Pier Data
Pier Station     Upstream=    4164    Downstream=    4164
Upstream     num=       2
```

```
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream      num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=    4858    Downstream=    4858
Upstream     num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream      num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=    5552    Downstream=    5552
Upstream     num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream      num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=    6246    Downstream=    6246
Upstream     num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream      num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=    6908    Downstream=    6908
Upstream     num=        2
    Width   Elev    Width   Elev
       4      60       4  119.31
Downstream      num=        2
    Width   Elev    Width   Elev
       4      60       4  119.31

Pier Data
Pier Station     Upstream=  7001.2    Downstream=  7001.2
Upstream     num=        2
    Width   Elev    Width   Elev
       4      60       4  119.22
Downstream      num=        2
    Width   Elev    Width   Elev
       4      60       4  119.22

Pier Data
Pier Station     Upstream=  7094.4    Downstream=  7094.4
Upstream     num=        2
    Width   Elev    Width   Elev
       4      60       4  119.22
Downstream      num=        2
    Width   Elev    Width   Elev
       4      60       4  119.22

Pier Data
Pier Station     Upstream=  7187.6    Downstream=  7187.6
Upstream     num=        2
    Width   Elev    Width   Elev
       4      60       4  119.22
Downstream      num=        2
    Width   Elev    Width   Elev
       4      60       4  119.22

Pier Data
Pier Station     Upstream=  7280.8    Downstream=  7280.8
Upstream     num=        2
    Width   Elev    Width   Elev
       4      60       4  119.29
Downstream      num=        2
    Width   Elev    Width   Elev
       4      60       4  119.29

Pier Data
Pier Station     Upstream=    7374    Downstream=    7374
Upstream     num=        2
    Width   Elev    Width   Elev
       4      60       4  119.33
Downstream      num=        2
    Width   Elev    Width   Elev
       4      60       4  119.33

Pier Data
Pier Station     Upstream=  8136.1    Downstream=  8136.1
Upstream     num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream      num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=  8898.2    Downstream=  8898.2
Upstream     num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream      num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=  9660.3    Downstream=  9660.3
Upstream     num=        2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream      num=        2
    Width   Elev    Width   Elev
```

```
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 10422.4    Downstream= 10422.4
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 11184.5    Downstream= 11184.5
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 11946.6    Downstream= 11946.6
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 12708.7    Downstream= 12708.7
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 13470.8    Downstream= 13470.8
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 14232.9    Downstream= 14232.9
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  125.23
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  125.23

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.25

INPUT
Description: RGV-04, Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      82
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  103.64      34    93.7      74   93.29      90   95.73     658   96.08
     694    96.1    1352   96.51    1388   96.53    2046   96.94    2082   96.96
    2719   97.35    2740   96.33    2776   94.92    3434   95.14    3470   95.15
    4128   95.37    4164   95.39    4822   95.61    4858   95.62    5194   95.73
    5371   96.75    5454   89.74    5516   89.92    5552   90.02    6210   91.89
    6246   91.99    6813   92.84    6846    93.7    6904   96.54    6908    94.6
    6951    73.7  6997.2   66.88  7001.2   66.29    7004   65.88  7090.4   68.61
  7094.4   68.72    7154   71.67    7182   77.76  7183.6   77.86  7187.6   78.12
    7201   78.98    7232   90.66  7276.8   91.59  7280.8   91.67    7359   93.29
    7370   95.83    7374   96.75  8100.1   97.17  8136.1   97.19    8414   97.35
    8651   95.73    8674   90.86  8862.2   97.69  8898.2   97.74    9614   97.35
  9624.3   96.91  9660.3   95.35    9774   90.45    9834   90.45   10334   94.11
 10386.4   96.77 10422.4   98.15 11148.5   96.18 11184.5   96.08   11614   94.92
 11910.6   95.17 11946.6   95.19   12594   95.73 12672.7   93.07 12708.7   91.85
   12714   91.67   12750   91.67   12834   98.98 13434.8    98.1 13470.8   98.04
 14196.9   96.97 14232.9   96.92   14762   96.14   14784  101.41   14798  101.01
   14826   97.76   14959  113.29

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    6813     .06    6846    .066    6951    .015    7201    .066
    7374     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          6904    7374            12.07      10   22.96             .2       .5
Left Levee      Station=       0      Elevation=  103.64
Right Levee     Station=   14959      Elevation=  113.29
```

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	6904	95.64	8414	14959	97.35

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	104.17	Element			
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.043	0.060
W.S. Elev (ft)	104.14	Reach Len. (ft)	12.07	10.00	22.96
Crit W.S. (ft)	89.83	Flow Area (sq ft)	56011.91	11659.46	49710.21
E.G. Slope (ft/ft)	0.000088	Area (sq ft)	56011.91	11659.46	49710.21
Q Total (cfs)	125000.00	Flow (cfs)	52617.85	31560.82	40821.32
Top Width (ft)	14880.60	Top Width (ft)	6904.00	470.00	7506.60
Vel Total (ft/s)	1.06	Avg. Vel. (ft/s)	0.94	2.71	0.82
Max Chl Dpth (ft)	38.26	Hydr. Depth (ft)	8.11	24.81	6.62
Conv. Total (cfs)	13292410.0	Conv. (cfs)	5595343.0	3356155.0	4340909.0
Length Wtd. (ft)	15.16	Wetted Per. (ft)	6905.76	479.19	7507.74
Min Ch El (ft)	65.88	Shear (lb/sq ft)	0.04	0.13	0.04
Alpha	2.15	Stream Power (lb/ft s)	0.04	0.36	0.03
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	110126.70	43539.80	138295.80
C & E Loss (ft)	0.01	Cum SA (acres)	15705.66	1985.98	17223.34

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 151.24

INPUT
Description: RGV-04, Updated on left with new survey to Station1031.87.
Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 450

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	101.66	3	100.51	13	100.47	29	104.4	46	105.14
71	97.36	88.99	92.8	114.99	92.02	146.99	94.51	151.98	93.53
174.98	93.28	182.98	95.51	196.98	92.35	209.98	93.17	214.98	94.86
232.97	95.24	243.97	93.45	254.97	94.01	287.97	94.58	372.96	94.51
456.95	94.7	576.93	94.75	643.92	95.04	769.9	95.22	793.9	96.15
805.9	94.91	870.89	95.42	952.88	95.28	989.88	95.61	1031.87	95.55
1134.76	95.83	1157.72	95.63	1220.03	95.82	1269.22	95.74	1302.02	96.41
1354.5	96.82	1384.01	97.57	1400.41	97.03	1436.49	97.48	1456.17	98.04
1488.96	97.32	1515.2	97.42	1538.16	97.06	1554.55	96.13	1570.95	95.89
1584.07	96.43	1610.31	96.49	1718.54	96.31	1748.05	96.47	1771.01	96.28
1807.09	96.48	1879.24	96.43	1980.91	96.53	1997.31	96.34	2033.38	96.58
2072.74	96.5	2108.82	96.69	2154.73	96.53	2190.81	96.7	2279.36	96.64
2321.99	96.51	2413.82	96.79	2561.41	96.57	2597.48	96.87	2643.4	96.61
2659.8	96.77	2708.99	96.45	2725.39	96.77	2751.63	95.85	2768.02	95.61
2777.86	94.06	2784.42	95.05	2820.5	94.4	2869.69	94.34	2876.25	94.71
2905.77	94.35	2977.92	94.19	3017.28	94.61	3046.79	94.28	3174.7	94.66
3194.38	94.57	3243.57	94.8	3250.13	95.06	3302.61	95.38	3387.88	95.19
3417.39	95.4	3473.15	95.34	3486.27	95.54	3528.9	95.29	3594.49	95.56
3630.57	95.41	3660.09	95.58	3768.32	95.65	3814.23	95.51	3843.75	95.72
3929.02	95.58	3948.7	95.89	4011.01	95.74	4040.53	95.95	4188.11	95.55
4227.46	95.54	4270.1	95.3	4293.05	95.61	4319.29	94.92	4355.36	94.82
4411.12	95.37	4437.35	95.1	4473.43	95.62	4522.62	95.49	4575.09	95.85
4594.77	95.7	4627.57	96.08	4657.08	95.98	4670.2	96.28	4699.72	96.24
4712.84	95.82	4752.19	96.36	4814.5	95.88	4866.97	94.84	4886.65	94.65
4948.96	94.88	5057.19	94.97	5126.06	95.27	5162.13	95.57	5194.93	95.37
5290.03	95.59	5316.27	95.87	5358.91	95.91	5394.98	96.37	5414.66	96.35
5437.61	96.79	5473.69	96.42	5496.65	95.38	5516.32	92.72	5542.56	91.53
5565.52	90.94	5591.75	89.37	5673.74	89.31	5699.98	89.43	5755.73	89.26
5834.44	89.36	5844.28	89.23	5945.94	89.35	5998.42	89.2	6090.24	89.32
6113.2	89.97	6146	90.37	6168.95	91.07	6221.43	91.84	6241.1	91.72
6267.34	92.16	6323.09	91.92	6349.33	92.22	6388.68	91.81	6431.32	91.66
6480.51	92.33	6490.35	92.09	6549.38	92.1	6611.69	92.31	6670.72	92.84
6736.31	92.64	6815.02	92.8	6844.54	93	6874.05	92.86	6910.13	93.38
6926.53	88.78	6936.36	86.8	6942.92	87.2	6949.48	86.27	6965.88	78.85
6972.44	73.25	6975.72	72.21	7090.4	68.61	7094.4	68.72	7175.78	72.21
7182.34	72.91	7195.46	77.69	7215.14	86.94	7221.69	88.24	7251.21	88.22
7274.17	89.55	7290.57	89.04	7346.33	90.76	7385.68	91.48	7392.24	91.17
7418.48	91.93	7431.6	91.96	7441.44	92.77	7474.24	93.73	7598.87	94.66
7621.83	94.48	7667.75	95.08	7693.98	95.18	7713.66	94.81	7749.74	94.73
7762.86	94.94	7785.82	94.62	7838.29	94.54	7848.13	94.28	7900.61	94.64
7923.57	94.48	7972.77	94.62	7999	95	8021.96	94.88	8090.84	95.18
8153.15	95.19	8182.67	96.05	8205.63	96.25	8261.39	96.01	8274.51	96.34
8294.19	96.14	8317.15	96.65	8340.11	96.23	8386.03	96.78	8448.35	95.39
8517.23	95.37	8536.91	94.78	8579.55	94.82	8589.39	94.47	8622.19	94.75
8674.67	93.95	8691.07	92.93	8720.59	93.25	8756.67	94.57	8779.63	94.75
8822.27	94.61	8855.07	95.79	8868.19	95.98	8894.43	97.29	8933.79	96.46
8960.03	96.76	8996.11	96.36	9028.91	96.62	9068.27	95.96	9091.23	96
9150.27	96.53	9166.67	96.1	9206.03	96.77	9261.79	96.6	9343.79	95.54
9419.23	95.64	9481.55	95.29	9576.67	95.32	9632.43	94.9	9645.55	94.42
9661.95	95.24	9675.07	94.61	9698.03	94.53	9714.43	94.86	9730.83	93.91
9753.79	91.28	9770.19	91.16	9789.87	89.99	9802.99	90.25	9825.95	89.83
9835.79	90.93	9855.47	90.16	9871.87	90.96	9911.23	91.26	9937.47	91.83
9947.31	92.41	9963.71	92.0710022.75		92.0610062.11		92.7610075.23		92.14
10101.47	92.3810130.99		91.8210144.11		91.8710180.19		93.3410193.31		94.81
10206.43	94.4810222.83		95.1110229.39		96.0210242.51		96.0810252.35		96.96
10265.47	96.1210294.99		96.810304.83		95.9910331.07		97.310357.31		95.73
10363.87	96.8810380.27		95.9810399.95		95.9210406.51		95.4410445.87		96.57
10458.99	95.1610481.95		94.8710495.07		94.2310518.03		94.4310537.71		93.83
10557.39	93.9910573.79		93.6410596.75		93.7110662.33		93.9210685.28		94.19
10708.23	94.8810718.07		94.4110744.29		94.6510770.52		94.0110816.42		94.15
10829.53	94.8410842.64		9410862.31		93.510918.04		93.610927.88		94.03
10967.22	93.510980.33		94.16	11000	93.4311055.73		93.3411078.68		92.96
11111.46	92.8811131.13		93.3111147.53		93.0211183.59		92.91 11196.7		93.31
11242.6	92.7511275.38		92.9811288.49		92.7611344.23		92.73 11363.9		93.14
11409.79	92.8211432.74		93.5211442.58		92.7311501.58		92.911557.32		92.9
11573.71	93.1911593.38		92.8411609.77		93.1211662.22		9311757.29		93.35
11767.13	93.111790.08		93.7 11816.3		93.49 11832.7		93.76 11862.2		93.57
11878.59	93.811911.38		93.72 11983.5		94.28 12058.9		94.2412101.52		94.55
12134.3	94.3212173.64		94.49 12209.7		94.2612239.21		94.74 12255.6		94.25
12285.1	94.8412294.94		94.2212314.61		94.612347.39		93.94 12376.9		94.19
12390.01	93.9 12406.4		94.2112435.91		94.112445.74		94.5212458.85		93.93
12465.41	94.4112478.52		93.8912508.03		93.6312544.09		94.3112553.93		93.6
12563.76	94.0212593.27		93.3912616.21		93.3712635.88		93.8712665.39		93.59
12691.62	94.112737.51		95.9112750.62		96.9212757.18		96.2312770.29		97.38

```
12780.13   97.0712812.91   99.3612826.03   97.9912855.53   98.4412868.64    98.1
12901.43   98.2412914.54   97.7412937.49   97.7912976.83   97.0313058.79   96.71
13085.01    96.813124.35   97.8613150.58   98.3513265.32   97.3313278.43   99.63
13294.83   99.7913307.94   97.4613317.77   98.6913327.61      9913347.28   97.93
13452.19   96.9413507.92    96.8 13586.6   95.9813599.71   96.1713632.49    95.6
13652.16   95.9213701.34   95.7613727.56   96.6513734.12   96.2813770.18   96.46
13789.85      9713793.13   97.7413819.36   97.0513832.47   97.4913852.14   96.91
13868.53   97.4613920.99   96.9513960.33   96.9413966.88   97.2714012.78   96.89
14042.28   97.0214075.07   96.5414117.68   96.7914199.64   96.6114225.87    96.9
14265.21   96.4214284.88   96.7714291.44   96.2414340.61   96.4714373.39    96.2
14429.12   96.4214438.96   96.1514527.47   95.5114602.88   95.3314632.38   95.63
14724.17   95.3614747.12   95.1114766.79   95.7114776.63   94.6614789.74   94.81
14806.13   95.94 14825.8   99.5214835.64   99.5914845.46   97.8414868.29    96.9
14897.64   97.9514904.17   98.66   14927   99.4514946.57  100.8314966.14  104.64
14975.92  105.0114988.97  107.2314995.49  109.8415002.02  111.0415021.59  110.06
15044.42  104.0615054.21  103.8415067.25  100.4915073.78   97.6315086.82   96.46

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 6874.05    .066 6972.44    .015 7195.46    .066 7598.87    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6910.13 7474.24          2853.84    2485 1923.56            .1       .3
Left Levee      Station=      46      Elevation=  105.14
Right Levee     Station=15002.02      Elevation=  111.04
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    9.01  6913.8    93.4 8392.1114981.41   96.85

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            104.17    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.060      0.050      0.067
  W.S. Elev (ft)            104.14    Reach Len. (ft)          2853.84    2485.00    1923.56
  Crit W.S. (ft)             96.57    Flow Area (sq ft)       61450.63   12533.10   55213.12
  E.G. Slope (ft/ft)      0.000078    Area (sq ft)            61450.63   12533.10   55213.12
  Q Total (cfs)           125000.00    Flow (cfs)              57974.68   25965.39   41059.93
  Top Width (ft)          14914.38    Top Width (ft)           6860.92    564.11    7489.34
  Vel Total (ft/s)            0.97    Avg. Vel. (ft/s)            0.94       2.07       0.74
  Max Chl Dpth (ft)          35.53    Hydr. Depth (ft)            8.96      22.22       7.37
  Conv. Total (cfs)       14139560.0    Conv. (cfs)             6557890.0   2937113.0   4644553.0
  Length Wtd. (ft)         2424.18    Wetted Per. (ft)         6864.18     573.10    7491.40
  Min Ch El (ft)             68.61    Shear (lb/sq ft)            0.04       0.11       0.04
  Alpha                       1.59    Stream Power (lb/ft s)      0.04       0.22       0.03
  Frctn Loss (ft)             0.25    Cum Volume (acre-ft)    110110.40   43537.02   138268.20
  C & E Loss (ft)             0.00    Cum SA (acres)          15703.75    1985.86   17219.39


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 150.78

INPUT
Description: RGV-04, Updated on left with new survey to Station1090.94.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.83      12    92.5      25   93.23      40  100.33      51  101.27
      65  100.62      88  108.31  104.99  107.63  138.99   96.11  148.99   93.57
  160.99   92.17  176.99   91.92  194.99   93.79  234.99   95.17  283.98    95.2
  298.98   94.78  320.98   95.08  413.98   95.44  561.97   95.44  632.96    95.9
  721.96   96.05  744.96   96.37  769.96   96.21  868.95   96.22  920.95   96.45
  959.95    96.4  987.95   96.85 1008.94   96.39 1039.94   96.41 1090.94   96.86
 1121.65   96.85 1141.33   95.99 1167.56   94.03 1213.48   92.74 1272.51   92.71
 1298.75   92.95 1380.74   93.24 1446.34   93.22 1505.37   93.58 1525.05   93.45
 1570.97   93.71  1646.4   93.53 1685.75   93.84 1718.55    93.7 1761.19   94.02
  1790.7    94.5 1816.94   94.42  1823.5   93.84  1839.9    90.1 1849.74   88.65
 2240.02   88.65 2246.58   88.88 2338.41    89.5 2400.72   90.31 2417.12   90.18
 2453.19    90.7 2499.11   94.37 2512.23   94.38 2525.35   95.73 2617.18   96.33
 2646.69   95.92 2659.81   96.55 2699.17   95.74 2718.84    96.8  2741.8   96.46
  2758.2   96.82  2807.4   96.98 2836.91   95.32 2863.15   94.93 2909.06   95.96
 2945.14   96.28 2977.94   96.29 3004.17    97.1 3017.29   96.37 3036.97   98.64
 3043.53   98.73 3063.21   97.06 3082.88   96.34 3109.12   96.43 3132.08   97.55
 3155.04   96.55 3214.07      97  3289.5   96.85 3325.58   97.15 3341.98   96.67
 3391.17   96.25 3407.57   95.28 3430.53   93.21 3453.48   92.75  3499.4   92.91
 3607.63   92.78 3663.38   91.89 3728.97   92.03 3771.61   91.74 3794.57   92.11
 3824.08   91.83 3899.51   91.77 3942.15   91.93 4027.42   91.67 4089.73   91.68
 4178.28   91.88 4312.74   91.85 4365.22   92.12 4394.74      93 4427.53   92.68
 4440.65   92.96 4483.29   92.92 4584.95   93.34  4801.4   93.34 4873.56   93.71
 4909.63   94.23 4916.19   93.97 5040.82   93.71 5047.38   93.84 5175.28   93.78
 5257.27   93.99 5306.46   93.82 5335.98   94.89  5349.1   94.67 5362.22    90.4
 5378.61    86.4 5398.29   86.47 5411.41   85.78 5440.93   86.29  5460.6    85.4
 6267.38    85.4 6310.02   85.65 6323.14   85.41 6454.32    85.4 6500.23   85.94
 6526.47   85.55 6533.03    85.9 6582.23    85.9 6608.46   85.66 6664.22   85.82
 6674.05   86.45 6683.89   86.02 6703.57   86.24 6749.49   85.52 6808.52   85.68
 6851.15   85.39 7041.37   85.51 7110.24   85.39  7133.2   85.58 7188.95   85.39
 7270.94   85.44 7297.18   85.61 7349.65   85.37 7375.89    85.6 7411.96   85.51
 7428.36   85.92 7497.23   85.42 7510.35   85.76 7530.03   85.31 7562.82   85.58
 7589.06   85.17 7608.74   85.53 7641.53   85.33 7713.69   85.79    7776   85.31
 7831.75   85.54 7871.11   85.33 7900.62   85.56  7936.7   85.48 7943.26   85.93
 7956.37   88.45 7966.21   87.71 7979.33   88.39 7995.73   87.07 8008.85   87.85
 8025.25   92.11  8048.2   95.34 8061.32   96.37    8081   95.71 8123.63   96.37
 8156.43   96.62 8189.23   96.53 8212.18   96.11 8248.26   96.52 8294.18   96.39
 8353.21   95.99 8379.45   95.57  8418.8   96.65 8445.04    96.3 8490.96   96.47
 8536.87    95.9 8635.26   95.85 8654.94   97.32 8691.02   96.96 8723.81    97.3
 8743.49   96.72 8779.57   96.45 8822.08   96.61 8854.76    97.1  8880.9   96.32
 8913.58   96.57 8920.11    96.3 8949.52   96.94 8956.05   96.56  9011.6   96.75
 9037.74   97.29 9083.49   96.03 9109.63   95.97 9119.43   96.65 9148.84   96.64
 9155.38    96.1 9181.52   96.08 9207.66   95.45  9243.6   95.79 9289.35   96.85
 9299.16   96.26 9318.83    98.6 9331.94   98.42 9351.61   93.67 9358.17    90.11
 9374.56   86.71 9387.68   82.64 9397.51   77.67 9404.07   73.36 9410.62    71.62
    9412   56.38    9441    56.8    9465    57.7    9477    57.3    9488    57.5
    9498    57.3    9510    56.7    9519    56.7    9541   57.24    9550   73.26
 9617.16   71.62 9623.71   73.19 9630.27   77.59 9646.66    83.7  9656.5   89.23
 9659.78   90.01 9669.61   88.45    9686   87.56 9708.95   88.48  9731.9    88.7
  9761.4   88.07 9771.24   88.64 9790.91   88.24 9817.14   91.62 9830.25    94.6
 9843.36   94.39 9856.48   92.92 9885.98    91.3 9918.76   92.53 9938.43   95.41
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 9951.55   95.51  9974.5   94.19 9987.61   93.8710020.39   93.8410026.95   94.14
10046.62   97.9110059.73    98.410089.24   97.7210102.35    96.910128.58   96.69
10158.08   96.8810187.59   97.7810200.71   97.1910213.83   97.92 10253.2   97.39
10295.84   97.8710325.37   96.8210338.49   96.8410354.89   95.7310371.29   95.51
 10404.1   96.2310430.34   96.4910453.31   97.5410479.55   96.9810499.23   97.25
 10522.2   96.3610561.56   97.0710581.25   96.3510610.77   96.67 10656.7   95.11
10679.66    96.510702.62   95.9510728.87   93.8310755.11    93.110787.92   93.35
10810.88   93.9810833.84   94.1410856.81   95.6810886.33   95.5310896.17   94.92
10915.86   95.5710935.54   95.0110948.66   96.5210961.78   96.6910981.47   95.52
11004.43   95.0211033.96   95.24 11043.8   94.9711083.16   95.7111115.97   95.06
11142.21   95.0811152.05   95.6211171.74   94.92 11194.7   94.7711204.54   95.25
11220.94   94.8311283.27   94.77 11312.8   94.3411325.92   94.5311384.97   94.25
11457.14   94.2311486.66   94.4811499.79   94.1911552.27   94.3611608.04      94
11621.16   94.2711660.53   94.0111680.21   94.2411713.02   93.97 11732.7    94.2
11811.43   94.03 11867.2   94.23 11883.6   93.9712024.67   94.1112041.07    94.4
 12119.8   94.6612139.48   95.8612152.61    94.512175.57   95.4612198.53   94.98
 12221.5    95.712247.74   95.5412260.86   95.0912326.47   95.58   12356   96.13
12369.12   97.26 12388.8   96.5512398.64   97.3512411.76      9612431.45   97.47
12454.41   97.3812470.81   96.5712477.38   95.0912500.34   94.4812520.02   96.78
12526.58   96.3312552.83   97.2712565.95   97.2412572.51   95.8812588.91   98.23
12605.31   96.8912690.61   96.1212697.17   96.3412733.25   95.7512766.06   95.53
12789.02   96.1412818.55   96.0712831.67   95.2912841.51   96.2112874.32   96.59
12903.84   96.5212979.29   97.1112998.97   96.6213015.38   96.9913035.06   96.54
13094.11    96.313123.63   95.8813149.88   96.0813192.52   95.8513267.98   94.89
13310.62   93.8213382.79   93.4513461.52   93.2113481.21    93.413546.82   95.24
13573.06   95.3213628.83    94.713664.92   94.8713687.88   95.9113730.53   96.21
13750.21   97.0913773.17   98.7813789.57   98.6213805.98   99.3613825.66   99.44
13855.18    98.613914.23   98.5713956.88   97.8813976.56   98.79 13986.4   97.81
13999.53   97.6614015.93   98.2914038.89   97.0714055.29    97.5 14088.1   97.53
14114.34   97.9914147.15   97.6314179.95    98.514212.76   98.54   14239    98.2
14288.21   98.1314330.86   98.45 14357.1   98.24 14373.5   98.4814406.31   97.69
14429.27   97.9114462.08   97.1214498.16   97.5214527.69   97.0314553.93   96.25
14681.87   96.0314754.04   95.64   14777   95.7614849.18   95.4714944.31   95.34
14970.55   95.7415072.25   95.3515095.21   95.7915101.77   95.3615150.98    95.7
 15249.4   95.33 15265.8   95.5815337.97   95.1915436.39   95.3615459.35   95.62
15495.43   95.54 15518.4   96.1715544.64   95.6315603.69   95.5815616.81   95.91
15646.34    95.915659.46   95.54 15685.7   96.5515705.39   95.6315748.03   95.48
15774.28   95.79 15820.2   95.0215856.29   95.3815862.85   94.91 15905.5   95.11
15944.86   94.8815974.39   93.9215987.51   94.5916000.63   96.3616007.19    98.1
16017.03    98.316026.88   96.0716046.56   94.0816105.61   94.4116135.13   95.02
16151.53   96.1616164.66   98.47 16174.5  102.0116187.62  104.2316194.18  106.32
16220.42  106.2216236.83  101.9816253.23  101.1516263.07   97.05

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      88    .066 9318.83     .07 9410.62    .025 9623.71     .07
10059.73    .06616194.18     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9318.83 9938.43          2017.47 2485.16 3297.89             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 9318.83    98.6       T
 9938.4316263.07   95.41       T
Left Levee      Station=      88      Elevation=  108.31
Right Levee     Station=16194.18      Elevation=  106.32
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1825.35  2606.2   94.44 5344.23  8366.2   94.94

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            103.92    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.066      0.056      0.066
  W.S. Elev (ft)            103.88    Reach Len. (ft)          2017.47    2485.16    3297.89
  Crit W.S. (ft)             84.99    Flow Area (sq ft)       48523.43   14713.20   48184.20
  E.G. Slope (ft/ft)      0.000138    Area (sq ft)            83574.93   14713.20   50479.58
  Q Total (cfs)           125000.00    Flow (cfs)              38828.39   36552.00   49619.62
  Top Width (ft)          16069.49    Top Width (ft)           9202.77     619.60    6247.12
  Vel Total (ft/s)            1.12    Avg. Vel. (ft/s)            0.80       2.48       1.03
  Max Chl Dpth (ft)          47.50    Hydr. Depth (ft)            5.27      23.75       7.71
  Conv. Total (cfs)       10650760.0    Conv. (cfs)             3308415.0   3114453.0   4227894.0
  Length Wtd. (ft)          2467.50    Wetted Per. (ft)         9207.17     653.38    6251.71
  Min Ch El (ft)              56.38    Shear (lb/sq ft)            0.05       0.19       0.07
  Alpha                        1.93    Stream Power (lb/ft s)      0.04       0.48       0.07
  Frctn Loss (ft)              0.38    Cum Volume (acre-ft)    105359.70   42759.85   135934.50
  C & E Loss (ft)              0.00    Cum SA (acres)          15177.54    1952.10   16916.10


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 150.31

INPUT
Description: RGV-04, Updated on left with new survey to Station1086.76.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     461
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.72   16.99   88.39   24.99   91.58   29.99   95.84   37.99   99.96
   50.99  100.94   63.98  100.16   67.98   101.9   74.98  102.81   85.98  107.29
  103.97  107.64  108.97  106.82  128.97   99.68  146.96   93.79  159.96   91.16
  167.96   91.13  184.96   92.85  195.95   94.94  226.95   94.47  272.94   94.23
  399.91   94.13   439.9   94.34  558.88   94.25  600.87   94.09  707.84   94.09
  751.83   94.19  791.83   94.05  881.81   94.19   922.8   93.96 1086.76   93.78
 1095.24   94.19 1180.49   94.09 1210.01   93.52  1226.4   94.34 1246.08    91.8
 1259.19   91.26 1298.54   91.49 1387.08   91.41 1432.99   91.55 1583.83    91.5
 1659.25   91.38 1675.64   91.55 1737.95   91.39 1774.02   91.53 1911.74   91.37
 1964.21   91.51  1980.6   91.25 2098.65   91.55 2108.49   92.08 2144.56   91.45
 2229.82    91.5 2252.78   91.78 2285.57   91.47  2328.2   91.66 2357.71   91.44
  2518.4   91.51 2551.19   91.99 2590.54   91.53 2600.38   94.21 2616.77   93.11
 2633.17    92.9 2741.39   93.46 2836.48   93.49 2882.39   93.24 2941.42   93.58
 2990.61   93.42  3023.4   93.61 3072.59    93.4 3154.57   93.23 3262.78   93.15
 3485.77   93.57 3538.24   93.46 3584.15   93.61 3636.62   93.49 3666.14   93.75
  3754.7   93.66 3908.86    93.8 3954.78   93.64 4007.26   93.85  4082.7   93.68
  4131.9   93.79 4256.53    93.7 4338.53   93.96 4459.88   93.94  4522.2   94.19
  4604.2   93.94 4640.27    94.5 4679.63   93.99 4751.79   94.37 4791.15   94.26
 4882.98   94.42 4909.22   94.24 4958.42    94.5 5030.58   94.41 5086.33    94.1
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 5119.13   95.09 5165.05   94.28 5292.96   94.36 5329.04   94.21 5453.68   94.31
 5558.63   94.14 5565.19   94.31 5686.54   94.15 5712.78   93.97 5830.86   94.02
 5958.77   93.74 6007.97   93.81 6034.21   93.58 6103.08   93.49 6158.84   92.41
 6168.68   94.01 6191.64   95.08 6224.44   91.89 6234.28   92.78 6250.68   86.83
 6267.08   85.75 6329.39   85.72 6335.95   85.41 6414.67    85.4 6427.79    85.9
 6493.39   85.83 6545.86   85.45  6637.7   85.64 6677.06   85.94 6693.46   85.64
 6726.25   86.29 6739.37   85.95 6755.77   93.16 6768.89   96.68 6785.29   96.55
 6791.85   95.66 6818.09   95.35 6857.45   95.42 6867.29   94.74 6890.25   94.97
 6923.05   94.48 6949.28    94.9 7018.16   95.25 7037.84   95.05 7073.92   96.47
  7093.6   95.71 7116.56   96.02  7126.4   95.48 7172.31   95.52 7201.83   95.26
 7244.47   95.54 7323.19   94.62 7378.94   95.21 7395.34   94.67 7431.42   94.93
 7487.18   94.19 7539.66   94.33  7565.9   93.79 7621.65   93.64 7674.13   92.97
 7716.77   91.57 7733.17   91.86 7765.97   91.25 7785.64   91.45 7844.68   94.21
  7857.8   93.77 7887.32   94.37 7900.44   93.67 7962.76   93.89 8015.23   93.21
 8041.47   93.57 8064.43   93.25 8077.55   94.08 8097.23   93.43 8169.39   93.43
 8185.79   94.57 8198.91   93.55 8238.27   92.83 8297.31   93.22 8326.84   94.21
 8359.64   94.17 8385.88   95.48 8418.68   95.22 8435.09   96.49 8454.77   95.69
 8477.73   96.13 8484.29   95.59 8503.97   95.96 8523.65   95.28 8595.82   95.32
 8628.62   95.91 8635.18   95.35 8664.71   95.06 8707.35    95.7 8713.91   95.48
 8805.76   95.92 8835.28   97.41 8851.68   96.22 8877.92   96.01 8917.29   96.42
 8943.53   95.44 8976.33   95.22 9009.13   93.96 9028.82   94.79 9041.94    91.9
 9055.06   85.97 9074.74   86.76 9110.82   86.97 9133.78    86.5 9192.83   86.59
 9235.47      88 9245.31   88.66    9265   86.89  9297.8   85.96 9320.76   86.57
 9360.12   86.81 9389.65   85.74 9412.61   90.08 9422.45   90.86 9442.13   90.79
 9471.65   91.54 9507.74   92.93  9530.7   91.08 9550.38   87.58 9566.78   87.45
  9579.9   88.47 9593.02   91.86 9602.86   93.06 9615.98    92.7 9701.27   93.14
 9724.23   93.01 9734.07   93.54 9776.72   92.69 9832.48   92.56 9868.57   92.17
 9911.21   92.45 9940.73   92.29 9989.94   92.9210022.74   92.6710111.31   92.66
10153.95   92.4410170.35   92.8210212.99   92.6110275.32   93.17   10295   93.71
 10327.8   93.3510340.92   93.9610386.85   94.9210416.37   95.0810439.33   94.63
10485.26   95.6610518.06   94.6910567.26   96.1110619.75   95.1110639.43   95.28
10652.55   94.3310714.88   94.09 10744.4   94.6110800.16   94.3410836.25   94.78
10849.37   94.4310875.61   95.2410914.97   95.5310934.65   94.93 10960.9   95.31
11013.38   95.0111052.74   95.0511095.22   96.2911108.25   95.7611153.85      96
11170.13   96.3711212.47    96.211222.24   95.6411245.04   96.3211258.07   95.62
11290.63   95.5111316.69   95.8711378.57   95.3811407.88    94.611427.56   95.48
11460.36   94.93   11503   95.5411522.68   94.67 11552.2   95.6611581.72   91.41
11627.64   88.7111644.04   87.0511657.16   87.6511673.56   86.8111696.52   86.46
11726.04   85.4411762.12   86.23 11781.8   81.6411788.36   81.0311804.76   82.75
11817.88   78.4211827.72   72.2711834.28   70.7711844.28   63.6711854.28   63.57
11874.28   63.7711894.28   63.7711904.28   63.2711914.28   63.5711924.28   64.27
11934.28   64.8711954.28   64.2711964.28   64.5711965.48   70.7711972.04   70.94
11981.88   74.8911991.72    76.911998.28   80.4212014.68   82.91 12027.8   93.35
12047.48   94.2512057.32   90.0112067.16   94.0512086.84   94.6312113.08   94.13
 12142.6    92.9   12159   93.0712188.52   91.9912244.28   90.9212260.68   90.87
12300.04   89.7312342.68   89.9512362.36   90.7412408.28    91.512424.68   91.18
12464.04   92.2612483.72   93.3112506.68   91.6312532.92   91.4612542.76   92.47
   12569   92.0712575.56   93.4912591.96   94.6712608.36   94.59 12618.2   95.64
12641.17    95.812657.56   96.9712664.12   99.4412677.25   99.1112693.64   95.94
12729.72   96.9712755.96   94.7212772.37   94.3812788.77   96.2312798.61   95.02
12811.73   94.9912854.37   99.2512880.61   99.7912916.69  100.0312933.09  100.73
12965.89   99.7912982.29  100.7313001.97  100.1813018.37   100.613034.77   99.64
13064.29  101.6213087.25  101.7613133.17  101.2213149.57  102.1313159.41  101.32
13179.09  102.8713185.65  102.3813208.61   104.113218.45  105.9813241.41  105.48
13254.53  106.6913267.65  106.3813287.33   99.0913303.73   97.9613329.97     102
13349.65  103.4613356.21  101.5113369.33  101.0813382.45    99.613411.97  100.81
13425.09    98.713461.17   96.9413490.69   94.9613513.65   95.4413546.45   94.42
13566.13   95.1513595.65   95.2213605.49   94.6413631.73   94.4213690.77   94.81
13720.29   94.5613756.37   95.2513766.21      9514025.33   95.9514071.25   96.41
14153.25   96.7114172.93   97.1414258.21   96.6814291.01   97.1714327.09   96.69
14336.93   95.2714366.45    96.514376.29    97.414412.37   97.5914451.73    97.3
14471.41   96.5614582.93   96.1114678.05   95.4114707.57   94.9414792.85   94.66
14809.25   95.3314851.89   94.2314868.29   94.9514887.97    94.914917.49   96.48
14943.73    96.214999.49    93.415009.33    95.215015.89    93.715035.57    93.1
15101.17   93.4815147.09   94.6715170.05   94.7615209.41   93.7915258.61   93.32
15455.42   93.0115563.66   93.17 15671.9   93.55 15688.3   94.4915740.78   94.43
15760.46   94.9815832.62   94.92 15934.3   95.4516045.82   95.02 16131.1   95.28
16203.26   95.67 16229.5    96.316242.62   95.9616288.54   96.4816409.89   96.84
16495.16   96.9516590.26   97.3716600.09   97.66 16662.4   97.5816714.87    97.9
16721.43   98.2916750.94   97.9316800.13   96.0216819.81   93.6316842.76   93.71
   16869   97.7916878.83   97.3416885.39   95.2116901.79   93.1516914.91   92.79
16944.42   93.0716996.89   92.9917010.01   93.8417016.56   95.7817029.68   96.89
17046.08  104.6817072.31  103.817085.43  101.0817095.27  100.4617111.66   96.46
17226.44   96.46

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .09 11552.2    .06611817.88    .01511991.72    .066 12027.8    .102

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       11552.212047.48          881.09  1506.5  1723.2             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
12047.4817226.44   94.25       T
Left Levee      Station=  103.97      Elevation=  107.64
Right Levee     Station=17046.08      Elevation=  104.68
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  101.4111540.28    95.612665.9217067.04   99.46

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            103.53    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.090      0.053     0.102
  W.S. Elev (ft)            103.49    Reach Len. (ft)           881.09    1506.50    1723.20
  Crit W.S. (ft)             91.80    Flow Area (sq ft)       89787.69   11705.43   22217.01
  E.G. Slope (ft/ft)      0.000176    Area (sq ft)            89787.69   11705.43   23507.52
  Q Total (cfs)           125000.00     Flow (cfs)             77736.41   35237.93   12025.67
  Top Width (ft)          16850.21    Top Width (ft)          11433.89     495.28    4921.04
  Vel Total (ft/s)            1.01    Avg. Vel. (ft/s)            0.87       3.01       0.54
  Max Chl Dpth (ft)          40.22    Hydr. Depth (ft)            7.85      23.63       4.51
  Conv. Total (cfs)       9416326.0     Conv. (cfs)            5855931.0  2654494.0   905901.0
  Length Wtd. (ft)         1175.09    Wetted Per. (ft)        11436.09     512.25    4926.52
  Min Ch El (ft)             63.27    Shear (lb/sq ft)            0.09       0.25       0.05
  Alpha                       2.99    Stream Power (lb/ft s)      0.07       0.76       0.03
  Frctn Loss (ft)             0.16    Cum Volume (acre-ft)    101345.10   42006.24   133133.80
  C & E Loss (ft)             0.00    Cum SA (acres)          14699.65    1920.30   16493.33


Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
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CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 149.66*

INPUT
Description: RGV-04,
Station Elevation Data num= 466

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.32	8.49	91.15	17.09	93.04	26.26	96.38	31.07	98.95
37.48	100.37	45.04	100.61	59	100.17	71.13	102.62	80.48	106.43
84.22	107.2	101.99	107.18	106.72	105.98	125.65	99.27	142.68	93.75
154.98	91.3	158.98	91.29	169.27	92.83	189.05	94.68	205.75	94.27
212.28	94.73	271.76	94.35	408.16	94.14	451.12	94.29	545.25	94.28
624.05	94.07	786.22	94.15	896.93	94	969.89	93.95	1084.37	93.86
1134.51	94.21	1162.9	93.9	1178.67	94.3	1197.6	93.02	1342.54	92.67
1377.39	92.82	1458.59	92.52	1489.3	92.88	1509.79	91.45	1610.81	91.49
1837.92	91.38	1888.39	91.47	1904.16	91.34	2008.13	91.42	2027.18	91.74
2061.87	91.42	2117.35	91.35	2131	91.59	2165.13	91.53	2182.2	91.94
2199.26	91.55	2266.91	91.4	2363.1	91.55	2404.06	91.44	2453.02	91.97
2490.87	91.58	2500.34	92.9	2516.1	92.32	2537.17	92.18	2571.3	92.64
2605.43	92.66	2625.91	94.86	2642.98	96.19	2656.63	95.83	2677.11	93.52
2704.42	93.19	2771.61	93.27	2828.39	93.53	2875.71	93.42	2907.25	93.56
3079.86	93.45	3154.95	93.56	3284.65	93.56	3342.68	93.76	3393.88	93.69
3434.83	93.94	3497.13	93.85	3619.14	94.78	3690.82	94.04	3735.19	94.66
3762.5	94.65	3786.38	94	3878.54	93.55	3973.55	93.43	4038.96	93.22
4093.43	93.2	4213.12	93.4	4348.99	93.54	4380.48	93.44	4462.57	93.69
4500.43	93.48	4619.56	93.73	4721.28	93.63	4768.6	93.84	4817.66	93.89
4891.64	93.64	4923.19	94.15	4967.37	93.78	5080.66	93.9	5114.81	93.75
5245.01	93.83	5319.74	93.75	5352.27	93.9	5422.21	93.75	5449.53	94.08
5463.19	93.69	5507.6	94.39	5541.75	94.02	5592.98	93.74	5647.63	93.81
5702.27	93.55	5778.19	93.56	5811.58	93.4	5869.68	93.48	5893.54	93.08
5923.32	93.04	5932.78	93.84	5954.87	94.33	5986.42	92.66	5995.89	93.09
6011.66	90.07	6027.44	89.53	6087.38	89.59	6093.69	89.43	6169.41	89.34
6182.03	89.57	6245.13	89.53	6295.6	89.36	6421.81	89.57	6437.58	89.41
6469.13	89.71	6481.75	89.54	6497.52	93.13	6510.14	94.88	6532.23	94.37
6595.33	94.25	6604.8	93.91	6626.88	94.03	6658.43	93.77	6683.67	93.95
6768.85	94.09	6803.56	94.73	6822.49	94.32	6926.6	94.14	6967.62	94.28
7043.34	93.8	7096.97	94.01	7112.74	93.72	7147.45	93.85	7201.09	93.48
7251.57	93.63	7324.64	93.14	7380.92	92.91	7421.93	92.27	7437.71	92.41
7469.26	92.1	7488.18	92.19	7544.98	93.71	7587.63	93.25	7608.12	94.11
7625.21	95.68	7635.46	95.65	7652.53	94.27	7672.6895.63695		7683.27	95.45
7696.93	93.58	7707.17	92.89	7734.51	92.82	7761.83	91.08	7768.98	91.21
7792.56	90.28	7819.89	90.31	7857.46	89.44	7873.1	90.04	7885.72	89.55
7923.58	89.27	7980.37	89.39	8008.78	90.29	8040.33	90.46	8065.57	91.65
8096.55	91.51	8112.91	92.55	8160.23	91.85	8179.16	92.03	8229.75	91.57
8257.07	92.23	8299.07	92.32	8315.14	91.85	8366.37	91.62	8403.94	91.65
8431.26	92.82	8448.34	93.08	8468.83	93.97	8482.5	93.85	8497.86	94.4
8513.64	93.96	8576.75	94.12	8601.99	93.69	8656.69	93.35	8665.09	93.49
8684.03	94.87	8696.65	93.21	8709.27	89.47	8762.91	89.25	8785	89.01
8841.8	89.2	8882.11	90.03	8892.28	90.62	8923.09	90.26	8942.77	89.49
8964.86	89.81	9002.72	89.93	9031.12	89.48	9053.21	91.81	9062.68	92.26
9087.03	92.05	9114.36	92.89	9144.72	93.39	9166.8	92.6	9185.73	90.67
9201.51	90.46	9214.13	91.11	9236.22	93.5	9271.47	93.48	9291.96	94.03
9326.11	93.67	9336.36	94.1	9352.97	93.9	9380.77	94.24	9404.67	95.43
9414.92	95.3	9428.58	93.3	9452.48	93.38	9466.15	93.95	9483.23	90.66
9490.06	89.81	9517.38	88.98	9541.29	89.25	9572.02	89.2	9602.77	89.67
9616.43	89.27	9660.83	89.78	9694.98	89.54	9712.06	90	9776.96	89.84
9787.2	90.15	9835.01	90.27	9862.35	90.01	9902	90.36	9944.31	90.38
9990.36	91.0210018.75		91.0910040.84		90.8610084.34		91.5810116.57		91.02
10163.9	92.5510193.64		93.2210233.32		93.1310245.94		92.3410279.03		91.44
10296.1	91.8110313.18		91.3810398.57		92.4510412.23		93.41 10449.8		92.85
10477.13	93.3310498.37		93.35 10517.3		92.9910562.51		93.5710610.33		93.43
10630.9	93.6110671.76		94.4310684.29		94.1610743.82		94.2110793.94		93.9
10815.88	94.4110832.19		94.1710862.82		94.810917.29		94.8310934.31		94.47
10944.53	94.7311009.21		92.9811033.04		93.1311046.66		93.811082.94		93.75
11111.34	94.4311132.71		91.8211148.32		91.5111177.83		89.6511187.33		89.68
11201.17	87.9111237.19		87.0411254.01		87.511263.31		87.1411277.56		84.67
11280.9484.6984811294.18			84.8111303.68		81.9711315.55		77.0711322.79		72.51
11345.9768.5793511359.76			67.2111366.23		59.4311409.21		60.4311442.06		60.13
11446.18	60.7411447.66		64.0311455.75		66.911466.14		72.5111474.39		73.9
11488.09	77.7411499.4978.71619		11508.3		80.3111524.47		91.1411532.21		93.97
11537.72	94.8911548.73		95.2811558.53		93.0711568.32		95.0411587.92		95.45
11614.04	95.0911643.43		94.1811676.94		93.8511690.12		93.3511719.76		93.39
11744.67	92.5411800.18		91.5211842.63		91.5811894.33		92.1811924.28		92.11
11950.33	92.5911960.21		92.4611983.06		93.0812005.92		92.3812032.04		92.5
12041.84	92.9912067.96		92.712074.49		93.2512116.95		93.8212139.82		93.35
12156.13	93.9512162.67		95.2412175.74		95.1612192.06		93.5412227.98		93.93
12254.1	93.3112270.44		93.6612286.77		94.8812296.57		94.2612309.63		94.62
12342.29	97.4612352.08		97.8412414.13		98.0712431.23		98.5412463.11		97.94
12479.44	98.3512499.04		98.0612515.36		98.2512531.69		97.812561.08		99.22
12569.57	99.3312629.66		99.0712645.99		99.5512655.79		99.1512671.68		100.09
12691.43	100.0312714.57		102.2612734.25		100.9912750.49		101.8112763.55		101.54
12783.14	97.9412799.47		97.38 12825.6		99.3612845.19		100.0612851.72		99.09
12877.85	98.1612907.24		98.73 12920.3		97.6612956.22		96.7312985.61		95.7
13008.47	95.9313041.13		95.4913060.72		95.8513090.11		95.8413099.91		95.53
13159.15	95.3613175.62		96.0413214.21		95.4613259.92		95.6113406.19		95.79
13517.91	95.8413570.88		96.1613623.58		96.1113664.86		96.3913705.93		95.91
13719.1	96.4913738.86		95.913782.42		96.3813818.35		96.1113828.14		95.4
13867.33	96.5313942.44		96.3313962.03		95.9614025.43		95.83 14038.6		95.61
14137.41	95.3814197.16		9514282.06		9514298.39		95.3414340.84		94.81
14376.77	95.1614406.16		96.0314432.28		95.93 14487.8		94.6114497.59		95.56
14504.12	94.8114523.72		94.44 14568.9		94.6214591.96		94.3914605.13		94.93
14634.75	95.3614657.61		95.3114745.78		94.515033.33		93.6615059.68		93.74
15157.26	93.6615173.59		94.0715225.84		94.0415245.43		94.3115317.28		94.13
15422	94.4315494.46		94.0515520.81		94.2615589.98		94.0715626.21		94.36
15686.29	94.3915712.42		94.7415725.48		94.5915777.72		94.9215929.24		94.95
15962.18	94.8416051.12		94.916084.05		95.2216143.42		95.1516189.46		95.26
16202.19	95.5516231.57		95.3816280.54		94.5116300.14		93.416322.99		93.45
16349.11	95.47 16358.9		95.2416365.43		94.1816381.76		93.2 16429.9		93.05
16449.66	93.3516456.25		92.916466.13		93.6 16482.6		93.4316496.03		95.61
16509.09	96.6516525.41		101.8716538.53		101.4316550.01		99.7616558.21		97.76
16615.59	97.76								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.09	7635.46	.1211111.34		.06611201.17		.01511488.09		.066
11548.73	.102								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

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     11111.3411548.73           881.09  1506.5  1723.2            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      011111.34   94.43       T
11548.7316615.59   95.28       T
Left Levee      Station=   84.22      Elevation=   107.2
Right Levee     Station=16525.41      Elevation=  101.86
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 5948.36 6506.02   94.23 7672.9810667.81   93.66

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 149

INPUT
Description: RGV-04, Updated on left with new survey to Station 1081.98.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     462
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   93.92      19    95.1      25   98.41      31  100.34      55  100.17
      67  102.32      77   106.4      81  107.08     100  106.72     132   95.45
     144    92.2     150   91.44     161   93.57     173   94.26     193   94.63
     200   93.84  206.99   94.84  236.99   94.84  257.99    94.5  416.99   94.15
  495.99   94.31  562.98   94.28  615.98   94.02  699.98   94.11  848.98    94.1
  886.98   94.17  938.98   93.85  987.98   93.78 1016.98   93.94 1081.98   93.95
 1150.64   94.23 1163.75   94.45 1239.15   94.01 1248.98   94.17 1288.32   93.91
 1324.38    94.1 1380.11   93.83 1399.78   93.52 1412.89   94.29 1429.28   94.24
 1442.39   91.87 1448.95    91.4 1504.68    91.5 1560.41   91.41 1645.64   91.51
 1678.42   91.34 1871.84   91.46 1927.57   91.32 1957.07   91.45 2032.47   91.22
 2045.58   91.69 2078.36   91.29 2094.75   92.26 2104.59   91.34 2111.14   91.63
 2137.37    91.3 2248.82   91.45 2268.49   91.61 2307.83   91.38 2347.16   92.02
 2379.94   91.69 2435.67   91.44 2468.45   92.17 2478.29   91.85 2501.23   92.03
  2520.9   96.32 2537.29   98.91  2550.4   98.19 2570.07   93.56  2596.3    92.9
 2612.69   92.84 2648.75   93.25 2720.86    93.5 2747.09   93.39 2868.38   93.73
 2956.88   93.71    3029   93.94 3153.57   93.69  3209.3   93.97 3258.47    93.9
  3297.8   94.32 3337.14   94.14  3373.2   94.28  3432.2   95.22 3448.59   95.69
 3474.82    95.9 3497.77   95.55 3543.66   94.35 3560.05   94.48 3586.27   95.54
  3612.5   95.52 3628.89   95.12 3635.44    94.3 3668.22   93.78 3723.95   93.31
 3792.79   93.21 3878.02    92.7 4028.88   92.68 4045.29   92.84 4137.13   93.03
 4206.02   92.78 4248.67   93.03 4271.63   92.85 4343.79   93.03 4406.12    92.9
 4435.64   93.18 4530.77   93.01  4625.9   93.34 4652.14   93.11 4878.49   93.44
 4911.29   93.24 4947.37   93.37 5108.11   93.32 5131.07   93.49 5196.68   93.44
 5206.52   93.29 5232.76   93.99 5245.88   93.23 5255.72    94.4 5262.28   93.93
 5288.53   94.81 5308.21   94.75 5321.33   94.04 5370.53   93.46 5423.02   93.69
  5475.5    93.3 5495.19   93.41 5580.48   93.24 5603.44   93.44 5652.64   93.47
  5659.2   93.16 5678.88   93.66 5701.85   93.67 5780.57   93.28  5826.5    93.5
 5954.43    93.2  6092.2   93.31 6252.94   93.08 6387.43   93.08 6462.88   92.89
 6495.68   93.14 6554.73   92.91 6590.81   93.02 6754.83   93.01 6830.28   92.77
 6915.56   92.77 6991.01   93.03 7033.66   92.63 7115.66   92.97 7223.92   92.92
  7243.6   93.22 7266.56   93.01 7286.24   92.22 7305.92   94.52 7322.33    97.6
 7332.17   97.49 7348.57   94.67 7368.25   97.63 7378.09   97.34 7391.21   93.78
 7401.05   92.54  7427.3   92.07  7443.7   90.31 7453.54   88.55  7476.5   87.86
 7483.06   87.12  7509.3   87.19 7525.71   86.01 7545.39   85.44  7627.4    85.8
 7666.76   85.54 7686.44   86.37 7712.68   86.39 7752.05   88.11 7775.01   87.79
 7784.85    88.5 7804.53   88.89 7827.49   88.11  7860.3    88.1 7873.42   88.54
 7902.94   87.84 7919.34   88.14 7929.18   89.14 7952.15   89.07 7984.95   88.44
 8001.35    88.7 8034.15   87.67 8070.24    87.7 8083.36   88.33 8096.48   89.92
 8112.88   90.35 8132.56   92.03 8145.69    91.1 8175.21   91.69 8204.73    91.9
 8247.38    91.8 8273.62    92.1 8290.02   91.81 8312.98    92.4 8329.38   93.65
 8339.22   94.95 8349.06   94.81 8365.46   92.71 8378.59   91.89 8417.95   91.51
 8460.59   91.55 8470.43   91.82 8513.08   91.81 8529.48   92.09 8549.16   93.09
    8559   94.05 8568.84   93.98  8591.8   92.82 8601.64   93.06 8660.69   93.05
 8709.89   93.77 8726.29   93.17 8752.54   94.06 8768.94   93.68 8805.02   94.15
 8834.54   93.44 8850.95    93.8 8860.79   93.41 8877.19   94.39 8903.43   94.13
 8923.11   95.12 8955.91   94.23 8965.75   95.09 8995.28   94.54  9008.4   95.32
 9031.36   98.18  9041.2   97.93 9054.32   93.98 9077.28   94.19 9090.41   95.44
 9106.81   89.05 9113.37   87.43 9139.61   85.61 9162.57   86.09 9192.09   85.97
 9221.62   86.49 9234.74   85.68 9277.38   86.89 9303.62   86.91 9310.18   86.42
 9326.58   87.33 9336.43   87.07 9369.23    87.4 9388.91   86.98 9398.75   87.51
 9444.67   87.81 9470.92   87.04 9480.76   87.28 9503.72   86.94 9536.52   87.34
 9549.64    86.9 9566.04   87.14 9654.61   87.09 9684.13   87.51 9720.22   87.32
 9746.46   88.21 9775.98   89.84  9789.1   90.92 9808.79   91.49 9825.19   91.08
 9871.11   88.68 9887.51    89.5 9903.91   88.54 9917.03   88.53 9946.56   89.31
 9966.24   90.13 9985.92   90.43 9999.04   92.1810018.72   92.0410035.12   90.81
10048.25   90.6810061.37   91.2910100.73   91.0510123.69   91.3110143.37   91.95
 10189.3   91.8410235.22    92.6 10271.3   92.5410327.07   91.9410350.03   91.91
10402.38   92.74 10431.8   94.0410461.23   93.6510484.11   94.0510500.46   93.47
10510.27   94.0910536.43   93.2110559.31   90.9410572.39   90.7810595.28   91.18
10608.36   92.3110627.97   91.9310634.51   92.7110670.48   93.2110680.29   92.01
10693.36   92.8710716.25    92.110726.06   89.0610739.14   88.2610758.75   89.06
10768.56   87.3510778.37   88.0810794.72   84.3210807.82   78.4210817.63   72.15
10824.18    70.710828.18    55.610840.18    55.610852.18    55.810865.18    55.9
10879.18    55.910890.18    56.110901.18    55.910913.18    55.910923.18    55.8
10931.18    57.610951.81    70.710961.62   71.83 10964.9   73.2810974.71   74.94
10991.08   75.5311000.89    77.111030.34   94.3111036.89   95.9411049.98    96.3
11066.34      9611099.07   96.3811167.79   94.9911177.63   95.2611190.75   94.73
11220.26   95.3811253.05   93.7711282.57   93.3611394.06   93.0811407.18   92.88
11449.81   93.2911459.65   92.7411489.16   92.8811531.79   93.5411564.59   93.46
11580.98   92.6111607.22   92.5111630.17   91.1311643.29   90.7811682.64   91.33
11708.88   90.7111738.39   91.0211777.74   93.5411797.42    93.511840.05   96.66
11869.56   95.9611922.03   96.1511928.59   96.3711971.22   95.9912020.41   95.88
12036.81   96.0212046.64   96.6312066.32   96.98   12086   96.8412154.86   96.99
12167.98    97.612187.65   96.9612210.61   98.5512230.28   96.43 12243.4      97
12256.52   96.6912286.03   96.8212345.06   96.6512364.74   96.7512495.91    96.4
 12545.1   96.5912620.52   96.3412653.31   96.0912669.71   97.3312676.27   96.31
12682.83   96.87 12718.9   96.1312761.53   96.2412804.16    96.112899.26   96.05
12932.05   95.7612955.01   95.8913033.71   95.6613063.23   95.8813115.69   95.58
13125.53   95.7113181.28   95.5713197.68   94.9113210.79   96.1313230.47   95.07
13240.31   95.6513315.73   95.5213361.64   95.6613404.27   95.3613515.77   95.36
13528.89   94.9813597.75   94.9113627.26   95.1313679.73   95.0313745.32   95.33
13873.21   95.4213902.73   95.6413965.03   95.7113987.99   95.95 14033.9   95.61
14056.85   95.8714079.81   95.2314086.37   96.3514092.92   95.9714119.16   96.07
14151.95    95.814184.75   95.9614283.12    95.414332.31   95.4914335.59   95.24
14388.06   94.9414420.85   94.9214456.93   94.5614496.28   94.4814519.23   94.17
14545.47   94.2714594.66   93.9414617.61   93.9814656.96   93.6614729.11   93.64
14817.65   93.2814837.33   93.4714866.84   93.2314906.19   93.4214978.33   92.95
15004.57   93.4715050.48   93.2715073.43   92.9415109.51   93.3715145.58   93.06
15260.35   93.3415355.45   93.1615381.69   92.85 15411.2   93.01   15444   92.75
15483.35   92.7515532.54   92.5315565.33   92.7915670.27   92.6615683.38   92.82
```

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15739.13   92.8215785.04   93.2115840.79   93.1315876.86   93.3315909.66   93.04
15929.33   93.6715935.89   92.7715945.73   94.1915962.12   93.4715971.96   95.18
15988.36   96.3916004.75   99.05

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 7368.25     .1210670.48     .0710817.63    .02510931.18     .07
11049.98    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10670.4811049.98          1249.78 1505.93 1342.39             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      010670.48   93.21       T
11049.9816004.75    96.3       T
Left Levee      Station=      81      Elevation=  107.08
Right Levee     Station=16004.75      Elevation=   99.04
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1429.86 2525.07   94.24 7382.54 9015.21    97.3

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            103.24    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.074      0.058      0.066
  W.S. Elev (ft)            103.22    Reach Len. (ft)          1249.78    1505.93    1342.39
  Crit W.S. (ft)             87.32    Flow Area (sq ft)       94504.57   10359.21   33948.05
  E.G. Slope (ft/ft)      0.000090    Area (sq ft)           100657.60   10359.21   42128.14
  Q Total (cfs)           125000.00    Flow (cfs)             77168.42   21759.79   26071.79
  Top Width (ft)          15894.81    Top Width (ft)         10560.54     379.50    4954.77
  Vel Total (ft/s)            0.90    Avg. Vel. (ft/s)           0.82       2.10       0.77
  Max Chl Dpth (ft)          47.62    Hydr. Depth (ft)           8.95      27.30       6.85
  Conv. Total (cfs)       13208630.0    Conv. (cfs)            8154312.0   2299335.0   2754981.0
  Length Wtd. (ft)         1367.15    Wetted Per. (ft)       10570.67     405.12    4960.63
  Min Ch El (ft)             55.60    Shear (lb/sq ft)           0.05       0.14       0.04
  Alpha                       1.61    Stream Power (lb/ft s)     0.04       0.30       0.03
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)    97253.73   41256.93   130227.60
  C & E Loss (ft)             0.03    Cum SA (acres)          14254.77    1890.04   16097.55


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 148.34*

INPUT
Description: RGV-04,
Station Elevation Data    num=     465
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   94.57    14.6   97.34   27.94  100.37   42.68  100.11   49.57  100.55
   60.38  102.65      73  107.06   88.99  106.68      92  106.19     124   95.34
  133.99   92.26     142    91.1  161.23   94.16  184.47   94.39  198.29   94.46
  227.93   94.49  345.48   94.16  473.04   94.24  480.12   93.76  488.22   94.25
  513.52   94.29  553.01   94.07  655.26   93.93  715.99   94.02  796.99      94
  837.48   93.67  870.02   93.75  921.39   93.65  998.44    93.8 1071.94   93.83
 1091.97   94.14 1126.25      94 1161.18   94.14 1223.39   93.79  1249.1   94.16
 1266.24   92.75 1288.15   92.66 1484.38   92.65 1534.41   92.55 1561.34   92.63
 1611.37    92.5 1709.07   92.54 1774.78   92.42  1786.2   92.67 1814.77   92.45
 1829.06   92.92  1866.2   92.35 1903.79   92.24 1949.96   92.52 2014.76   92.34
 2049.03   92.67 2126.17   92.41 2154.74   92.74  2183.3   92.64 2200.45   94.77
 2214.73   96.08 2226.15   95.74  2243.3   93.46 2280.44   93.23  2315.5   93.46
 2374.71   93.43 2438.63   93.04 2488.65   92.06 2503.27   92.26 2542.52    92.1
 2584.84   92.41 2627.17   92.34 2646.41   92.52 2704.12   92.59 2719.52   92.75
 2746.45   92.39 2784.92   92.38 2815.71   92.53 2854.19   92.44 2865.73   92.91
 2877.27   92.65  2911.8   92.71 2977.31   93.22 2988.85   92.92  3008.1   93.73
 3046.57   93.15 3085.04    93.1 3106.07   93.67 3131.22   94.93 3181.24    92.9
 3227.42   92.44    3339    92.4 3383.18   92.22 3446.73   92.17 3514.65   92.22
 3554.47   92.37 3608.99    92.4 3662.21   92.26  3706.2   92.49 3843.42   92.37
 3869.14   92.53 3952.05   92.51 4034.95    92.6 4057.82   92.47 4143.17    92.5
 4185.49   92.62 4255.09   92.66 4283.67   92.56  4455.2    92.7 4474.07    92.8
 4540.97   92.64 4563.83   93.01 4575.27   92.64 4612.44   93.47 4641.02   93.05
  4683.9   92.69 4729.65   92.87 4775.38   92.65 4866.87   92.65 4952.63   92.85
 5041.25   92.75 5082.01    92.9 5192.77   92.73 5282.08   92.84 5324.41   92.76
 5432.13   92.82 5497.55   92.71 5528.33   92.78 5635.88   92.68 5664.47   92.86
 5715.93   92.72 5747.38    92.8 5890.01    92.9 5956.07   92.78 6036.21   92.79
 6096.15   92.96 6133.32   92.74 6204.78   92.87 6336.29   92.86 6353.44   92.47
 6370.59   93.62  6384.9   95.16 6393.47   95.11 6407.76    93.7 6423.8495.15327
 6433.49   95.16 6444.92   93.45  6453.5   92.88 6476.38   92.88 6490.23   92.26
 6497.92   90.94 6501.77   91.42 6524.97   90.35 6547.84   90.35 6579.29    89.5
 6605.66   89.45 6650.76   89.65 6685.07   89.47 6702.22   89.91 6725.09   89.99
  6759.4   90.75 6779.41   90.54 6805.13   91.16 6825.14   90.75 6853.74   90.73
 6865.17   90.94  6890.9   90.49 6913.77   91.01 6933.78   90.86 6948.08   90.44
 6976.66   90.48 7005.25   89.76  7036.7    89.8 7059.57   90.91 7073.86   91.08
 7091.01   91.86 7102.45   91.36 7153.91   91.64 7228.24   91.57 7248.25   91.97
 7271.12   93.27 7279.69   93.02 7293.98   91.89 7355.93   91.39 7386.71   91.68
 7422.63   91.65 7436.93   91.82 7462.65   92.91 7491.24   92.64 7536.76   92.96
 7551.28   92.83 7594.15   92.89 7608.45   92.55 7631.32   92.92 7645.62   92.69
 7677.06   92.84 7702.79   92.47 7725.66   92.45 7739.96   92.92 7762.82   92.71
 7779.98   93.17 7808.56   92.73 7817.14   93.18 7842.87   93.01 7854.31    93.4
 7874.32   94.82 7882.89   94.69 7894.33   92.71 7914.33   92.81 7925.78   93.43
 7940.07   90.22 7945.79    89.4 7968.66   88.47 7988.67   88.69 8014.39    88.6
 8040.13   88.84 8051.56   88.47 8088.72   89.07 8117.31   88.81  8131.6   89.28
 8234.52   89.48 8257.39   89.12 8285.98   89.09 8314.56    89.3 8340.29   89.18
 8417.48   89.11 8448.65   89.37 8474.66   89.23 8497.53   89.66 8534.69   91.09
 8551.85   91.32 8566.14   91.08 8606.16   89.85 8620.45   90.27 8648.72   89.74
 8689.06   90.62 8706.21   90.77 8717.65   91.64  8734.8   91.56 8749.09   90.94
 8771.97   91.17 8806.27   91.09 8843.43   91.56 8883.46   91.52 8906.51   91.74
 8954.92   91.84 9003.53   91.48 9023.54   91.53 9069.16   91.99  9094.8   92.67
 9120.45   92.55 9140.39   92.94 9154.64   92.79 9179.69   93.38 9205.92   91.34
 9237.27   91.15 9248.67   91.58 9264.34   91.61 9283.57   94.07 9302.81   94.36
 9318.71   91.98 9334.62   89.13 9345.2986.05899 9350.52   85.15 9364.15   83.79
 9370.96   81.84 9377.78   80.93 9396.37   75.17 9405.06   69.08 9409.62   67.12
 9412.39   58.82 9418.39   58.82  9452.9   60.95  9459.8   60.61  9487.4   61.47
 9493.61   62.39 9525.38   64.98 9543.48   68.74 9559.33   68.55 9566.12   67.47
 9583.59   67.44 9591.02   68.04 9609.13   72.87 9622.71    78.7 9636.29    79.1
 9643.8481.19987 9647.61    81.1 9656.66   78.13 9667.98   76.99 9674.77   77.11
 9699.67   79.44 9706.46   81.76 9731.35   87.48 9742.67   88.35  9763.6   92.45
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 9781.14   94.45 9799.25      95  9827.4   94.51 9844.28   94.69 9852.72   94.32
 9872.43   95.08 9892.13    94.5 9903.38   93.68 9940.38   93.83 9959.68   94.33
10004.71   93.4410030.03   92.1610063.81   91.8510097.58   91.9310122.91   91.58
10142.62   92.2210196.09    91.4 10218.6   91.3810243.93   90.5810269.27   90.68
10280.52   91.3810305.85   91.3910322.74   91.1210356.51   91.4210387.47   91.43
10435.37   90.7610460.65   90.79 10494.3   89.7810510.02   89.6110557.16   90.12
10588.59   89.1710623.95   88.9810671.09   90.1110694.66   90.2310745.73   91.56
10809.64   91.3110823.71   91.5610891.26   91.5210955.99   91.27 10978.5      91
11012.28   91.4511057.31   90.4911091.09    90.211107.97   90.7111116.41   90.42
11127.67   90.9511155.82   90.3711167.07   90.7411178.33   92.0311189.59   95.16
11195.22   95.8211213.22   96.1211223.36   96.6511248.69   95.8811259.95   96.11
11276.84   95.8511313.42   96.39 11327.5   96.78 11347.2   96.7511358.45   96.14
11378.16   96.2311403.49   95.9411431.63   96.1811507.62   95.9111558.28   96.01
11594.87   95.82 11620.2   95.8811653.98   95.6411682.12   95.85   11699   95.53
11719.99   95.4911739.64    96.3 11747.5   95.8611755.36   96.2211865.05   96.25
11887.57    96.611904.46   96.4411941.05    96.611969.19   96.3911980.45   96.04
12000.15   96.3612011.41   96.0112031.11   96.1212059.25   95.7712078.96   96.03
12101.47    95.8 12126.8   95.9312143.69    95.612191.53   95.5512214.05   95.82
12245.01   95.1712270.34   95.3912323.81   95.3512352.49    95.212372.13   94.79
12387.84   95.3612411.42   94.77 12423.2   95.0312523.64   94.7212568.55    94.7
12667.18   94.2612700.95   94.35 12753.2   94.1912779.75   94.5612802.26   94.53
 12827.6   94.7912841.67   95.4312851.41   95.0212900.78   95.1912954.25   95.07
13007.72   95.4613047.13    95.3 13100.6    95.413114.67   95.6213142.82   95.16
13170.96   94.9913213.18   95.213249.76   95.13 13318.9   95.39 13373.9   95.22
13407.38   95.48 13428.9   95.0413436.76   95.66 13452.4   95.3313517.14   95.34
13534.03   95.8113590.31   94.7113612.83   94.7713663.49   94.51   13686   94.67
13702.89   95.5513731.39    95.513747.93   95.24 13781.7   95.4413837.46   95.42
13897.09   95.2413955.31   94.8613986.75   94.9214026.55    94.714073.17   94.67
14120.31   94.4114220.75    94.3 14248.9    94.114336.39   93.8914371.74   93.71
14418.88   93.64 14505.3   93.1214536.74   93.3114591.74   93.1114619.23    92.9
14662.45   93.1314705.66   92.9414772.38   93.0714907.48   93.1114988.52   92.95
15098.86    93.215208.62   93.2115222.69   93.6615231.14   93.0715253.66   93.31
15321.21   93.1315349.93   93.2215428.15   93.1815439.41    93.315581.72   93.34
15621.01    93.215644.57   93.5215652.43   93.0715664.22   93.7815678.64   93.67
15684.27   92.8815701.16    94.415712.41   96.2715718.04   98.1815734.92   99.88

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .105 9302.81    .066 9364.15    .015 9799.25    .06611223.36    .095

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9302.81 9799.25          1249.78 1505.93 1342.39             .1       .3
Left Levee      Station=      73      Elevation=  107.06
Right Levee     Station=15734.92      Elevation=  99.875
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 9280.55   94.37 9794.61 11235.8   94.9511941.05   16000    96.6

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 147.68

INPUT
Description: RGV-04, Updated on left with new survey to Station 1061.90.
          Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     451
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   95.23      13   99.75      22  100.49      38     100      51  101.98
      65  107.03   80.99  106.58  100.99  100.43  125.99   91.78  133.99   90.76
  144.99   91.77  152.99   94.26  193.98   94.05  256.98   94.29  334.97   94.03
  371.97   94.19  460.96    94.2  463.96   95.31  467.96   93.21  471.96   95.14
  475.96   94.19  500.95   94.28  539.95   93.88  620.94   93.91  640.94   93.79
  700.93   93.93  780.93    93.9  820.92   93.24  979.91   93.66  1061.9   93.72
 1082.53   94.11 1102.21   93.87 1161.26   93.85 1184.22   93.98 1253.11   93.72
 1269.51   93.95 1312.16   93.72 1335.12   93.85 1377.77   93.55 1433.53   93.67
  1489.3   93.57 1528.67   93.65 1577.87   93.56 1627.08   93.12 1666.44   93.61
 1712.37   93.28  1807.5    93.4 1876.39   93.21 1912.48   93.31    1942   93.62
 1978.08   93.65 2053.53   93.22 2083.06   92.55  2109.3   91.02  2125.7   90.44
 2138.82    90.8 2171.63   90.48 2207.71   91.09  2243.8    90.8  2260.2    91.1
  2309.4   91.38 2322.53   91.73 2345.49   91.08 2378.29   90.87 2404.54   91.11
 2437.34   90.84 2447.18   91.65 2457.02   90.98 2525.91   91.69 2542.31   91.54
 2552.15   90.72 2568.56   91.79 2601.36   90.65 2634.16   91.65 2673.53   94.32
 2699.77   92.26 2716.17   91.68 2755.54   91.37 2768.66   91.55 2824.43    91.6
 2850.67    91.8 2942.52   91.64 3034.37   91.83 3126.22   91.72 3175.43   92.02
 3204.95   91.91 3290.24   91.84 3359.13   92.04 3421.46   91.88 3536.27   91.75
 3572.35   91.92 3683.89   91.86 3818.38   92.11 3870.87   91.99 3939.76   92.13
 4005.37    91.9 4028.33   92.05 4107.06   91.98 4159.54   92.08 4238.27   92.03
 4336.68   92.31 4484.29   92.24 4507.25   92.39 4543.34   92.22 4635.18   92.52
 4690.95   92.34 4717.19   92.47 4792.64   92.39 4841.84   92.61 4861.52   92.51
 5025.54   92.78 5058.34   92.71 5123.94   92.96 5150.19   92.79 5169.87   92.95
 5268.28   92.78 5337.16   92.75 5343.72   92.94 5399.49    92.7 5471.65   92.74
 5517.58   93.38 5537.26   94.16 5543.82   93.05  5547.1   94.37 5553.66   93.63
 5589.74   93.49  5596.3   93.75 5635.67   93.32 5688.15   93.56 5707.83   93.35
 5734.07   93.62 5789.84   93.24 5799.68   93.44 5865.29   93.32 5917.77   92.62
 5927.61   92.13 5947.29   92.33 5976.81   91.85 6019.46   91.92 6088.34   91.41
 6160.51   91.25 6199.87   91.75 6216.27   90.93  6245.8   91.58 6275.32   91.25
 6301.56   91.54 6337.65   91.48 6377.01   91.89 6390.13   92.46 6429.49   92.87
 6468.86   92.07 6550.86   91.51 6600.07   91.48 6629.59   91.22 6665.67   91.24
 6691.91   91.49 6764.08   91.41 6855.93   91.18 6878.89   91.31 6921.53    91.2
 6980.58   91.31 7013.38   91.13 7078.99   91.27 7197.08    91.1 7206.92   91.26
    7243   91.08  7275.8   91.28 7321.73   90.99 7367.65   91.07 7377.49   90.88
 7410.29   91.12 7495.58   91.04 7518.54   91.17 7597.27    91.2 7613.67   90.94
 7649.75   91.22 7685.84   90.98  7692.4   91.14  7774.4   91.33 7823.61   92.44
 7830.17   93.31 7849.85   91.72 7866.25   91.83 7885.93   90.76 7902.34   91.26
 7918.74   95.23 7935.14   95.52 7938.42    94.8 7948.26   88.33 7971.22   77.75
 7981.06   71.21 7987.62    70.7 7996.61   62.04 8006.61   62.84 8016.61   63.84
 8026.61   64.14 8046.61   66.04 8056.61   65.34 8066.61   66.04 8076.61   66.54
 8096.61   67.04 8105.61   68.84 8125.39    70.7 8135.23   72.28 8151.64   74.02
 8177.88   81.59    8191   80.83 8200.84   81.25 8210.68   79.12 8220.52   79.29
 8246.76   75.88 8273.01   79.21 8289.41   85.75 8292.69   86.59 8305.81   85.85
 8312.37   86.54 8322.21   89.57 8328.77   88.66 8341.89   81.87 8358.29   78.94
 8368.13   79.03 8404.22    82.7 8414.06   86.75  8423.9   88.58 8433.74   89.07
 8450.13   91.03 8466.53   89.13 8502.61   90.86 8522.28   92.88 8548.52   93.69
 8581.32   92.94 8600.99   93.14 8610.83   92.32 8633.79   94.03 8656.75   93.19
 8669.86   91.75 8686.26   91.85 8719.06   92.85 8735.46   93.65 8751.85   92.79
 8761.69    92.8 8774.81   91.85 8787.93   91.56 8797.77   90.66 8817.44   90.04
 8833.84   90.61  8856.8   90.18 8896.15   90.54 8925.67   89.89 8948.63   91.21
  8968.3   91.08 8978.14   90.46 9010.94   89.69 9037.17   89.78 9050.29   88.77
 9066.69   88.15 9096.21   88.14 9109.32   89.58 9138.84   89.98 9158.52   89.37
 9197.87   89.56 9210.99    89.2 9233.95   89.35 9270.02   88.81 9319.22   89.05
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 9332.33   88.39 9381.53   88.45 9437.28   88.96 9443.84   88.39  9466.8   87.67
 9499.59      87 9568.46   86.65 9597.98   87.04 9607.82   86.74 9643.89   86.42
 9699.64   86.75 9725.88   86.58 9742.28   87.04 9761.96   86.62 9794.75   86.67
 9820.99   86.97 9834.11   86.39 9847.22   86.73 9896.42   86.65 9922.65   86.01
 9962.01   85.9810014.48   84.1110053.84   83.4710073.51   84.4510083.35   83.86
10096.47   84.7310106.31   84.0510129.27   83.6110142.38   84.24 10155.5   86.16
10162.06    88.410168.62   91.7710175.18    93.610198.14   96.0310207.97    96.5
10237.49   95.0510250.61   95.4810270.29    94.910312.92   96.0510329.32   96.85
10352.28   96.8510365.39    95.610388.35   95.7110417.87    95.210424.43   95.57
10450.66   95.7410539.21   95.3610552.33    95.610572.01   95.3510598.24   95.53
10640.88   95.0610670.39   95.2610703.19   95.1610709.75   94.8610742.54   95.37
10762.22   94.8310785.18   94.8710857.33   96.0410890.12   96.3510955.71    96.3
10981.95   97.0711001.63   96.7911044.26   97.1211077.06   96.7211090.17   96.01
11113.13   96.6611126.25   95.9611149.21   96.3111168.88   96.21   11182   95.75
11204.96   96.1911224.64   96.23 11231.2   95.7611260.71   96.0811280.39   95.46
11306.63   95.6711336.14   95.3511362.38   95.7811398.45   94.6311411.57   94.59
11427.97   95.1911490.28   95.0611546.03   94.67 11614.9   94.3811641.14   94.38
11716.57   94.0611723.13    93.911837.91   93.5511890.39   93.1511929.74   93.33
11995.33   92.9912021.57   94.15 12047.8    94.112077.32   94.6512093.72   95.94
12103.56   95.1412146.19   95.0512162.59   95.2812211.78   95.25 12224.9   95.09
12260.98   95.2612287.21   95.6612333.13   95.2512395.44   95.4212411.83   95.86
12444.63   94.9212477.43   94.5612493.82   94.7912516.78   94.5512526.62   94.79
12569.25   94.5812588.93   94.8212621.73   94.7512684.04   94.9412736.51   94.76
12752.91   95.2312779.15   94.8312798.82   95.1612805.38   94.6712880.81   94.87
12900.49   95.7512939.84    94.612966.08   93.6212992.32   93.8613051.35   93.58
13077.58   93.9113097.26   95.6613113.66   95.4113136.62   95.5513149.74    95.3
13189.09   95.8713248.12   95.9313294.04   95.8313323.55   95.9513330.11   95.31
13339.95   95.73 13395.7   95.5413415.38   95.6213474.41   95.3513546.56   95.37
13569.52   95.1713625.27   95.1613654.79   94.99 13700.7   95.01 13733.5   94.71
13789.25   94.6513825.32   94.31 13861.4   94.3313904.03   93.9513953.23   93.78
14018.82   93.3314156.56   92.8614231.99   92.9114268.06   92.8214343.49   92.94
14428.76   92.8614500.91   92.9814546.83   92.8114579.62   93.0314628.81   93.08
14723.92   93.6514750.16    93.614809.19   93.8914841.99   93.8914851.82   93.64
14858.38   94.5214868.22   94.5414878.06   93.38 14904.3   93.8814927.25   93.68
14946.93   93.8314983.01   93.5815071.55   93.6615107.63   93.4515120.75   93.61
15186.34   93.4115202.74   93.56   15288   93.3415386.39   93.3815399.51   93.67
15406.07   92.2315415.91    92.115425.75   93.2815438.86   96.3315445.42   99.59
 15465.1  100.71

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .105 7935.14    .066 7987.62    .015 8105.61    .066 8548.52    .095

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7935.14 8548.52          1070.14    1752 1559.36             .1       .3
Left Levee      Station=      65      Elevation=  107.03
Right Levee     Station= 15465.1      Elevation=  100.71
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   45.07 7932.39    95.5 8536.3410203.94   93.7410203.9410970.14    96.5
11024.23 15549.3    96.3

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            102.92    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.105      0.058      0.095
  W.S. Elev (ft)            102.87    Reach Len. (ft)          1070.14    1752.00    1559.36
  Crit W.S. (ft)             89.24    Flow Area (sq ft)       57749.09   14290.53   49348.16
  E.G. Slope (ft/ft)      0.000199    Area (sq ft)            57749.09   14290.53   49348.16
  Q Total (cfs)           125000.00     Flow (cfs)             43577.48   41132.03   40290.49
  Top Width (ft)          15372.06    Top Width (ft)           7842.10     613.38    6916.58
  Vel Total (ft/s)            1.03    Avg. Vel. (ft/s)            0.75       2.88       0.82
  Max Chl Dpth (ft)          40.83    Hydr. Depth (ft)            7.36      23.30       7.13
  Conv. Total (cfs)       8872154.0     Conv. (cfs)            3093009.0   2919438.0   2859708.0
  Length Wtd. (ft)          1469.16    Wetted Per. (ft)         7843.33     631.51    6919.95
  Min Ch El (ft)              62.04    Shear (lb/sq ft)            0.09       0.28       0.09
  Alpha                        2.96    Stream Power (lb/ft s)      0.07       0.81       0.07
  Frctn Loss (ft)              0.26    Cum Volume (acre-ft)    92761.85   40372.13   127603.40
  C & E Loss (ft)              0.00    Cum SA (acres)          13726.80    1855.72   15731.71


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 147.34*

INPUT
Description: RGV-04,
Station Elevation Data    num=     450
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    94.5   14.38   98.05   25.88   98.56   37.39  100.15   55.36  101.04
    71.9  106.85   89.82   106.1  108.92  100.11  134.63   91.51  142.86   90.51
  153.71   92.21   161.6   94.32  175.67   93.92  202.02   93.77   287.9   93.91
  337.66   93.71  368.37   94.16  391.66   93.74  465.34   93.69   468.3   94.58
  472.24    92.9  476.19   94.44  480.13   93.68  504.78   93.74  543.24   93.44
  623.12   93.51  780.91   93.41  820.35   92.88  977.16   93.22 1069.55   93.32
  1087.7   93.59 1150.45   93.35 1165.39   93.55 1204.24   93.38 1225.15   93.47
    1264   93.23 1314.78   93.31 1365.58   93.22 1401.44    93.3 1446.25   93.23
 1491.07   92.87 1526.92   93.24 1568.76      93  1655.4   93.08 1718.15   92.89
 1751.02   92.98 1777.91   93.24 1810.77   93.28 1879.49   92.93 1906.39   92.39
 1930.29   91.17 1945.23   90.69 1957.18   90.97 1987.06   90.69 2019.93   91.19
  2052.8   90.97 2067.73   91.23 2108.79   91.48 2124.51   91.72 2145.42    91.2
 2175.29   91.04  2199.2   91.24 2229.08   91.02 2238.04   91.66    2247   91.12
 2309.75   91.59 2324.69   91.45 2333.65    90.8  2348.6   91.65 2378.47   90.78
 2408.35   91.63 2444.21   93.84 2468.11    92.3 2483.04   91.92  2518.9   91.69
 2530.85   91.82 2577.91   91.81 2610.26   91.56 2689.21   91.44 2772.87   91.59
 2856.53    91.5 2901.35   91.74 3005.92    91.6 3068.67   91.76  3133.3   91.72
 3165.65   92.04 3230.01   91.94 3262.87   92.08 3397.51   92.12 3429.86   92.25
 3597.52   92.35 3657.28   92.14 3688.68   92.36  3742.6   92.24 3769.55    92.3
 3872.01   92.25 3959.04   92.54 4093.49   92.54  4114.4   92.67 4147.28   92.55
 4254.84   92.75 4281.72   92.63 4314.15   92.81 4335.71   92.61 4373.47   92.92
 4395.04   92.77 4421.99      92 4443.56   91.87 4586.48   92.07 4616.35   92.02
  4676.1   92.22 4700.01   92.08 4734.73   92.38 4745.51   92.87 4767.08   92.79
 4799.42   91.88 4876.28   91.98 4927.08   91.76  4992.8    91.8 5034.64   92.31
 5052.56   92.93 5058.54   92.04 5061.53    93.1  5067.5   92.51 5100.36    92.4
 5106.34    92.6  5142.2   92.26    5190   92.45 5207.92   92.28 5263.15   93.26
 5300.89   93.55 5333.24   92.65  5354.8   93.06 5399.14   92.64  5408.1   92.25
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 5426.03   92.42 5452.92   92.06 5491.76   92.15 5570.49   91.73 5620.23   91.69
 5656.08   92.09 5671.02   91.42 5697.92   91.94 5724.81   91.69 5748.71   91.93
 5781.58    91.9 5817.43   92.24 5829.38   92.69 5865.23      93 5901.09   92.37
 5975.77   91.94 6080.35   91.72 6104.25   91.92 6169.98   91.88 6253.64    91.7
 6274.55   91.81 6313.39   91.73 6367.17   91.84 6397.05   91.69 6456.81   91.79
 6564.37   91.66 6573.33    91.8 6606.19   91.59 6636.07   91.76  6677.9   91.56
 6758.57   91.64 6799.86   91.48 6928.87    91.6 6943.81   91.39 6976.67   91.59
 7015.52   91.51 7090.21   91.67 7135.03   92.54    7141   93.23 7158.93   91.96
 7173.87   92.05 7191.79   91.19 7206.74   91.69 7221.67   95.04 7236.61   95.46
 7239.93   94.79  7249.9   88.47 7258.49   83.69 7273.14   77.06 7283.11   71.39
 7285.0771.18929 7289.75   70.71 7295.99   65.71 7298.85   60.53 7320.54    62.3
 7339.29   63.38 7353.06   64.57  7363.9   64.17 7379.73   65.02 7389.18    67.2
 7399.19   67.91 7417.03   71.43 7420.2171.58426 7438.47   72.47 7456.76   74.63
 7466.93   75.52 7495.38   82.12 7509.61   81.85 7520.27   82.32 7530.94   80.75
 7541.61   81.09 7570.06   77.97 7598.52   80.46  7616.3   85.55 7619.86   86.23
 7634.08   85.68 7641.19    86.3 7651.86   88.84 7658.97   88.18  7673.2   82.83
 7690.98   80.67 7701.65   80.75 7740.77   83.88 7751.44   87.11 7762.11   88.66
 7772.78   89.21 7790.55   90.89 7808.33   89.55 7822.16    89.9 7847.45      91
 7868.77   92.89 7897.22   93.77 7937.53    93.1 7955.25   92.95 7966.13   92.23
 7991.52   93.49 8016.91   93.25 8031.41   92.23 8049.54   92.22 8085.82   92.94
 8103.95   93.58 8122.08   92.92 8132.96   92.94 8147.47    92.2 8161.98   91.94
 8172.86   91.22 8194.61   90.73 8212.75   91.15 8238.14   90.78 8281.66   91.04
  8299.690.75969  8314.3   90.53 8339.69   91.55 8361.45   91.44 8372.33   90.94
  8408.6   90.36 8437.61   90.43 8452.12   89.62 8470.25   89.11  8502.9   89.08
  8517.4   90.22 8550.04   90.51  8571.8   90.01 8615.32   90.14 8629.83   89.86
 8655.22   89.96 8695.11   89.51 8749.52   89.68 8764.02   89.13 8818.43   89.19
 8880.08   89.62 8887.33   89.18 8912.72   88.63 8948.98   88.08 9025.15   87.76
 9057.79   88.08 9068.67   87.84 9108.56   87.54 9170.21   87.76 9199.23    87.6
 9217.37   87.97 9239.13    87.6 9275.39   87.62 9304.41   87.85 9318.92   87.35
 9333.42   87.59 9387.83   87.55 9416.83   87.04 9460.36   87.03 9518.39   85.55
 9561.91   85.06 9583.67   85.86 9594.55   85.38 9609.06   86.07 9619.94   85.51
 9645.33   85.18 9659.83   85.69 9674.34   87.21 9681.59      89 9688.85   91.69
  9696.1   93.18 9721.49   95.09 9732.36   95.47 9765.01   94.29 9779.52   94.65
 9801.28   94.19 9848.42   95.08 9866.56   95.75 9891.95   95.74 9906.45   94.73
 9931.84   94.85 9964.49   94.45 9971.74   94.7410000.75   94.8810098.67   94.57
10113.18   94.7810134.94   94.6110163.95   94.7510211.11    94.410243.74   94.56
10280.01   94.4810287.27   94.2210323.53   94.6110345.29   94.1410370.68    94.2
10450.47   95.1710486.73   95.4910559.27   95.6510588.29   96.3510612.29    96.1
10657.19   96.4310693.46   96.0810707.96    95.510733.35   96.0110747.86   95.45
10773.25   95.7410795.01   95.6510809.52   95.2710834.91   95.6210856.67   95.65
10863.92   95.2810896.56   95.5210918.32   95.0210947.34   95.2710979.97   94.99
11008.99   95.2411048.88   94.3411063.39   94.3211081.53    94.811150.43   94.75
11212.09   94.4611317.27    94.211407.94   93.7511563.15   93.3311608.21   92.95
11615.33   93.1511686.46   92.9911708.96   92.7311737.97   93.6611766.98   93.57
11799.63   94.2111817.76   95.1111828.64   94.4711875.79   94.1811902.21   94.64
11970.96   94.4212006.53   94.7612031.74   95.29 12065.8   95.0312151.43   95.19
12169.55   95.5412205.82   94.81 12242.1   94.5212260.22    94.712285.61   94.48
12296.49   94.6612343.64   94.44 12365.4   94.6312401.67   94.5412480.68   94.58
12528.61   94.3912546.74   94.7812575.76   94.4412597.51   94.6812604.77   94.29
12688.18   94.3512709.95   95.0412753.46   94.0812782.48   93.28 12811.5   93.47
12876.78   93.2912905.79   93.56 12933.5   95.4512971.08   95.6312985.58   95.42
 13029.1    95.813111.31   95.8513145.16    95.7 13177.8   95.8113185.05   95.29
13195.93   95.6113257.59   95.4213279.35   95.4713344.63   95.2513424.42   95.14
13544.11    94.813594.88   94.7813628.13   94.4913637.62   94.63 13692.8    94.4
13732.69    94.113786.97   93.9913952.93   93.0314009.82   92.8614107.03   92.71
14197.12   92.7814218.45   92.6614275.35   92.7314400.02    92.514438.93   92.57
14536.13   92.4414557.47   92.7114628.59   92.9214664.16   93.27 14685.5   92.99
14704.46   93.4114755.45   93.2114820.73   93.42   14857   93.4214867.87   93.22
14875.12   93.93   14886   93.9414896.89   93.01 14925.9   93.4514951.28   93.27
14973.05   93.3715012.95   93.1115110.86   93.1415150.76   92.9515165.27   93.08
 15237.8   92.9815255.94   93.1415350.23   93.1515441.76   93.2415473.54   93.42
 15480.8   92.2515491.68   92.1115502.56   93.0115517.06   95.7915524.31    97.9
15546.08  100.79 15554.6  100.5615558.54   99.2715577.55   99.2715586.08   99.88

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .105 7236.61    .066 7283.11    .015 7417.03    .066 7966.13    .095

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7236.61 7897.22          1070.14    1752 1559.36             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 7236.61   95.46       T
Left Levee      Station=    71.9      Elevation=  106.85
Right Levee     Station=15546.08      Elevation= 100.786
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1890.99 7205.97   92.97 7903.61 9776.25   93.81

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 147.01*

INPUT
Description: RGV-04,
Station Elevation Data    num=     451
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   93.76   15.76   96.35   28.37   96.67   40.97  100.17   60.68  100.25
   71.71  103.74    78.8  106.67   93.53  106.58   97.22  106.06  143.39   91.22
  151.72   90.27   170.2   94.37  184.08   93.66  210.06   93.49  252.99   93.45
  294.75    93.6  343.82   93.37   374.1   94.17  397.06   93.29  469.71   93.18
  476.52   92.58  480.41   93.74   484.3   93.16  508.61    93.2  546.53      93
   625.3    93.1   780.9   92.93  819.79   92.52  974.41   92.78  1077.2   92.93
 1115.18   93.08 1150.22   92.91 1177.81   92.98 1221.59   92.86 1274.21   92.95
 1314.63    92.9 1355.07   92.63 1387.41   92.86 1425.14   92.72 1503.31   92.77
 1559.91   92.57 1613.82   92.86 1643.47    92.9 1705.46   92.65 1729.72   92.24
 1764.76   90.94 1775.54   91.14  1802.5    90.9 1832.14   91.28 1861.79   91.15
 1875.27   91.36 1926.48    91.7 1945.35   91.32  1972.3   91.21 1993.87   91.36
 2020.82    91.2  2028.9   91.68 2036.99   91.27 2093.59   91.48 2115.15   90.87
 2128.63   91.51 2155.58    90.9 2182.53   91.62 2214.88   93.35 2236.44   92.34
 2282.27   92.01 2335.49   92.03 2364.67   91.32  2435.9   91.23 2511.37   91.35
 2586.83   91.28 2627.27   91.46  2721.6   91.35  2778.2   91.47 2817.06    91.4
 2836.51   91.57 2865.69   92.25 2923.75   92.12  2953.4   92.24 3074.85   92.31
 3104.04   92.51 3123.49   92.38 3155.55    92.5  3191.6    92.4 3201.32   92.67
 3309.19   92.37 3337.52   92.67 3386.15   92.49 3410.47   92.59 3500.55   92.46
  3609.9   92.84 3629.36   92.71 3721.56   92.95 3770.42   92.83 3857.97   92.87
 3901.75   93.16  3921.2   92.79 3955.26   93.46 3974.71   93.05 3999.03    91.4
 4018.49   91.21 4147.41   91.37 4174.36   91.32 4228.26   91.48 4271.42   91.46
 4281.15   91.84 4290.87   92.84 4310.33   92.73 4324.92   91.61 4339.51   90.97
 4393.02   91.02 4454.67   90.83 4513.96   90.85  4551.7   91.24 4567.87    91.7
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 4573.26   91.04 4581.34   91.39 4616.38   91.46 4648.72    91.2 4718.91   91.32
 4757.83   93.14 4791.88   93.68 4821.06   91.93 4840.51   92.85 4880.51   92.66
  4888.6   92.37 4904.77   92.51 4929.02   92.27 4964.07   92.39 5035.09   92.09
 5079.96   92.14  5112.3   92.43 5125.77    91.9 5150.04   92.31 5174.29   92.13
 5195.85   92.32 5225.51   92.31 5257.85   92.59 5268.63   92.92 5300.97   93.14
 5333.31   92.68 5433.94    92.3 5495.02   92.19 5516.58   92.35 5575.88   92.35
 5651.35   92.21 5753.77   92.37 5780.72   92.24 5891.16   92.29 5900.89   92.18
 5954.38   92.32 5969.39   92.09 5996.34   92.25 6034.08   92.12 6071.81   92.26
 6144.09   91.89 6260.47   91.99 6273.95   91.84 6303.59   91.96 6338.64   91.89
 6406.01   92.02 6446.45   92.63 6451.84   93.16 6468.01    92.2 6481.48   92.26
 6497.65   91.62 6511.13   92.11 6524.61   94.86 6538.08   95.39 6541.45   94.79
 6547.58   91.64 6560.23   82.96 6585.15   71.56 6591.88   70.73  6598.2   66.66
 6598.6565.46946 6601.09   59.01 6614.25   60.25 6644.67   61.93 6659.51    63.1
  6671.2      63 6688.25   63.78 6698.43   67.78 6709.22   68.96  6725.4   73.76
 6734.8173.83974 6744.28   73.92 6765.87   75.29 6771.26   76.24 6782.23   77.01
 6812.88   82.65 6839.71   83.39  6851.2   82.38 6865.67   82.84 6893.36   80.06
 6924.03   81.72 6947.02   85.86 6962.35   85.52 6970.02   86.07 6981.51    88.1
 6989.18    87.7 7004.51   83.79 7023.67    82.4 7035.16   82.47 7077.33   85.06
 7088.83   87.47 7100.32   88.75 7130.97   90.76 7150.13   89.97 7165.03   90.06
 7192.29   91.14 7215.27    92.9 7245.92   93.86  7277.1   93.44  7309.5   92.75
 7321.43   92.13 7336.87   92.36 7360.25   93.31 7377.07   93.32 7404.42    92.5
  7435.6   92.76 7472.45   93.52 7492.31   93.04 7504.23   93.08 7536.03   92.32
 7547.95   91.79 7571.79   91.43 7591.66   91.69 7619.48   91.38 7667.16   91.54
 7688.7291.31699 7702.93   91.17 7730.76    91.9 7754.59   91.79 7766.51   91.41
 7806.26   91.03 7838.04   91.08 7853.94   90.47 7873.81   90.07 7909.58   90.02
 7925.47   90.86 7961.24   91.05 7985.09   90.65 8032.77   90.73 8048.67   90.51
 8076.49   90.56  8120.2    90.2 8179.82   90.31  8195.7   89.88 8255.32   89.94
 8322.88   90.28 8330.82   89.97 8398.38   89.16 8481.83   88.88  8517.6   89.12
 8560.64   88.71 8640.79   88.76 8672.58   88.63 8692.46    88.9  8716.3   88.58
  8776.3   88.58 8787.83   88.72 8803.73   88.31 8849.05   88.55 8879.24   88.45
    8927      88 8958.71   88.08 9022.29      87 9069.99   86.65 9093.82   87.27
 9105.75    86.9 9121.64    87.4 9133.57   86.98 9161.39   86.74 9177.28   87.14
 9193.17   88.27 9209.07   91.61 9217.02   92.75 9244.84   94.16 9256.75   94.45
 9292.53   93.52 9308.42   93.81 9332.27   93.48 9383.93    94.1  9403.8   94.64
 9431.62   94.63 9447.51   93.87 9475.33   93.99  9511.1   93.69 9519.05   93.92
 9584.35      94 9658.13   93.78 9674.03   93.96 9729.66   93.96 9781.33   93.74
 9817.09   93.86 9856.84   93.79 9864.78   93.59 9904.52   93.85 9928.36   93.45
 9974.09   93.62 9992.28   93.8610083.35   94.6210162.83      9510194.62   95.63
10220.93   95.3910270.12   95.7410309.87   95.4410325.76   94.9910353.58   95.35
10369.48   94.95 10397.3   95.1810437.03    94.8 10488.7   95.0810496.65    94.8
10532.41   94.9710556.25   94.5810588.05   94.8610623.81   94.6410655.61   94.71
10699.31   94.0510715.21   94.0410735.08   94.4210810.59   94.44 10852.3    94.3
10993.39   94.0311092.74    93.611200.47   93.3911249.83   93.1911262.82   93.31
11294.01   93.1511312.19    92.711319.99   93.0511340.77   92.4911348.57   92.85
11382.34   92.7311397.94   92.8911418.72   92.4111434.31    92.911454.38   93.16
11501.86   93.17 11541.8   94.2811553.73   93.7911577.19   93.7611597.97   93.26
11623.95   93.5911634.34   94.0111644.74   93.6511657.72   93.9511709.67   93.71
11748.64    94.211766.82   94.8611813.59   94.6811907.41   94.9511927.27   95.23
11967.02   94.7112006.76   94.4712026.62    94.612118.02    94.312141.87   94.43
12247.41   94.2412268.19   94.2612317.54   94.0112340.57   94.3412372.37   94.05
12396.21   94.2112404.15    93.912495.55   93.83 12519.4   94.3312533.16   94.17
12598.88   92.9412630.68   93.0912722.79   93.0212746.17   93.6612764.36   95.32
12805.53   95.7212839.69   95.5512896.84   95.8912902.04   95.7912977.37   95.57
13032.04   95.6713039.99   95.2713051.92   95.4913119.47    95.313143.32   95.32
13244.94   95.1313273.51   94.9113325.47   94.9213416.39   94.5813447.56   94.69
13489.05   94.5513525.49   94.2513535.89   94.5613569.65   94.1613596.35   94.15
   13632    93.913699.54   93.7713709.93   93.5513785.27    93.413798.25   93.21
 13855.4   92.9813881.38   92.7613943.72   92.5914050.24   92.5514076.21   92.71
14148.95   92.6914172.32    92.514234.67   92.5614267.95   92.3814371.28   92.13
14413.92   92.22 14432.1   92.1114484.05   92.1114507.44    92.414520.42   92.04
 14543.8   92.4614587.97    92.514621.74   92.7214637.32    93.1 14660.7   93.24
14684.08   92.5614704.87   93.2914736.04   92.9214760.73   92.8114872.01   92.96
14883.92    92.814891.87   93.3314903.79   93.3414915.71   92.6414947.51   93.01
14999.17   92.9115042.89   92.6315169.86   92.4815245.19   92.4615289.27   92.55
15362.09    92.915442.62   93.0515547.58   93.1715555.53   92.2815567.45   92.12
 15582.9   93.1315595.89   95.4315603.68   96.1515616.67   98.4615627.06  100.86
15634.93  100.2615644.11  100.4115651.98   97.8315690.01   97.8315696.56   99.34
15707.06   99.06

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .105 6538.08    .066 6547.58    .015 7192.29    .066 7245.92    .095

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6538.08 7245.92          1070.14    1752 1559.36             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6538.08   95.39       T
 7245.9215707.06   93.68       T
Left Levee      Station=    78.8      Elevation=  106.67
Right Levee     Station=15627.06      Elevation= 100.862
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1698.22 6545.04   92.87 7233.51 9243.83   93.87

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 146.67*

INPUT
Description: RGV-04,
Station Elevation Data    num=     454
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   93.03   17.14   94.65   30.85   94.78   44.56  100.19   55.71  100.24
   59.14   99.15   65.99   99.46   72.85   102.3   77.99  103.15   85.71  106.48
  100.83  106.55  104.61  106.02  144.44   93.12  152.04   90.95  160.59   90.02
  173.97   94.16  178.81   94.43  192.49   93.39  260.43   93.07   301.6    93.3
  349.97   93.04  379.83   94.17  402.46   92.83  549.83   92.56  627.48    92.7
  780.88   92.44  819.22   92.15  971.67   92.33 1003.77   92.45 1084.85   92.53
 1100.07   92.48 1183.01   92.58 1219.06   92.38 1247.89   92.49 1347.23   92.46
 1401.67   92.25 1449.73   92.48 1490.34   92.51 1531.42   92.36 1553.05   92.08
 1584.29    91.2 1617.93   91.11 1644.36   91.38 1670.79   91.32 1715.82   91.72
 1745.28   91.44 1788.53   91.49 1812.55   91.38 1850.25   91.51 1889.44   91.28
 1896.65   90.95 1908.67   91.37 1932.69   91.03 1956.72    91.6 1985.56   92.87
 2004.78   92.38 2023.69    92.5 2045.63   92.33 2093.08   92.24 2119.09   91.09
 2182.59   91.03 2249.86    91.1 2317.14   91.06 2353.19   91.18 2437.28   91.11
 2522.38   91.14 2539.72   91.43 2565.74   92.47 2578.74   92.28  2752.2    92.5
 2778.21   92.77 2795.55   92.55 2830.25   92.71 2856.27   92.59 2864.94      93
 2934.32   92.61 2977.68    92.7 2986.35   92.99 3029.71   92.74 3133.78   92.68
 3155.46   92.95 3168.46   92.82 3229.18   93.11 3246.52   92.92 3328.71   93.23
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 3372.27    93.1 3424.31   93.12 3441.65   93.38 3450.32   93.11 3489.34   93.52
 3506.69   92.97 3537.05   93.99 3554.39   93.34  3567.4   91.45 3576.07    90.8
 3593.41   90.55 3780.42   90.73  3818.9   90.73 3827.57    91.3 3836.24   92.82
 3853.58   92.66 3866.59      91  3879.6   90.05  3927.3   90.15 3982.26   89.89
 4035.11   89.91 4068.75   90.16 4083.17   90.48 4095.18   90.26 4126.41   90.31
 4155.25   90.14 4217.82   90.23  4239.5   91.76 4252.52   93.02 4265.53   93.62
 4282.87   93.82 4308.88   91.22 4326.23   92.63 4343.57   92.78 4369.09    92.5
 4436.37   92.62 4499.68   92.46 4568.51   92.76 4580.53   92.39 4602.16   92.67
 4623.78   92.57 4669.43   92.73 4707.87   93.15 4736.71   93.27 4765.54   92.98
 4855.25   92.71  4909.7   92.67 4989.67   92.82 5049.06   92.73 5140.36   92.89
 5164.39    92.8 5262.84   92.84 5271.51    92.7 5319.21    92.9 5327.89    92.6
 5390.25   92.69 5423.88   92.85 5455.12   92.67 5488.33   92.29 5592.07   92.39
 5648.76    92.2  5700.8    92.4 5721.82   92.36 5757.86   92.73 5762.67   93.08
 5777.08   92.44 5803.51   92.05 5815.53   92.54 5827.54   94.67 5839.56   95.33
 5845.96   93.79 5849.16   92.03 5861.97   82.24 5877.99   75.18  5887.2   71.74
 5894.9570.28156 5900.41   67.62 5903.34    57.5 5917.44   58.89 5928.02   59.17
 5940.36    60.2 5950.06   60.48 5965.96   61.64 5991.8362.28204 5996.78   62.53
 6007.69   68.36 6013.47   68.61 6019.25   70.02 6030.82    74.8  6036.6   76.49
  6049.476.22646 6056.84   75.83 6079.98   76.66 6085.76   77.85 6097.52   78.51
    6106   79.48 6130.38   83.18 6159.14   84.46 6171.47   84.01 6186.97   84.79
 6198.54   83.97 6216.66   82.16 6236.13    82.4 6249.54   82.97 6274.19    85.5
 6290.62   85.35 6298.84   85.83 6311.16   87.37 6319.38   87.22 6335.81   84.75
 6356.36   84.13 6377.82    84.5 6392.27   85.38 6413.88   86.24 6426.21   87.84
 6438.54   88.83 6471.39   90.62  6507.9   90.21 6525.25   90.67 6561.76   92.91
 6594.63   93.94 6642.66   93.34 6676.73   92.04 6693.51   91.91 6718.94   93.11
 6750.01   93.46 6766.97   92.85 6800.87   92.93 6840.94   93.45  6875.5   93.21
 6923.04   92.35 6948.96   92.12 6970.57   92.23 7000.82   91.98 7052.67   92.05
 7077.8491.89471 7091.57   91.81 7121.82   92.24 7147.74   92.15 7165.33   91.85
 7203.92    91.7 7238.48   91.73 7277.38   91.03 7316.27   90.95 7333.55    91.5
 7372.44   91.58 7398.37   91.28 7450.22   91.31 7497.76   91.17 7545.29    90.9
 7610.11   90.94 7627.39   90.62 7651.28   90.56 7765.67   90.95 7804.57   90.54
 7882.95   90.06 7938.52   89.99 7977.41   90.16 8024.21    89.8 8111.36   89.77
 8145.94   89.65 8167.55   89.83 8193.48   89.56 8258.71   89.44 8275.66   89.58
 8288.54   89.27 8337.82   89.47 8394.32   89.26 8422.58      89 8457.07   89.13
 8498.86   88.61 8578.06   88.25 8603.98   88.68 8616.95   88.42 8634.23   88.74
  8647.2   88.44 8677.45   88.31 8694.72   88.58 8712.01   89.32 8737.94   92.33
 8781.15   93.42 8820.04   92.76 8837.33   92.98 8863.26   92.77 8891.57   92.79
 8941.04   93.54 8971.29   93.51 8988.57      93 9018.82   93.14 9057.71   92.94
 9066.36   93.09 9137.37   93.19 9217.59   92.99 9234.88   93.14 9295.37   93.18
 9351.56   93.08 9433.66   93.11 9462.28   92.95  9476.4   93.18 9511.44   92.76
 9561.16   92.87 9580.94   93.11 9660.04   93.56 9766.38   94.36 9800.96   94.91
 9829.56   94.68 9877.58   95.04 9926.27    94.8 9943.55   94.48  9973.8    94.7
 9991.09   94.44 10035.8   94.6110064.55   94.3210120.73    94.510129.04   94.32
10168.26   94.4110194.19   94.1410236.39   94.4910302.22   94.1710349.74   93.76
10388.64   94.0310487.84   94.1410669.52   93.8510761.89   93.4510894.68   93.27
10968.14   93.01 10996.4   93.1511016.17   92.4411024.65   92.9511047.25   92.07
11055.72   92.6211092.45   92.5111109.41   92.7811132.01   92.1111148.96   92.64
11222.41   92.5811247.83   93.5111278.81   93.1211304.32    93.111326.92   92.36
11355.17   92.7611366.47   93.3811377.77   92.8311391.89   93.2911448.38   93.01
11473.81    93.611490.75   93.6411510.53   94.5111561.37   94.3311581.15   94.52
11626.34   94.5611684.99   94.9111702.61   94.6911771.43   94.4311793.02   94.51
11823.28   94.3511874.92   94.3111903.16   94.1311920.11   94.24 12033.1    93.9
 12055.7   93.9312109.36   93.6312134.41   93.8912168.98   93.66 12194.9   93.73
12203.54   93.5212302.93    93.312328.86   93.6212343.81   93.5512415.28   92.59
12449.86    92.712521.78   92.7512550.02   92.6312575.44   93.0912586.74   93.85
12595.21   95.1912646.06   95.8112677.13   95.5612702.55   95.5912739.27   95.89
12744.92   95.7412801.42    95.612826.84   95.4212886.29   95.5312894.93   95.25
12939.82   95.38 12959.6   95.2413033.04    95.113117.79   95.0213148.85   94.68
13216.65   94.5913304.21   94.3413338.11   94.5313355.06   94.2713383.23   94.32
13422.85   94.0113434.15   94.4913476.52   93.9913538.67   93.6713566.91   93.72
13612.11   93.5513623.41   93.2613648.83   93.3613705.33    93.213719.45   92.94
13781.59   92.7613809.84   92.4813835.25   92.5313877.62   92.3113993.44   92.39
14021.68   92.6214055.59   92.5314100.78   92.59 14126.2   92.3314193.99   92.39
 14205.3   92.1514357.83   91.74 14388.9   91.8814408.67    91.714465.17   91.72
14473.64   92.2414479.29   91.8614490.59   92.1914504.71   91.6414530.14    92.2
14578.16   92.2214614.88   92.5214631.82   93.0514657.25    93.214682.67   92.12
14705.27   93.1814719.39    93.114739.16   92.5614764.59   92.4114787.19   92.54
14809.78   92.3914887.01   92.4914899.97   92.3914921.57   92.7414934.54   92.27
14969.11   92.5815025.28   92.4515103.55   92.0515168.52   92.0215182.65   92.13
15210.89   91.9315254.31   92.01 15292.8   91.9415340.74   92.1315419.92   92.62
15507.48   92.9115583.75   92.9715621.61   92.9215630.26    92.315643.22   92.13
15660.02   92.7115674.14   94.8515682.62   94.4215696.74   97.5815702.39   99.98
15708.03  100.9415719.84  100.0415733.61  100.2615741.48    96.715745.41   96.39
15802.46   96.3915808.36   97.02 15812.3   98.6515828.03   98.23

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5839.56     .07  5887.2    .025 5996.78     .07 6079.98    .085
 6377.82    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5839.56 6594.63          1070.14    1752 1559.36             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5839.56   95.33       T
 6594.6315828.03   93.94       T
Left Levee      Station=   85.71      Elevation=  106.48
Right Levee     Station=15708.03      Elevation= 100.938
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 2102.12 4286.86   92.22 6581.76 8766.49    93.3

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 146.34*

INPUT
Description: RGV-04,
Station Elevation Data    num=     456
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.29   18.52   92.95   33.34   92.89   48.15  100.21   60.19  100.11
    63.9   98.52   71.31   98.67   78.71  101.89   84.27  102.56   92.61   106.3
  108.13  106.52  112.01  105.98  152.88   92.77  160.68   90.68  169.45   89.78
  182.65   94.65   200.9   93.13  267.86   92.69  308.44   92.99  356.13    92.7
  385.55   94.18  407.87   92.38  434.25   92.23  553.12   92.12  629.66   92.29
  780.87   91.95  818.66   91.79  968.92   91.89 1003.97   92.05  1092.5   92.14
 1100.41   92.06 1137.92   92.16 1195.62   92.14 1245.14   91.93  1321.3   92.16
 1376.38   91.93 1403.81   91.45 1433.36   91.32 1479.79    91.5 1519.33   91.85
 1526.95   91.65  1637.4   91.58 1678.15   91.02 1709.81   91.16 1730.91   91.58
 1756.23   92.38 1789.73    92.8 1850.66   92.46 1873.51   90.85 2047.45   90.84
```

```
 2079.11    90.9  2227.7   90.88 2242.93   91.28 2265.78   92.68  2277.2   92.44
 2391.46   92.66 2402.88   92.84 2429.54   92.69 2452.39   93.02 2467.62   92.72
 2498.09   92.91 2520.94   92.79 2528.55   93.34 2589.49   92.81 2627.57   92.91
 2635.19    93.3 2673.26      93  2692.3   93.16 2711.35   92.96 2764.66    92.9
  2783.7   93.23 2795.13   93.03 2848.45   93.38 2863.68   93.14 2913.19   93.43
  2966.5   93.56 2974.12   93.37 3019.82   93.32 3035.06    93.7 3042.67   93.34
 3076.94   93.87 3092.17   93.14 3118.84   94.53 3134.07   93.62  3145.5   91.08
 3153.11   90.21 3168.34    89.9 3366.37   89.99 3373.99   90.76  3381.6   92.79
 3396.84    92.6 3408.26    90.4 3419.68   89.14 3461.58   89.29 3480.62      89
 3556.26   88.96 3636.45   89.17 3661.78   89.08 3716.73   89.15 3735.77   91.18
  3747.2    92.9 3758.63   93.73 3773.86   93.95 3796.71   90.51 3811.94   92.42
 3827.17   92.72 3849.58   92.62 3941.42   92.96 3964.28   92.82 4009.97   93.13
 4035.28   92.87 4054.28   93.03 4113.36   93.14 4147.12   93.38 4242.27    93.3
 4276.55   93.12 4287.98   93.27 4329.86   93.14 4394.61   93.29 4402.22   93.19
 4526.96   93.42  4581.2   93.31 4634.53    93.4 4642.14   93.21 4684.03   93.47
 4691.66    93.1 4746.42   93.26 4783.04   93.48 4832.56    92.7 4859.21   92.82
 4923.68   92.78 4973.46   92.58 5019.17   92.77 5069.28   92.83 5114.36   92.53
 5130.48   94.48 5141.03   95.26 5147.51   94.08 5150.75   92.42 5163.72   81.51
 5179.92   74.53 5189.25   71.92 5196.14   70.75 5202.61   68.57 5205.58   55.98
5209.6756.40394 5220.63   57.54 5231.92   57.63 5245.09   58.89 5255.44   59.03
  5263.9   59.75 5283.66   60.67 5302.8261.21894  5305.3   61.29 5316.94   68.94
 5323.12   69.23 5329.29   71.07 5341.63   77.26  5347.8   79.21    536478.21996
  5369.4   77.73  5394.1   78.04 5400.27   79.46 5421.87   80.64 5434.21   82.35
  5458.9   84.71 5478.58   85.53 5491.73   85.63 5508.28   86.73 5520.62   86.04
 5536.05   84.36 5554.56   84.37 5560.74   83.92 5601.36   85.13 5618.89   85.18
 5640.81   86.64 5649.58   86.74 5667.12   85.71 5711.95   86.08 5727.38   86.86
 5750.44   87.42 5770.57   88.38    5786   89.54 5811.81   90.49 5832.27   90.88
 5850.78   90.37 5869.29   90.76 5903.22   92.71 5943.33   94.03 5955.54   93.79
 5979.95   93.78 5995.22   93.47 6013.53   92.41 6050.16   91.45 6065.42    91.9
 6077.63   92.92  6111.2    93.9 6129.52   93.19 6135.63   93.37 6166.15   93.09
 6209.44   93.38 6246.77   93.35 6298.13   92.91 6334.02   92.86 6382.16   92.58
 6438.18   92.55 6466.9592.40681 6489.68   92.59 6540.88   92.51 6559.89   92.34
 6581.25   92.45 6638.92   92.38 6680.94      92 6722.96   91.89 6741.62   92.13
 6783.64   92.11 6811.66   91.92 6867.67    91.9 6953.64   91.59 6999.42   91.68
 7040.41   91.56 7084.88   91.28 7158.14   91.55 7225.29   91.61 7335.17   91.12
  7395.2   91.11 7437.23    91.2 7469.47   91.13 7487.78    90.9 7515.26   90.95
 7619.29   90.68 7642.63   90.76 7683.13   90.48 7719.76   90.47 7741.13    90.3
 7759.43    90.5 7783.86   90.12 7826.59    90.4 7872.37   90.18 7887.63   90.27
 7918.16      90 7957.84   90.18 8000.57   89.86 8052.45   89.96 8064.66   89.78
 8114.14   90.09 8193.51   89.87 8230.85   90.38 8258.86    91.9 8305.54   92.39
 8347.56      92 8388.21   92.13 8424.83    91.9 8488.93   92.48 8529.62   92.14
 8562.19   92.28 8604.33   92.19 8690.38   92.38 8777.06    92.2 8827.74   92.39
 8876.58   92.36 8963.79   92.46 9010.87   92.42  9041.4   92.24 9056.65   92.48
 9102.44   92.06 9114.65   92.27 9148.22   92.13 9169.59   92.37 9221.48   92.49
 9255.06   92.68 9369.94   93.71 9419.88   94.28  9438.2   93.98 9490.08   94.36
 9561.34   93.97  9612.7   93.93    9661   94.06 9692.06   93.85    9777   93.96
 9822.78   93.67 9877.72   94.11 9902.14   94.04 9944.87   93.6210000.18   93.47
 10042.2   93.6410097.48    93.710149.37   93.86 10179.9   93.7810231.78   93.84
10329.46   93.7310445.44   93.2310462.35    93.3 10588.9   93.15 10646.9   92.94
10662.15   93.2710668.26   92.9110686.58   92.8510698.79   93.1410720.15   92.18
10729.31   92.8610753.72   91.6610762.88    92.410802.56   92.2910820.88   92.68
10830.04   92.0810845.29   91.8210863.61   92.3810894.13   92.0710942.96      92
10970.43   93.0510979.58   92.5111031.46   92.4311055.87   91.4511086.39   91.92
11098.59   92.75 11110.8   92.0211126.06   92.6311138.26   92.2811150.47   92.51
11187.09    92.311214.56   93.0611232.87   93.0911254.23   94.1711309.16   93.97
11330.52   94.2711379.35   94.2911442.71    94.611461.74   94.43 11489.4    94.5
11559.42   94.42 11647.9   94.1911678.41   93.9411696.73   94.0511757.76   93.86
11818.79   93.56 11843.2   93.6111901.18   93.2511928.24   93.4512002.93   93.13
12062.92      93 12110.3   92.7812154.47   92.9212181.94   92.5912231.68   92.25
12346.73   92.4712377.24   92.2512404.71   92.5112416.91   93.2712426.07   95.06
12462.69   95.7512481.01   95.9312514.57   95.5812542.04   95.5212581.71   95.88
12587.81   95.6812648.84    95.512654.95   95.7212676.31   95.2812740.54   95.39
12749.88   95.2312798.37   95.2912819.74   95.1212899.08   94.9512926.55   95.02
12990.63    94.9 13024.2   94.4613097.44   94.3913115.75   94.5413137.11   94.28
13192.04   94.0913228.66   94.3813246.98   94.0313268.34   94.1413320.21   93.77
13332.42   94.4113338.53   94.0613356.84   94.22 13378.2   93.7613445.33   93.43
13475.84   93.5213509.42   93.2713524.67   93.3313536.88   92.9713564.34   93.16
13607.06   92.9513625.38      9313640.64   92.6613707.77   92.5313738.29   92.21
 13756.6    92.513765.75   92.2913811.53   92.0413854.25   92.1713896.98   92.12
13936.65   92.2313967.16   92.5414003.79    92.414052.62    92.514080.08   92.17
14153.32   92.2214165.53   91.8914330.31   91.3614363.89   91.5314385.25   91.28
14446.28   91.3214455.44   92.0214461.53   91.5214473.75   91.97   14489   91.23
14516.47   91.9414568.35   91.9414608.02   92.3214626.33      9314638.54   92.84
14653.79   93.1614669.05   92.0814681.26   91.6914705.68   93.0614720.93   92.94
14742.29    92.214769.76   92.0214794.17   92.1614818.59   91.9314888.77   92.03
14916.01   91.9714939.36   92.1414953.37    91.914980.32   92.14 15051.4   91.99
15135.95   91.5315206.14   91.4715221.41   91.6215251.92   91.3915267.18   91.49
15340.42   91.4115444.18   92.0315477.74   92.3515572.35   92.7615654.74   92.83
15695.65   92.6715718.99   92.1415737.14    92.3 15752.4   94.2815761.55   92.69
15776.81    96.715782.92   99.8215789.01  101.0115804.76   99.8115823.12  100.11
 15833.6   95.3715838.85   94.9515914.92   94.9515922.78   95.7915928.03   97.97
15949.01   97.41

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5141.03     .07 5202.61    .025 5316.94     .07 5943.33    .085
  6111.2    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5141.03 5943.33          1070.14    1752 1559.36            .1       .3
Left Levee      Station=  108.13      Elevation=  106.52
Right Levee     Station=15789.01      Elevation= 101.014
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1863.45 5103.84   92.51

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 146

INPUT
Description: RGV-04, Updated on left with new survey to Station 1100.15.
             Extended block obstruction, Bathymetric elevations translated from
             IBWC 2008 Cross-sections
Station Elevation Data    num=     450
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.56   35.82      91   51.74  100.23   64.68   99.97   68.66   97.89
   76.62   97.88   84.58  101.49   90.55  101.97   99.51  106.12  115.43  106.49
  119.41  105.94  138.33   99.54  161.32   92.42  169.32   90.41  178.32   89.53
  191.32   95.14  209.31   92.86   275.3   92.31  315.29   92.69  362.28   92.37
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  391.28   94.19  413.27   91.93  439.27   91.74  518.25   91.58  639.23   91.91
  783.21   91.46  877.19   91.38  966.17   91.45 1004.17   91.64 1100.15   91.74
 1152.27   91.82  1214.6   91.76 1250.68   91.52 1280.21    91.6 1322.85   91.97
 1329.41   91.66 1388.46   91.76 1424.55   91.65 1447.51   91.11 1473.75   91.08
 1529.52   91.94 1555.76    93.1 1608.25   92.67 1627.93   90.62 1933.02   90.62
 1946.14   91.13 1965.82   92.89 1975.66    92.6 2074.08   92.86 2083.92   93.09
 2106.88   92.88 2126.56   93.28 2139.68   92.89 2165.93   93.12 2185.61   92.98
 2192.17   93.67 2244.66      93 2277.46   93.13 2284.02   93.62 2316.82   93.25
 2333.22   93.44 2349.63   93.18 2395.55   93.11 2411.95   93.51 2421.79   93.25
 2467.72   93.65 2480.84   93.35 2523.49   93.73 2569.41   93.89 2575.97   93.64
 2615.34   93.52 2628.46   94.01 2635.02   93.58 2664.54   94.22 2677.66   93.32
 2700.63   95.06 2713.75    93.9 2723.59   90.71 2730.15   89.61 2743.27   89.24
 2913.85   89.25 2920.41   90.22 2926.97   92.76 2940.09   92.53 2949.93   89.79
 2959.77   88.22 2995.86   88.42 3012.26   88.02 3212.36   88.02 3215.64   88.06
 3232.04    90.6 3241.89   92.78 3251.73   93.85 3264.85   94.08 3284.53    89.8
 3297.65   92.21 3310.77   92.66 3346.86   92.81 3409.18   93.31 3428.87   93.18
 3468.23   93.55 3491.19   93.35 3579.76   93.63 3612.57   93.52 3668.33   93.73
 3697.86   93.53  3707.7   93.74 3743.78    93.6 3799.55   93.77 3806.11   93.65
 3917.64   93.96 3960.28   93.83 4006.21   93.96 4012.77   93.73 4048.85   94.05
 4055.42    93.6 4117.74    93.9 4134.14   94.13 4176.79    93.1 4199.75   93.26
 4225.99   93.11 4268.64   93.21 4298.16   92.96 4337.53   93.15 4373.61   92.93
 4419.53   92.91  4442.5    95.2 4449.06   94.38 4452.34   92.81 4465.46   80.78
 4481.86   73.89 4504.82   69.52 4507.82   54.47 4523.82   56.18 4535.82   56.08
 4549.82   57.58 4560.82   57.58 4569.82   58.33 4580.82   58.78 4590.82   59.48
 4601.82   59.48 4613.82   60.04  4626.2   69.52 4632.76   69.85 4639.32   72.13
 4652.44   79.73    4659   81.93 4665.56   81.65 4681.96   79.64 4708.21   79.41
 4714.77   81.07 4737.73   81.81 4750.85   83.28 4763.97   84.08 4777.09   85.61
 4819.74   87.63 4829.58   88.67  4842.7   88.11  4859.1   86.39 4878.78   86.15
 4885.35   85.44 4898.47   85.54 4924.71   84.72 4947.67   85.02 4983.76   86.42
 4996.88   86.58 5013.28   87.56 5046.08   87.66 5062.48   88.34 5082.16   88.61
 5108.39   88.54 5124.79   89.69 5157.58   90.48 5173.98   91.28 5193.65   90.53
 5213.33   90.85  5249.4   92.76 5292.03   94.11 5305.15   93.86 5331.38   93.95
 5347.78   93.59 5367.45   92.24 5383.85   92.01 5406.81      91  5423.2   91.37
 5436.32   92.72 5452.72   93.24 5472.39   94.35 5492.07   93.54 5498.63   93.75
 5531.42   93.26 5580.61   93.32 5639.64   93.59 5656.03   93.46 5711.78   93.52
 5734.74   93.24 5856.07   92.98 5879.02   93.17 5905.26   92.91 5954.45   92.83
  5977.4   93.05 6062.67   93.02 6252.86   92.48 6315.17   92.48 6377.48   92.24
 6426.67   92.37 6518.49      92 6597.19   92.28 6656.22   92.27 6669.34   92.46
  6738.2   92.44 6787.39   92.19 6931.68   92.26 6951.35      92 6980.87   92.07
 7072.69    91.7 7115.32    91.7 7161.23   91.44 7200.58   91.41 7223.54   91.16
 7243.21   91.42 7269.45   91.01 7295.68   91.01 7315.36   91.33 7364.55   91.11
 7380.94   91.29 7413.74      91 7456.37   91.24 7502.28   91.11 7558.02   91.49
 7571.14   91.29 7610.49   91.53 7676.08   91.37 7735.11   91.49  7767.9   91.36
 7790.85   91.59 7800.69   91.32 7849.88    91.4 7866.28    91.2 7918.75   91.41
  7958.1      91 8026.96   91.39 8063.04   91.24 8105.67   91.42 8220.44   91.45
  8243.4   91.57  8338.5   91.41 8390.97   91.65 8443.44    91.6  8495.9   91.78
 8587.72   91.74 8620.52   91.52 8636.91   91.79 8653.31   91.46  8686.1   91.36
 8699.22   91.62 8735.29   91.38 8758.25   91.62    8814   91.63 8850.07    91.8
 9027.15   93.61 9046.83   93.27 9102.57   93.68 9204.23   93.38 9286.21   93.51
 9302.61   93.38 9394.43   93.35 9410.83   93.48 9460.02   93.17 9519.04   93.74
 9545.28    93.7 9591.19   93.09 9755.15   93.35  9810.9   93.58  9843.7   93.52
 9899.44  93.6510004.38   93.5710128.99   93.0210138.83   93.1510233.93    93.1
10276.56  92.8910283.12   93.0310345.43   92.8110361.82   93.2510368.38   92.81
10388.06  92.7610401.18   93.1410424.13   91.9210433.97   92.76 10460.2   91.24
10470.04  92.1710512.67   92.0710532.35   92.5710542.19   91.8410558.58   91.52
10578.26  92.1210611.05   91.5510663.51   91.4110693.02    92.610702.86   91.79
10758.59  91.7610784.82   90.5510817.61   91.0910830.72   92.1210843.84   91.21
10860.23  91.9710873.34   91.5310886.46   91.83 10925.8    91.610955.31   92.52
10974.98  92.5310997.93   93.8311056.95   93.62 11079.9   94.0311132.36   94.03
11191.37  94.3311220.88   94.1711250.39   94.3911342.19   94.3111391.37   94.06
11420.88  94.0811453.66   93.7611473.34   93.8611538.91   93.6311604.48   93.22
11630.71   93.28   11693   92.8711706.12   93.0511866.77   92.55 11938.9   92.14
11965.13    92.311994.64   92.0312056.93   91.8912112.67   91.9712171.69   92.19
12204.47  91.8612220.87   92.1812233.98   91.9412247.09    92.712256.93   94.93
12296.27  95.8112315.95   96.0512352.01   95.5912381.52   95.4512424.14   95.88
 12430.7  95.6312496.27    95.412502.83   95.6712525.78   95.1312597.91   95.25
 12630.7  95.0812656.92    95.212679.88      9512765.12   94.8112794.63   94.91
12863.48  94.7912899.54   94.23   12952   94.2412965.12   94.4912978.23    94.2
 12997.9  94.3813020.85   94.0613079.87   93.8513119.21   94.2213138.89   93.79
13161.84  93.9213217.57   93.5313230.69   94.3413237.25    93.913256.92    94.1
13273.31  93.3813279.87   93.53   13352    93.213384.78   93.3213420.85   93.01
13437.24  93.1113450.36   92.6813479.86   92.9613525.76   92.7313545.44    92.8
13561.83  92.3913633.96    92.313666.75   91.9313686.42   92.3113696.25   92.05
13745.43  91.7613791.33   91.9513837.24   91.9213843.79   92.1213879.86   92.07
13912.64  92.4513951.99   92.2814004.45    92.414033.95      9214083.13   92.09
14092.97  91.8314112.64   92.0514125.76   91.64 14302.8   90.9814338.87   91.18
14361.82  90.8714427.39   90.9314437.23   91.8114443.78   91.19 14456.9   91.76
14473.29   90.83 14502.8   91.6814558.54   91.6614601.16   92.1214620.83   92.95
14633.95  92.7414650.34   93.1214666.73   91.7614679.85   91.2514706.08   92.94
14722.47  92.7714745.42   91.8414774.93   91.6214801.16   91.7814827.39   91.47
14902.79  91.5614984.76   91.5315001.15   91.7415079.84   91.5215168.36   91.01
15243.77  90.9315260.17   91.1115292.95   90.8415309.35   90.9915388.03   90.88
15499.51  91.6615535.57   92.0715637.21   92.6115725.73    92.715778.19   92.37
15814.26  91.8815830.65    93.715840.49   90.9615856.88   95.8215863.44   99.66
15869.99 101.0915889.67   99.5915912.62   99.9615919.17   96.3815925.73   94.03
15932.29   93.5116027.37   93.51 16037.2   94.5616043.76   97.2816069.99   96.58

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066  4442.5     .07 4504.82    .025 4613.82     .07 5292.03    .085
 5856.07    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4442.5 5292.03         2057.24 1788.32 1279.38             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  4442.5    95.2       T
 5292.0316069.99   94.11       T
Left Levee      Station=  115.43      Elevation=  106.49
Right Levee     Station=15869.99      Elevation=  101.09
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1541.41 3752.11   93.16

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            102.11    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.066      0.065      0.067
  W.S. Elev (ft)            102.09    Reach Len. (ft)          2057.24    1788.32    1279.38
  Crit W.S. (ft)             89.73    Flow Area (sq ft)        29609.83   17026.04   84750.89
  E.G. Slope (ft/ft)      0.000097    Area (sq ft)             39613.09   17026.04   101739.10
  Q Total (cfs)           125000.00    Flow (cfs)               23729.20   27821.99   73448.82
```

Top Width (ft)	15939.20	Top Width (ft)	4311.71	849.53	10777.96
Vel Total (ft/s)	0.95	Avg. Vel. (ft/s)	0.80	1.63	0.87
Max Chl Dpth (ft)	47.62	Hydr. Depth (ft)	6.87	20.04	7.86
Conv. Total (cfs)	12678230.0	Conv. (cfs)	2406754.0	2821870.0	7449611.0
Length Wtd. (ft)	1585.50	Wetted Per. (ft)	4316.38	876.06	10789.40
Min Ch El (ft)	54.47	Shear (lb/sq ft)	0.04	0.12	0.05
Alpha	1.28	Stream Power (lb/ft s)	0.03	0.19	0.04
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	85861.87	37210.64	113725.90
C & E Loss (ft)	0.00	Cum SA (acres)	12980.38	1708.62	14148.14

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 145.67*

INPUT
Description: RGV-04,
Station Elevation Data num= 439

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.77	39.79	91.14	52.36	95.65	57.47	98.22	64.82	99.28
71.84	99.12	76.26	97.69	85.11	97.58	100.58	101.39	110.53	105.75
129.72	105.45	151.16	98.08	176.5	90.77	185	89.48	197.89	93.42
215.73	92.93	229.63	93.29	281.15	92.76	320.8	92.94	367.39	92.72
396.15	93.87	417.95	92.4	518.47	92.2	639.54	92.42	680.24	92.4
784.74	92.11	891.86	92.03	966.14	92.15	1057.17	92.4	1125.45	92.37
1155.66	91.45	1202.6	91.57	1305.24	91.38	1416.6	91.54	1478.1	91.56
1502.05	91.37	1546.97	91.46	1588.64	91.69	1596.52	91.47	1667.37	91.59
1710.67	91.49	1738.22	91.17	1769.71	91.2	1836.63	91.69	1868.11	92.51
1931.1	92.18	1954.71	90.85	2139.79	91.05	2166.85	90.98	2228.35	91.09
2243.11	91	2320.79	91.1	2336.53	91.44	2360.14	92.8	2439.89	92.94
2452.19	93.13	2462.03	92.68	2501.85	92.78	2529.4	92.64	2553.01	92.94
2568.76	92.7	2585.03	92.92	2623.87	92.91	2631.74	93.38	2688.34	93.13
2698.17	94.23	2712.94	94.29	2737.53	92.69	2749.83	91.2	2762.13	91.35
2776.9	90.96	2875.78	90.85	2895.45	91.12	2907.26	90.94	2962.37	91.23
2978.11	91.01	3037.64	91.41	3059.77	91.32	3094.21	91.52	3123.72	91.22
3155.24	91.77	3163.11	91.51	3198.54	91.72	3214.28	91.19	3241.84	92.36
3257.58	91.56	3269.39	89.31	3277.26	88.64	3293	88.51	3327.89	88.87
3369.71	89.02	3441.04	88.69	3497.68	88.75	3505.55	89.42	3513.43	91.13
3529.17	91.02	3540.97	89.22	3552.78	88.2	3578.78	88.35	3615.76	88.03
3684.55	88.02	3704.23	88.11	3792.79	88	3812.46	88.17	3859.8	88.18
3879.48	89.87	3891.3	91.31	3903.1	92	3918.85	92.12	3942.46	89.3
3958.2	90.96	3973.95	91.31	4019.09	91.33	4048.6	91.62	4107.63	91.65
4162.88	91.88	4257.68	91.95	4301.96	92.13	4336.08	91.99	4402.98	92.23
4424.95	92.11	4471.69	92.34	4511.04	92.3	4543.02	92.64	4557.77	91.18
4577.45	90.85	4619.27	91.56	4638.95	91.61	4697.98	90.9	4715.2	90.96
4759.44	91.5	4764.35	91.38	4808.4	91.97	4816.27	91.82	4842.97	92.12
4889.65	92.26	4914.22	91.98	4924.05	92.3	4963.36	92.37	5014.96	91.55
5054.27	91.79	5088.67	92.46	5125.52	91.84	5157.47	92.31	5196.78	91.73
5213.97	91.93	5233.63	91.26	5248.37	91.9	5270.48	90.92	5280.32	90.9
5295.0790.08029		5314.71	90.67	5331.91	92.31	5354.18	88.39	5365.96	85.73
5383.5579.44789		5390.72	78.26	5400.01	78.65	5415.49	77.64	5427.87	72.56
5437.24	70.82	5472.97	67.62	5473.8666.28741		5479.76	57.45	5491.11	58.6
5499.61	58.55	5509.54	59.56	5517.34	59.58	5538.61	60.87	5554.92	61.27
5563.7	67.61	5573.01	69.36	5582.31	74.44	5586.96	75.91	5603.24	74.6
5621.85	74.75	5626.51	75.94	5642.79	76.7	5667.1179.04396		5700.94	80.85
5707.92	81.57	5717.22	81.23	5728.85	80.13	5742.8	80.02	5775.37	79.18
5791.65	79.44	5826.55	81.03	5838.18	82.16	5861.44	83.17	5873.06	84.09
5905.62	85.54	5917.25	86.78	5952.13	89.06	5968.79	89.1521	5980.03	89.7
6005.61	91.82	6030.2493.12363		6035.84	93.42	6070.77	93.27	6085.33	93.01
6102.79	92.09	6117.35	91.91	6137.74	91.2	6152.29	91.41	6163.94	92.29
6195.96	93.35	6248.37	92.78	6329.55	93.74	6382.15	93.99	6428.87	93.63
6469.82	93.69	6509.28	93.43	6539.4893.41734		6580.26	93.18	6623.93	93.08
6675.86	93.3	6724.16	93.29	6737.33	92.98	6750.5	92.15	6772.46	91.55
6816.35	91.32	6888.85	91.31	6939.3	91.4	6991.99	91.17	7043.16	91.39
7124.68	91.24	7185.18	91.48	7246.96	91.47	7258.6	91.61	7319.74	91.64
7363.41	91.46	7474.99	91.4	7492.55	91.55	7508.97	91.29	7540.85	91.37
7571.59	91.14	7654.54	91.06	7750.62	90.82	7768.08	91.01	7795.52	90.7
7832.14	91.03	7875.81	90.97	7890.36	91.11	7919.48	90.96	7957.32	91.17
7998.08	91.15	8047.57	91.5	8059.22	91.39	8094.15	91.62	8204.79	91.7
8263.01	91.55	8321.24	91.52	8367.82	91.64	8402.76	91.34	8463.89	91.57
8495.92	91.46	8533.77	91.57	8669.31	91.41	8740.47	91.09	8787.05	91.2
8833.64	91.04	8880.21	91.11	8961.73	90.91	8990.85	90.72	9005.4	90.86
9049.07	90.4	9060.72	90.53	9092.74	90.34	9113.12	90.46	9162.62	90.39
9226.94	90.75	9257.68	91.24	9292.81	92.77	9351.85	93.05	9369.32	92.81
9411.36	92.93	9424.54	93.94	9437.71	93.18	9509.06	93.07	9617.74	93.11
9648.48	92.91	9692.48	92.97	9736.15	92.74	9788.55	93.09	9811.84	93.04
9852.6	92.52	9995.35	92.5410076.78		92.4510126.27		92.5410219.43		92.27
10271.98	92.0310298.32		92.110482.74		91.6810542.59		91.6710571.71		91.87
10592.08	91.1310600.82		91.72 10624.1		90.6510632.84		91.2410670.69		91.16
10688.16	91.5110711.45		90.8410728.92		91.2210758.03		90.81 10804.6		90.63
10830.8	91.2910839.54		90.7310889.01		90.61 10912.3		89.7610941.41		90.14
10953.05	90.84 10964.7		90.2410979.25		90.7610990.89		90.4111027.21		90.61
11037.46	90.4811063.66		90.9911081.12		91 11101.5		91.8611153.89		91.72
11174.27	9211220.84		9211273.23		92.211299.43		92.0911325.63		92.24
11407.13	92.1811450.79		92.0211506.09		91.9811532.16		92.2711571.68		93.87
11619.97	93.6711663.28		93.6611718.58		93.2311742.92		93.4211887.82		92.95
11936.88	92.6711960.17		92.7511986.37		92.5412041.67		92.4112143.55		92.5
12172.66	92.2312198.85		92.212210.49		92.6512219.23		94.112271.63		94.77
12329.84	94.2312367.68		94.43 12373.5		94.2512431.71		93.9612457.91		93.71
12521.95	93.7212594.72		93.62 12670.4		93.71 12696.6		93.8512757.72		93.9
12789.73	93.58 12959.2		93.4712984.76		93.6913002.23		93.44 13022.6		93.54
13072.08	93.313083.73		93.8613089.55		93.5713108.48		93.9313112.89		93.37
13152.39	93.3713169.97		93.0513220.53		93.1313278.75		92.6913304.94		92.87
13363.16	92.7413377.71		92.4613441.75		92.3713470.86		92.1613488.32		92.45
13540.71	92.0313581.46		92.1713660.06		92.2713689.16		92.4913710.04		92.41
13770.67	92.513796.86		92.2213866.72		92.2513878.36		91.9814035.54		91.55
14067.56	91.714087.94		91.5114146.15		91.5714154.89		92.13 14160.7		91.69
14175.47	92.1814184.25		91.49 14213.1		92.0814262.58		92.0814300.42		92.37
14317.88	92.9214344.08		93.0114370.28		91.7514393.57		92.8614408.12		92.74
14428.49	92.0614454.69		91.8114477.98		91.8314509.18		91.59 14592.6		91.37
14640.98	91.1414655.53		91.2314725.39		90.9414803.98		90.3714869.23		90.19
14885.49	90.2915000.96		9015097.97		90.5615129.98		90.8215220.22		91.17
15290.76	91.2415303.93		91.4615321.49		92.2315352.23		92.59 15377.4		93.53
15391.95	95.2315400.69		93.6915415.24		96.9715421.07		99.5415426.88		100.51
15439.67	97.9515449.79		97.5115476.51		97.7515484.14		95.3715491.78		93.8
15499.42	93.4515529.24		93.6515539.47		95.05 15562.5		94.8115585.53		93.65

```
15610.12      9315621.56    93.6 15629.2   95.3915659.74    95.1

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5331.91     .07 5400.01    .025 5517.34     .07 6035.84    .085
 6675.86    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5331.91 6035.84             2076  870.68  188.51             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5331.91   92.31       T
 6035.8415659.74   93.42       T
Left Levee      Station=  110.53      Elevation=  105.75
Right Levee     Station=15426.88      Elevation=100.5133
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3241.84 3918.85   92.12

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 145.5

INPUT
Description: RGV-04 (end wall), RGV-01 (begin wall), new cross-section,
             Bathymetric elevations translated from IBWC 2008 Cross-sections,
             Section along left levee updated with 2017 survey
Station Elevation Data    num=     451
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   93.53   35.11   93.66   70.22   95.81  102.17   98.05  134.12   99.96
  194.67   96.22  255.23   92.04  315.78   91.32  376.33   91.01  436.88   91.42
  497.43   91.31  557.98   90.67  618.54   90.38  679.09   90.12  739.64   89.71
  747.62   91.23  790.27   91.71  796.83    92.1  816.52   91.58  826.36   92.14
  842.77   91.94  852.61   91.32  862.45   91.66   888.7   91.55  898.54   92.27
  908.38    91.6  931.35   92.77  941.19    91.6  960.87   91.99  980.56   91.63
 1003.52   93.17 1016.65   92.28 1052.73   92.89 1078.98   92.04 1101.95   92.36
 1111.79   91.86 1131.47   91.84 1141.31   92.23    1161   91.97 1206.93   92.29
 1229.89   92.78  1246.3   93.94 1252.86   93.61  1262.7   91.59 1279.11   87.19
 1321.76   87.16 1387.37   86.94 1407.06   87.25 1426.74   86.93 1439.86   87.21
 1472.67   87.26 1489.07   87.06 1515.32   87.25 1557.97   87.02 1580.94   87.44
 1636.71   86.97 1666.24   87.34 1679.36   86.93 1715.45   87.07 1794.19   86.94
 1810.59   87.34 1889.33   87.23 1895.89   88.58 1925.42   89.38 1931.98    89.1
 1984.47   88.99 1991.03   89.19 2036.96   89.38 2066.49   89.22 2092.73   89.34
 2158.35   89.25 2207.56   89.59 2227.24   89.47 2299.42   89.69 2365.03   89.66
 2433.93   89.45 2476.58   89.86 2499.54   89.72 2561.88   89.81 2584.84   89.47
 2597.97   89.71 2630.77   89.62 2663.58   89.78 2706.23   89.62  2745.6   89.83
 2784.97   89.74 2837.46   90.22  2847.3   89.93 2883.39   90.82 2899.79   91.99
  2932.6   92.84 2952.28   93.83 2978.53   96.34 2988.37   95.35 2998.21   95.35
 3014.62   88.75 3031.02   86.68 3040.86   86.92 3053.99   86.56 3076.95   86.65
 3109.76   86.31 3172.09   86.29 3277.07   86.38 3349.25   86.29  3391.9   86.34
 3418.14   86.55 3424.71   86.33 3464.07   86.51 3487.04   86.19 3506.72   86.58
 3532.97   86.73  3562.5   86.31 3585.46   86.43 3601.86    86.9 3621.55   86.39
 3719.97   86.35 3772.46   86.53 3821.67   86.32 3864.32   86.54 3890.57   86.35
 3988.99   86.49 4018.52   86.43  4038.2   86.76 4067.73    86.4 4097.25   86.88
 4146.46   86.77 4169.43   87.41 4172.71   87.87 4182.55    91.8  4192.4   92.58
  4225.2   92.07 4307.22   92.01 4320.35   91.86 4349.87   92.16 4369.56   91.94
 4389.24    92.2 4412.21    91.9 4431.89   92.09 4454.86   91.84 4507.35   92.17
 4513.91   91.93 4543.44   92.03 4599.21   91.92 4641.86   92.19 4654.98   91.89
 4697.63   92.04 4753.39   91.68    4819   92.02 4845.24   92.54 4864.92   94.33
  4868.2   94.13 4878.04   90.58 4887.88   88.74 4897.72    84.2 4904.28   83.01
 4920.68   81.58 4930.52   77.15 4940.37   70.39 4943.65   68.96 4946.65   53.91
 4962.65   55.62 4974.65   55.52 4988.65   57.02 4999.65   57.02 5008.65   57.77
 5019.65   58.22 5029.65   58.92 5040.65   58.92 5052.65   59.48 5127.34   68.96
 5130.62   69.27 5137.18   74.54 5140.46   75.85 5153.58   77.15 5173.27   82.07
 5186.39   88.34 5192.95   89.08 5212.63   87.69 5248.71    86.7 5265.11   87.13
 5274.95   86.84 5288.07   87.72 5307.76   87.54 5356.96   87.45 5442.25   88.28
 5471.77   88.38 5491.45   88.74 5527.53   88.88 5573.46   89.26 5625.94   89.16
 5662.02   88.89 5675.15      89 5740.75   88.57 5793.23   88.77 5812.91   88.64
 5904.76   88.64 5937.56   88.52 5967.08   88.76 6009.73   88.33 6049.09   88.15
 6121.25   88.13 6150.77    88.6  6180.3   88.74 6219.66   88.68  6229.5   89.02
 6314.78   88.95 6360.71   89.86 6373.83   90.69 6390.23   92.95 6400.07    95.3
 6409.91   95.79 6432.87    95.7 6445.99   93.95 6459.11   94.18 6485.35   95.39
 6534.56   95.02 6570.64   93.94 6583.76   94.55 6632.96   95.33 6688.73   95.04
 6714.97   95.42 6747.77   95.58 6774.01   95.24  6859.3   95.52 6869.14   95.26
 6915.06   95.05 6931.46   95.47 6938.02    95.2  6957.7   95.52  6974.1   95.12
 7023.31   95.66 7065.95   95.27 7085.63   95.76 7111.87   95.29 7144.67   95.67
 7167.64   95.63  7190.6   94.93  7239.8   94.56 7246.36   94.25 7295.56   94.67
 7328.37   94.28 7393.97   94.68 7416.93   94.24 7475.97   93.95  7505.5   93.98
 7564.54   93.65  7587.5   93.74 7633.42   93.56 7728.55   93.36 7758.07   93.52
 7807.27   93.28 7856.48   93.21 7889.28   93.39 7941.76   92.81 7974.56   92.69
 8092.65   92.71 8132.01   92.51 8171.38   92.76  8184.5   92.49 8253.38   92.51
 8296.02   92.16 8302.58   92.57 8322.26   92.15 8355.06    92.7 8394.42   92.41
 8407.54   93.11 8430.51    91.9 8453.47   91.98 8469.87   91.73 8486.27   92.38
 8512.51   91.73 8532.19   91.55 8542.03   92.79 8564.99   92.34 8591.23   92.41
 8604.35   92.73 8617.47   92.43 8630.59   93.14 8673.24   93.39 8686.36   92.97
 8706.04   93.38  8712.6   93.06 8751.96   92.97 8807.72   93.42  8860.2   93.51
  8925.8   93.32 8935.65   93.49 8965.17    93.3 9014.37   93.56 9040.61   93.47
 9057.01   93.87 9070.13   93.39 9096.37   93.56 9139.01   93.44 9171.81   94.43
  9207.9   93.24 9234.14   92.81 9270.22   92.89 9286.62   93.51  9306.3   93.65
 9345.66   93.54 9362.06   93.85 9401.42   93.91  9421.1   94.36 9430.94   93.86
 9447.34    91.4 9467.03   90.41 9476.87   90.61 9489.99   91.92 9509.67   92.02
 9529.35   91.52 9555.59   91.73 9588.39    91.2 9621.19   91.42 9673.67   90.63
 9693.35   91.35 9703.19   90.89 9722.88   90.73 9745.84   91.27 9762.24   90.66
 9788.48    90.4  9850.8   90.48 9913.12   90.14 9991.85   89.9210044.33   89.99
10050.89  89.6710067.29   89.9510086.97   89.7610168.97   89.8610185.37   90.11
10231.29  90.1110244.42   90.2810287.06    90.110300.18   90.2110352.66      90
10365.78  90.1810418.26   89.7910441.22   89.9110490.42   89.7310552.75   89.75
10598.67  89.3810690.51   89.3810742.99   88.9810785.63   88.86 10874.2   88.22
   10907  88.1710982.44   87.6311116.93   87.1311126.77   86.9711346.54   86.97
11362.94  87.7511379.34   90.3611399.02   92.4411415.42   95.19 11451.5   94.03
11461.34  93.1811477.74   93.14 11517.1   93.57 11533.5   93.4511543.34   93.92
11559.74  93.7711576.15   94.5311585.99    94.311595.83   95.0811605.67   94.44
11641.75  95.0411720.47      9511746.71   95.4411753.27   95.0611782.79   95.07
11802.47  94.8211828.71   94.9711871.36   94.6211917.28    94.711933.68   94.47
11950.08    94.811976.32  93.2312064.88   93.1712091.12   92.9612104.25   93.17
12146.89  93.0112245.29   93.1312314.17   92.9212333.85    93.112366.66   92.86
12432.26  92.8512448.66    92.7 12474.9   92.8812494.58   92.69 12573.3   92.92
12609.38  93.3812655.31    92.912694.67   93.2712714.35   93.0812799.63   93.61
12822.59  93.6612829.15   93.2812861.95   93.28 12937.4   93.5212960.36   93.25
13009.56  93.4113025.96   93.1913153.88   93.0813170.29   92.8913209.65   92.93
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13288.37   92.2713350.69   91.8813373.65   92.3213386.77   91.8613429.42   91.85
13458.94   91.4513524.54   91.3113534.38   92.4113540.94   92.22 13547.5   90.62
13567.18   89.0913590.14   89.4113665.58   89.3913698.39   89.2913760.71    89.5
13800.07   89.8613839.43   89.9913885.35   90.3313911.59   90.3513937.83   90.63
13987.04   90.5714013.28   90.7914039.52   90.3914052.64   90.48 14059.2   91.34
14065.76   90.1814072.32   91.3514078.88   90.5314105.12   90.7814118.24   90.62
14160.88   90.6714167.44   90.3714285.53   90.1214423.29   90.3414442.97   90.52
14534.82   90.7314557.78   90.5214600.42   89.6614606.98   89.0614610.26   89.89
14623.38   90.8814633.22   93.24 14652.9   95.4614662.74   97.1114672.58   99.74
14695.54   99.51

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4930.52    .066 4943.65    .015 5130.62    .066 5904.76    .088

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4887.88 5186.39         1658.45 1444.91 1082.27             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4887.88   88.74       T
 5186.3914695.54   88.34       T
Left Levee      Station=  134.12      Elevation=   99.96
Right Levee     Station=14672.58      Elevation=   99.74

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.93    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.066      0.038      0.085
  W.S. Elev (ft)            101.90    Reach Len. (ft)          1658.45    1444.91    1082.27
  Crit W.S. (ft)             84.69    Flow Area (sq ft)       55856.94   10260.54   95998.59
  E.G. Slope (ft/ft)      0.000047    Area (sq ft)            59462.59   10260.54   96718.86
  Q Total (cfs)           125000.00    Flow (cfs)              43552.26   27415.54   54032.21
  Top Width (ft)          14695.54    Top Width (ft)           4887.88     298.51    9509.15
  Vel Total (ft/s)            0.77    Avg. Vel. (ft/s)            0.78       2.67       0.56
  Max Chl Dpth (ft)          47.99    Hydr. Depth (ft)           11.43      34.37      10.10
  Conv. Total (cfs)       18277400.0    Conv. (cfs)             6368176.0   4008678.0   7900547.0
  Length Wtd. (ft)         1369.47    Wetted Per. (ft)         4901.71     320.43    9515.69
  Min Ch El (ft)             53.91    Shear (lb/sq ft)            0.03       0.09       0.03
  Alpha                       3.22    Stream Power (lb/ft s)      0.03       0.25       0.02
  Frctn Loss (ft)             0.07    Cum Volume (acre-ft)    81032.24   36257.37   110434.60
  C & E Loss (ft)             0.00    Cum SA (acres)          12515.77    1666.72   13807.13


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 145.2

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections, Section along left levee updated with
             2017 survey
Station Elevation Data    num=     447
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.67   35.09   92.76   70.19   94.02  110.14   96.79   150.1  100.18
  210.71    96.7  271.31   92.72  331.92    93.1  392.53   93.16  453.14   93.23
  513.75   93.31  574.36   93.42  634.96   93.54  695.57   93.62  756.18    93.7
   779.9   94.79  793.02   95.11  838.95   94.74  865.19    95.1  881.59   94.82
  894.71   95.16  914.39   95.01  937.35   96.25  950.47      96  966.88   96.37
 1006.24   96.26 1025.92   96.62 1032.48   95.72 1052.16   94.92 1084.96   94.99
 1101.36    94.4 1117.77   94.74 1140.73   95.96 1183.37   94.83 1193.21   95.53
 1206.33   95.18 1219.45   95.63 1229.29   95.03 1258.81   95.36 1268.66   95.85
 1301.46   95.09 1324.42    95.9  1344.1   95.27 1363.78   96.17 1373.62   95.05
  1393.3   94.61 1406.42   95.04 1412.98   94.42 1439.23   94.85 1455.63   95.45
 1468.75   94.37 1488.43   94.17 1494.99   94.65 1504.83   93.71 1524.51   94.62
 1537.63   94.13 1570.44    93.9 1583.56   94.96 1599.96   93.45 1639.32   93.69
    1659   93.33 1678.68   93.48  1691.8   94.16  1724.6    93.1 1741.01   94.13
 1750.85   93.24 1790.21   94.18 1819.73   92.88 1836.13   93.11 1845.97   94.52
 1859.09   93.38 1895.18   93.06 1927.98   93.57  1941.1   93.03 1970.62   93.24
 1983.74   92.87 2042.79   92.69 2062.47   93.32 2075.59   92.86 2114.95   93.11
 2144.48    92.6 2167.44   92.91  2190.4   92.62 2226.48   90.27 2265.85   89.98
 2328.17   90.57 2338.01   90.03 2360.98   90.02 2370.82   90.48 2416.74   90.37
 2433.14   88.93 2442.98   90.43 2472.51   91.29 2479.07    90.9 2502.03   91.21
 2534.83    92.3 2544.67   89.86 2551.23   90.14 2557.79   92.07 2626.68   92.08
 2652.92   92.62 2659.48   92.45 2734.93   92.53 2744.77   92.82 2764.45   92.53
 2797.26   92.71 2813.66   92.47 2859.58    92.7 2875.99    92.5 2957.99   92.98
 2980.96   92.53 2997.36   93.15 3003.92   92.31 3013.76   93.97 3030.16   95.94
 3043.28   96.16 3049.84   93.23 3059.68   94.08  3072.8   89.58 3085.93    87.1
 3099.05   86.51 3118.73    87.1 3128.57   86.76 3144.97   87.56 3151.53   87.06
 3171.21   86.85 3177.77    88.3 3194.18   88.82 3213.86   86.58 3230.26   86.84
 3249.94   86.55  3272.9   87.07 3282.74    86.3 3295.87   87.08 3345.07   87.16
 3358.19    87.6 3371.31   87.18 3492.68   87.15 3499.24   87.35 3574.69   87.39
 3604.21   87.58 3735.43   87.45 3755.11   87.68 3899.44   87.65 3942.09   87.89
 3951.93   87.71 4060.18   87.83 4079.86   87.71 4129.06   87.91 4178.27   87.83
 4227.47   87.99  4306.2   88.06 4325.88   88.35 4348.84   88.12 4394.77   88.07
 4427.57   88.23 4434.13   88.67  4457.1   88.15 4493.18   88.35 4529.26    88.8
 4598.15   88.37 4653.91   88.51 4676.88   88.32 4775.28   88.38 4794.97   88.68
 4817.93   88.38 4857.29   88.61  4906.5   88.48 4978.66   88.58 5014.75   88.76
 5060.67   88.55 5086.91   88.95 5103.31   88.77 5149.24   88.88 5178.76    88.6
 5247.65   88.92 5267.33   88.65 5287.01   88.93 5329.65   88.58 5352.62   89.28
 5385.42   89.08 5428.06   89.11 5496.95   89.48 5519.91   89.14 5562.56   89.31
 5647.84   89.18 5693.77   89.26 5703.61   89.74 5719.98   89.42 5739.62   89.71
 5759.26   89.53 5831.27   89.51 5886.91   89.83 5932.73   89.74 5994.92   90.08
 6014.56   89.88 6047.29   90.27 6053.84   90.61 6070.21   89.02 6086.57   89.88
 6093.12   89.68  6119.3   90.36 6142.22   90.41 6165.13   91.66 6181.49   88.61
 6204.41   87.53  6217.5   84.57 6240.41   78.69 6260.05   68.82 6263.32   68.64
 6270.68   67.86 6326.36   64.48 6336.94   59.17 6372.43   61.04 6381.27   61.25
 6386.44   64.44 6391.93   65.34 6400.16   68.65 6433.52   68.61  6436.8   68.99
 6449.89   77.06 6453.16   77.81 6462.98   74.71 6469.53   73.58 6476.08   73.81
 6482.62   75.79 6495.71   82.24 6502.26   84.07 6512.08   84.25 6528.45   86.55
 6538.27   85.84 6580.82   84.57 6616.82   85.47 6633.19   85.57 6646.28   84.79
  6692.1   83.27 6724.83   83.49 6747.75   82.91  6777.2   84.34 6800.12   86.51
  6826.3   89.81 6842.67   92.54 6881.94   94.28 6901.58   94.14 6934.32   95.56
 6947.43   95.82 6973.67   95.62  6983.5    94.8  6999.9   94.64 7019.58   94.93
 7072.06    95.3 7078.62    94.4 7088.46   94.43 7101.58   94.93 7134.37      95
 7180.29   95.58 7196.69   95.29 7249.17   95.45 7272.12   95.23 7285.24   95.47
 7347.56   95.33 7380.36   95.56  7390.2   95.37 7429.55   95.62 7491.87   95.24
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 7537.79   95.16 7547.62   95.34 7613.22   95.05 7619.78   95.29  7649.3   94.85
 7708.33   94.94 7724.73   94.81 7800.17   94.98 7813.29   94.76 7836.24   95.02
 7852.64   94.79 7888.72   94.78 7901.84   94.49 7931.36   94.55 7960.88    94.3
 8019.91   94.21 8065.83   93.81 8072.39   93.93 8147.82   93.67 8190.46   93.94
 8206.86   93.62 8239.66   94.16 8262.62   93.75 8285.58   93.74 8292.15   93.23
 8338.07   92.76 8361.03   91.99 8397.11   91.65 8423.35   91.13 8439.76   92.15
  8449.6   92.22    8466   88.68 8472.56    87.9 9102.36    87.9 9217.17   88.03
 9253.25   88.22 9335.26   88.16  9361.5   87.92 9404.14    87.9 9820.73    87.9
 9856.82   90.58  9909.3   90.95 9932.26   91.46 9951.94   90.74 9971.62    90.9
 9981.47   91.4510017.55   91.2710043.79   91.8910089.71   91.8910122.52    91.4
10132.36   92.1610155.32   91.5710165.16   92.1510188.12   92.3210201.24   91.98
10230.76    92.410237.32   92.0810260.29   92.2210266.85   91.8410289.81    92.5
10299.65   91.7910312.77    91.710339.01   92.3310355.41   92.1610365.25   92.54
10384.93   92.38 10391.5   91.8710450.54   92.1610460.38    91.610509.58   91.62
10565.35   90.3110611.27   90.1910686.72   90.2610735.92   89.5510778.56   89.57
10817.92   89.8110850.73   89.7110932.73   90.1610962.26   91.2610975.38   90.77
10981.94   91.1711008.18   91.0711014.74   91.6411040.98      9111093.46   90.04
11119.71   89.0511136.11    88.811145.95   86.9711496.93   86.9711503.49    87.1
 11536.3   95.58 11569.1   95.4411605.18   96.0311637.98   95.7911647.82   96.12
11680.63   95.7111729.83   95.6711746.23   96.2411759.35   95.7811769.19   96.18
11782.31   95.1711792.15   95.9211815.12   95.2111821.68   95.5811838.08   95.11
11854.48   95.5211861.04   95.02   11884   95.1811897.12   94.7511923.36   94.92
11936.49   94.6511975.85   94.4711992.25   94.6912011.93   94.2812031.61   92.84
12057.85   92.8812080.82   92.4812156.26   92.6512175.94   92.3612254.67   92.11
12385.88   92.5712408.84   92.7912412.12   93.7512421.96   99.6712425.24  100.56
12441.64   99.7912454.76   93.4412461.32    92.412500.68   92.4112563.01   92.72
12674.54   92.8112789.35   93.0812825.43   93.0112871.35   93.1612956.64      93
13032.08   93.2413094.41   93.1113182.97    93.213232.18   93.5913291.22   93.35
13363.39   93.4513376.51   92.8513383.07   93.2813412.59   92.4413448.67    91.9
13468.35   92.05 13527.4   91.87 13576.6    91.913586.44   91.56   13593   90.48
 13625.8   89.6713724.21   89.6713822.62   89.1213855.42   89.3113917.75   89.08
13980.07   89.3813996.47   88.8414019.43   88.7414045.67   89.3714055.52   89.23
14081.76   89.7414144.08   90.0414163.76   90.3214186.72   90.2314249.05   89.07
14275.29   88.9214301.53    89.4 14324.5   89.08 14357.3      90 14390.1   89.79
14413.06   89.2814442.58   89.0114514.75   88.9714531.15   90.5114554.11   93.53
14573.79   97.7914596.75   98.8214613.16      9914619.72   98.1614629.56   94.44
 14639.4   93.3714698.44   93.37

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 6165.13    .066 6204.41    .015 6381.27    .066 6391.93    .088

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6204.41 6528.45           920.68 1243.87  995.11             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6204.41   87.53       T
 6528.4514698.44   86.55       T
Left Levee      Station=   150.1      Elevation=  100.18
Right Levee     Station=14613.16      Elevation=      99
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1455.63 3043.28   95.45

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.85    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                0.066      0.054     0.088
  W.S. Elev (ft)            101.83    Reach Len. (ft)           920.68    1243.87    995.11
  Crit W.S. (ft)             91.16    Flow Area (sq ft)       62544.81    9847.26   85460.48
  E.G. Slope (ft/ft)      0.000061    Area (sq ft)            62762.70    9847.26   86019.00
  Q Total (cfs)           125000.00    Flow (cfs)              51217.08   20001.29   53781.64
  Top Width (ft)          14698.44    Top Width (ft)           6204.41     324.04    8169.99
  Vel Total (ft/s)            0.79    Avg. Vel. (ft/s)            0.82       2.03      0.63
  Max Chl Dpth (ft)          42.66    Hydr. Depth (ft)           10.08      30.39     10.46
  Conv. Total (cfs)       16019440.0    Conv. (cfs)             6563751.0   2563276.0   6892413.0
  Length Wtd. (ft)          1002.89    Wetted Per. (ft)         6217.20     335.71    8187.01
  Min Ch El (ft)              59.17    Shear (lb/sq ft)            0.04       0.11      0.04
  Alpha                        1.76    Stream Power (lb/ft s)      0.03       0.23      0.02
  Frctn Loss (ft)              0.05    Cum Volume (acre-ft)    78705.52   35923.88   108164.50
  C & E Loss (ft)              0.00    Cum SA (acres)          12304.61    1656.39   13587.51


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 145

INPUT
Description: RGV-01, Updated on left with new survey to Station 1176.05.
             Bathymetric elevations translated from IBWC 2008 Cross-sections,
             Section along left levee updated with 2017 survey
Station Elevation Data    num=     421
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.18   22.92   91.61    31.9   92.25   42.86   91.31    62.8   91.81
   77.75   97.65  108.65   96.81  122.61  100.81  132.57  105.02  149.52  104.74
  168.46   97.74  198.36   89.39  211.32   89.99  234.25   94.08  242.22   94.39
  281.12   93.74  323.12   93.43  363.12   93.53  403.11   93.22  483.11    93.6
   526.1   93.43   563.1   93.58  645.09   93.44  685.09   93.62  764.08   93.44
  893.07   93.32  966.07   93.55 1044.06   93.62 1086.06   93.83 1176.05   93.62
  1202.2   95.83 1228.43   95.39 1238.27   96.36 1248.11   94.66 1257.95   95.82
 1267.78   95.81 1284.18    94.9 1300.58   95.53 1316.97    94.8 1326.81   92.94
 1349.77      91  1392.4   90.67 1435.03   90.68 1454.71   91.03 1500.62   90.71
 1536.69   90.98 1576.05   90.68 1605.56   90.96 1644.91   90.76 1703.94   90.76
 1740.02   90.93 1812.16   90.94 1825.28   90.72 1890.87   91.02 1940.06   90.95
 1972.85   91.38 1999.09   91.05 2058.12   91.25 2064.68   91.04 2107.31   91.24
 2126.99   91.08 2159.78   91.27 2205.69   91.29 2271.28   91.12  2395.9   91.55
 2458.21   91.14 2530.36   91.56 2536.92   91.32 2576.27   91.19  2635.3    91.4
 2700.89   91.42 2750.08   91.74 2855.02    91.9 2891.09   91.71 2973.08   92.02
 2979.64   92.35 2992.76   91.75 3032.11      92 3133.77   92.08 3163.29   93.14
  3209.2    93.1 3255.11   93.33 3271.51   93.85 3284.63   92.44 3294.47   92.69
  3320.7   92.15 3376.45   92.17 3435.48   92.35  3448.6   92.73 3458.44   92.37
 3504.35    92.8 3533.86   92.79 3546.98    93.1 3573.22   92.98 3586.34   93.25
 3599.45   96.68 3619.13   96.74 3635.53   93.52 3645.37   92.97 3651.92   91.38
 3661.76   87.67 3668.32   86.52 3684.72   87.18  3704.4   86.29 3773.26   86.37
 3901.16   86.31 3920.84   86.44 4009.38   86.26 4052.02   86.73 4081.53   86.32
  4117.6   86.53 4127.44    87.3 4137.28   86.82 4166.79   86.54 4193.03   87.18
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 4222.54   87.38 4252.06   86.55 4297.97   87.06 4317.64   86.67 4330.76   87.25
 4360.28   86.51 4416.02   87.43 4438.98   88.14 4494.73   88.57  4530.8   88.33
 4553.76   87.79 4589.83   87.59 4661.98   87.73 4773.47   88.36 4802.99   87.99
 4871.85   88.21 4914.48   88.03 4940.72   88.28 4986.63   88.03 5025.98   88.15
 5058.78   87.95 5085.01   88.47 5124.36    88.1 5147.32   88.41 5183.39   88.42
 5235.86   88.14 5298.17   88.62  5340.8   88.57 5360.48   88.35 5389.99   88.49
 5399.83   88.81 5416.23   88.48  5435.9   88.64 5478.53   88.49 5491.65   88.72
 5544.12   88.52 5583.47   88.62 5599.87   89.03 5678.57   88.79 5704.81   89.16
  5737.6   89.17 5763.84   88.88  5832.7   89.05  5849.1   89.33 5901.57   89.11
 5921.24   89.48 5937.64   89.33 5963.88   89.67 6016.35   89.61 6058.98   90.47
 6065.54   89.66 6078.65      86 6098.33   85.75 6104.89   85.22  6150.8   86.55
 6160.64   87.14 6186.87   87.19 6222.94   86.06 6242.62    85.8 6265.58    84.8
 6288.53   85.04 6314.75   86.01 6347.51   86.81 6354.06   86.44 6376.99   87.23
 6413.02   87.98 6432.67   88.01 6458.88   88.52 6485.08   88.55 6491.63   89.13
 6521.11   89.41 6553.87   88.35 6566.97   89.24 6593.18   88.77 6606.28   89.22
 6619.38    88.9 6671.79   88.77 6688.17   88.42 6720.93   88.53 6740.58   88.99
 6753.68   89.85 6770.06   90.21 6786.44   91.09 6799.54   91.17 6809.37   89.89
 6835.57   89.14 6848.67   90.09 6878.16      91 6907.64   90.07 6930.57   88.97
 6937.12   89.77 6953.49   89.56 6963.32   88.03  6979.7   87.75 6999.35   89.84
 7012.46   88.93 7028.83   86.93 7041.94   86.86 7061.59   84.41 7087.79   84.48
 7110.72   86.52  7127.1    82.5 7136.93   80.77 7156.58   79.48 7182.79   81.12
 7208.99   77.39 7228.65   75.77  7235.2   75.76 7245.02   77.13 7254.85   80.39
 7267.95      81 7287.61    83.1 7297.43   80.23 7307.26   75.52 7313.81   71.06
 7323.64   68.37 7333.64    67.4 7343.64    66.9 7363.64    66.1 7383.64    65.1
 7403.64      64 7423.64    63.4 7443.64    63.9 7453.64    66.7 7480.87   68.37
 7484.14   68.76  7503.8   82.06 7520.17   91.14 7523.45   92.03 7582.41   91.73
 7628.27   91.35  7651.2   91.37 7683.96   91.85 7742.92   94.19 7782.22      95
 7792.05   94.53 7831.36   94.33 7847.73   94.78 7877.22   94.21 7893.59   94.34
 7916.52   93.79 7975.48   93.54 8001.69   93.82 8037.78   93.87 8047.62   93.02
 8057.46    90.6 8073.87   88.94 8106.67   88.55 8198.54   89.25 8237.91   88.97
 8277.28   89.44 8382.27   89.95 8408.52    89.8 8470.86   90.05 8552.88   89.97
 8598.82   89.71 8611.94   90.16 8625.06   89.85 8648.03   90.01    8671   89.62
 8710.37    89.8 8753.02   89.78 8772.71   90.02 8831.76   90.23 8838.33   90.09
 8874.42   90.54 8985.97   91.19 9081.12   91.97 9117.21   92.18 9205.79   91.97
 9235.32   92.18 9310.78   91.97 9389.53   91.88 9491.24   91.14 9550.29   90.39
 9589.67   90.26 9606.07   89.95 9638.88   89.87 9684.81   89.37 9734.03   89.12
 9786.52    88.3 9816.05   88.24 9839.02    87.9 9907.92    87.9 9930.89   88.66
 9957.14   92.46 9973.54   91.9610035.88   91.8610045.72   91.5410055.57   94.49
10058.85   94.5810065.41   92.3210111.34   92.4710190.09   92.3510199.93   92.58
 10222.9      9210341.01   91.77 10377.1   91.3710396.79   91.6210409.91   91.19
10452.57    90.910482.09   90.9210524.75   90.1910564.12   90.4810646.14   89.69
 10688.8   89.4810708.48   89.9510800.35    89.210829.88   89.4910846.28   89.11
10869.25   89.4310915.18   89.3410934.87   89.6510970.96   89.2411013.61   89.48
11079.23   89.2211105.48   88.6811164.54   88.1811217.03   88.3311236.72   87.97
11253.12   88.4911269.53   87.9311597.62   87.9311630.43   89.1611643.56   91.71
11659.96   94.2811679.65    94.311689.49   93.7711696.05    94.311725.58   94.45
11771.51   93.9411781.36   93.6111787.92   94.2511804.32   94.0111830.57   94.16
11883.07   93.8111896.19   93.9311984.78   93.47 12050.4    93.4 12119.3    92.9
12152.11   92.2812181.64   92.2212332.56   90.7812371.93   90.6612424.43   90.86
12522.86   91.9712575.35    92.312627.85   92.2512683.63   92.6612696.75    92.5
 12739.4   92.8112755.81   92.7112801.74   92.95 12808.3   93.7412811.59   92.49
12818.15   93.9612821.43   92.7312841.11   93.3212854.24   92.5412896.89   92.77
13064.22    92.513097.03   92.7713123.28   92.5513211.87   92.69 13257.8   92.53
13277.48   92.77 13326.7   92.6413497.31   92.6813546.52   92.7913569.49   93.04
 13602.3   92.5913605.58   93.4313612.14   92.4713615.42   93.2213628.55   92.86
13684.32   92.9213782.75   92.6713841.81   91.7613854.93    91.813917.27   91.01
13959.92   90.2614028.83   89.6614061.63   89.2114123.97    88.7 14222.4   88.22
14304.43   88.3914366.76   88.1314393.01   88.3314438.95   88.3414448.79   89.06
14461.91   91.6214484.88   93.2414501.29    96.514520.97   99.1514540.66   99.36
14543.94   98.6914557.06   93.3414662.05   93.34 14671.9   93.9414678.46   96.86
14685.02   98.1214714.55   97.4214744.08   93.9314770.33   92.0914796.57   91.56
14839.23   92.13

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 7061.59    .066 7307.26    .015 7484.14    .066 7520.17    .088

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7110.72 7523.45          1054.14  1745.3 2394.82            .1       .3
Left Levee      Station=  132.57      Elevation=  105.02
Right Levee     Station=14540.66      Elevation=   99.36
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1238.27 3596.62   92.3611984.7814494.65   92.92

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)           101.80    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.02    Wt. n-Val.                 0.066      0.048      0.088
  W.S. Elev (ft)           101.78    Reach Len. (ft)          1054.14    1745.30    2394.82
  Crit W.S. (ft)            90.90    Flow Area (sq ft)       78825.87   11388.31   73924.59
  E.G. Slope (ft/ft)      0.000049    Area (sq ft)            78825.87   11388.31   73924.59
  Q Total (cfs)           125000.00    Flow (cfs)             62505.07   21842.95   40651.97
  Top Width (ft)          14681.70    Top Width (ft)          6953.19     412.73    7315.78
  Vel Total (ft/s)            0.76    Avg. Vel. (ft/s)           0.79       1.92       0.55
  Max Chl Dpth (ft)          38.38    Hydr. Depth (ft)          11.34      27.59      10.10
  Conv. Total (cfs)       17914750.0    Conv. (cfs)            8958101.0   3130487.0   5826159.0
  Length Wtd. (ft)         1730.88    Wetted Per. (ft)         6959.88     424.90    7331.08
  Min Ch El (ft)             63.40    Shear (lb/sq ft)           0.03       0.08       0.03
  Alpha                       1.82    Stream Power (lb/ft s)     0.03       0.16       0.02
  Frctn Loss (ft)             0.10    Cum Volume (acre-ft)    77209.21   35620.68   106337.60
  C & E Loss (ft)             0.00    Cum SA (acres)          12165.56    1645.87   13410.63


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 144.7

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections, Section along left levee updated with
             2017 survey
Station Elevation Data    num=     441
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.97   35.12   91.98   70.24   91.99  113.27   93.05  156.29   95.64
  199.32  102.29   260.8   94.98  322.29   92.76  383.77   93.85  445.25      94
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  506.74      94  568.22   93.31  629.71   92.99  691.19   92.95  752.68   92.91
  769.96   94.01   796.2   94.67  809.32    94.1  815.87    94.7  835.55   94.32
  842.11   94.73  861.79   94.47  917.54   94.91  963.45   94.93  970.01   94.59
  999.53   95.32 1012.65   95.09 1032.32   95.42 1042.16   96.12 1058.56   95.15
 1071.68   95.54 1081.52   95.04 1091.36   95.42 1137.27   95.51 1160.23   95.38
 1166.79   95.85 1173.35   95.29 1222.54    95.7 1242.22   95.29 1288.13   95.19
 1327.49   95.62 1350.44   96.96 1360.28   96.34 1379.96   95.97 1393.08   96.33
 1416.04   96.02 1448.83   96.11 1461.95   95.95 1478.35    95.1 1494.75   93.57
 1511.14   90.64 1530.82   90.78 1560.34   91.42 1612.81    90.9 1639.05   91.17
 1671.84   91.23  1694.8    90.9 1743.99   90.75 1753.83   91.14 1770.23   90.83
 1783.35   90.99 1803.03   90.49 1819.42   90.92 1891.58   90.67 1904.69   90.86
 1934.21   90.52 1970.29   90.86 1996.52    90.6 2003.08    90.9 2035.88   90.83
    2049   90.57 2071.95   90.81 2098.19    90.8 2134.26   90.42 2147.38   90.56
 2180.18   90.38 2239.21   90.35 2258.89   90.58 2275.29   90.43 2344.16   90.75
 2367.11   90.38 2383.51   90.77 2419.59   90.68 2455.66   90.89  2481.9   90.72
 2511.42    90.8 2534.37   91.09 2606.52   91.14 2649.16   91.02 2698.35   91.16
 2731.15   91.51  2754.1    91.3 2767.22   91.66 2839.37   91.57  2914.8   91.81
 3006.63   91.63 3068.94   91.63  3108.3   91.96 3164.05   92.23 3275.56    91.9
 3331.31   91.96 3423.14   91.59 3498.57   91.53 3521.53   91.63 3567.44   91.31
 3600.24   91.36  3606.8   91.16 3678.95   91.19 3698.62   90.92 3747.82   90.87
 3760.94    90.5 3777.33   90.86 3800.29   90.38 3839.65    90.6  3862.6    90.4
 3892.12    90.5 3964.27   90.19 4000.35   90.36 4026.58   90.13 4079.06   90.19
 4157.76    89.9 4239.75   90.07 4292.22   90.69 4311.89   90.58 4334.85   90.97
 4403.71   90.98 4416.83   91.11  4485.7   90.95 4548.01   91.09 4574.24   90.83
 4715.26   91.12 4767.73   90.95 4800.52   91.21 4852.99   91.06 4905.46   91.17
 4961.21   91.08 5049.75   91.14 5059.59   91.26  5138.3   91.15 5177.65   91.38
 5203.88   91.14 5236.68   91.16 5282.59   90.97  5328.5   91.32 5358.01   91.89
 5367.85   91.26 5380.97   89.19 5400.65   87.64 5492.47   87.07 5528.54   87.27
 5571.17   87.23 5617.08   86.95 5636.76   87.15 5659.72   86.95 5712.19   86.81
 5764.66   87.07 5784.33   86.95 5830.24   87.02 5840.08   87.35 5863.04   86.77
 5872.88   87.37 5902.39   87.55 5925.35   88.28 5945.02   88.54  5981.1   89.62
 5997.49   90.33 6020.45   90.46  6043.4      91 6063.08   91.99 6079.48   91.95
 6112.27   91.46 6118.83   92.16 6128.67   91.79 6138.51   92.35 6168.02   92.84
 6190.98   92.35 6213.93   92.14 6227.05   91.08 6240.17   90.69    6250    89.6
 6269.68   88.39 6279.52   88.62 6286.08   87.82 6315.59   88.47 6345.11   88.27
 6351.67   87.52 6364.78   87.16 6381.18   87.42 6413.97    88.7 6427.09   88.37
 6433.65    86.7 6450.05   76.49 6459.88   74.37 6469.72   73.36 6479.56   71.27
  6489.4   68.11 6496.76   67.33 6552.44   63.95 6563.02   58.64 6598.51   60.51
 6607.35   60.72 6612.52   63.91 6618.01   64.81 6626.24   68.12 6636.97   72.12
 6643.53   72.99 6653.37   76.06 6663.21    77.9 6669.76   79.89 6682.88   85.98
 6689.44   87.91 6699.28    92.7 6709.12   93.14 6718.96   92.34 6735.35   92.36
 6748.47   91.92 6768.15   91.76  6774.7   92.09 6800.94   91.99 6810.78   92.48
 6859.97   92.41 6879.64   92.06    6919   92.11 6932.11   91.91 6961.63   91.97
 6991.14   91.74 7017.38   91.29 7060.01   91.12 7086.25   90.72 7158.39   90.59
 7230.54   89.67 7250.21   91.04 7266.61   90.47 7283.01   91.12 7296.13   90.42
 7312.52   90.54  7348.6   88.54 7361.71   88.29 7384.67   88.67 7414.18   89.91
 7440.42   89.68 7463.37   89.11 7473.21   88.51 7509.28   88.71 7545.36    88.3
 7604.39   88.18 7656.86   87.68 7715.88   87.57 7768.35   87.14 7788.03   87.24
  7824.1   87.02 7863.46   87.48 7883.13   87.23  7919.2   87.21 7984.79    87.6
 7994.63   87.84 8024.14   87.87  8063.5   88.23 8076.61   88.13 8109.41   88.38
  8158.6   88.34 8178.27   88.57 8201.23   88.38 8234.02   88.67 8247.14   88.38
 8260.26   88.65 8283.21   88.54 8322.56   88.69 8440.62   88.68 8466.85   88.54
 8535.72   88.71 8575.07   88.44 8588.19   88.63 8666.89    88.5  8729.2   88.72
 8781.66   88.49 8811.18   88.73 8866.93   88.68 8945.63   88.96  8965.3   88.83
 8991.54    89.1 9030.89   88.91 9099.76   89.45 9109.59    89.3 9145.67   89.77
  9155.5   89.59 9270.28   90.54 9299.79   91.07 9306.35   90.96 9381.78   91.64
 9401.45    91.4 9444.08   91.67 9450.64   91.35 9463.76   91.69 9506.39   91.73
 9526.06   91.38 9555.58   91.57 9591.65   91.37 9608.05   91.53 9650.68   91.17
 9706.43   91.33 9735.94   91.16 9781.85   91.38 9880.23   91.62 9906.46   91.34
 9913.02   91.5810099.94   91.4610139.29   91.3310165.53   91.0810247.51   90.89
10267.19   90.5810299.98   90.6910345.89   90.4210401.64   90.2810424.59   90.03
10460.66   90.0310490.18   89.7710536.09   89.59   10582   89.6110631.19   89.39
 10644.3   89.0210654.14   89.2910709.89   88.9310719.73   89.1110745.96   88.78
10778.76   88.6910831.22   88.9210870.58   88.5610886.97   88.7110932.88   88.42
10982.07   88.38 11024.7   88.1611037.82   88.3411077.17   87.9111093.57   88.52
11106.69   87.93 11326.4   87.9311332.96   88.4311359.19    88.911385.43   89.84
11434.62   91.9611447.73   92.9611457.57    94.311470.69   93.8811477.25   93.14
 11483.8   93.5911519.88    93.611536.27   94.2111542.83   93.5211546.11   94.35
11552.67   93.7511575.62   93.3711614.98   93.4111660.89   93.0311716.63   93.03
11733.03   92.87 11801.9   92.7811824.85   92.4511893.72   92.3911949.46   91.84
12015.05   91.5812038.01   91.3212090.47   91.0912116.71    90.812152.78   90.82
12175.74   90.5112195.41    90.712224.93   90.5212280.67   90.6812293.79   91.04
12336.42   91.2312375.77   91.6812411.85    91.712480.71   93.6212497.11   93.48
12510.22    92.212520.06   91.8212556.13   92.4612575.81   92.1412628.28   92.58
12647.96   92.5912657.79   93.0312664.35   92.2612680.75   92.6612687.31   92.12
12697.14   92.6412733.22   92.7112772.57   92.5812785.69   92.7912825.04   92.72
12903.74    92.9 12926.7   92.73   12989    92.813070.98   92.6313103.78   92.85
13238.23   92.75 13290.7   92.9313379.24   92.9913392.36   92.7313398.91   93.46
13405.47    92.413415.31   93.3313421.87   92.9413516.97   92.89 13559.6   92.53
13608.79   92.6213657.98    92.313743.24   92.31 13749.8   92.0313798.99   91.74
13854.74   91.1413884.25   90.6213907.21   90.4413972.79   89.38 14035.1   88.68
14061.33   88.5514136.76   87.7914185.95   87.3814222.02    86.914238.41   86.41
14244.97    87.214258.09   85.9314297.44   85.6514313.84    88.3 14320.4   90.32
14330.23   92.2514340.07   95.2214346.63   98.2714366.31   99.4314379.42   99.64
14389.26    97.114395.82   93.61 14399.1   93.34 14510.6   93.3414523.71   96.77
14546.67   96.4214576.18   93.7414595.86   92.4514608.97   92.2414625.37   92.55
14635.21   91.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .09 6469.72    .066  6489.4    .015 6626.24    .066 6653.37    .088

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6413.97 6709.12         1041.28  836.82     499             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 6413.97    88.7       T
Left Levee      Station=  199.32      Elevation=  102.29
Right Levee     Station=14379.42      Elevation=   99.64
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 5358.01    91.111824.85       0   91.46

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.69    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                0.090      0.057     0.088
  W.S. Elev (ft)            101.67    Reach Len. (ft)         1041.28     836.82     499.00
  Crit W.S. (ft)             92.83    Flow Area (sq ft)       62046.35    8697.79   87848.62
  E.G. Slope (ft/ft)      0.000077    Area (sq ft)            62971.34    8697.79   87848.62
  Q Total (cfs)           125000.00    Flow (cfs)             41798.80   18412.99   64788.20
  Top Width (ft)          14430.71    Top Width (ft)          6209.47     295.15    7926.09
```

Vel Total (ft/s)	0.79	Avg. Vel. (ft/s)	0.67	2.12	0.74	
Max Chl Dpth (ft)	43.03	Hydr. Depth (ft)	9.99	29.47	11.08	
Conv. Total (cfs)	14209250.0	Conv. (cfs)	4751436.0	2093078.0	7364732.0	
Length Wtd. (ft)	695.90	Wetted Per. (ft)	6211.30	306.80	7940.92	
Min Ch El (ft)	58.64	Shear (lb/sq ft)	0.05	0.14	0.05	
Alpha	1.76	Stream Power (lb/ft s)	0.03	0.29	0.04	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	75493.48	35218.29	101890.70	
C & E Loss (ft)	0.00	Cum SA (acres)	12006.29	1631.69	12991.65	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 144.55

INPUT
Description: RGV-01, Updated on left with new survey to Station 1231.74.
Bathymetric elevations translated from IBWC 2008 Cross-sections,
Section along left levee updated with 2017 survey
Station Elevation Data num= 427

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.24	29.98	92.2	59.96	93.28	72.95	97.52	109.93	96.77
129.92	100.53	140.92	104.3	146.91	105.03	162.9	103.86	186.89	95.87
209.88	89.26	225.88	88.23	235.87	88.41	249.87	90.84	267.87	91.21
310.86	91.09	340.86	91.63	360.86	91.33	391.85	91.66	431.85	91.38
550.83	91.43	721.8	91.34	752.8	91.94	792.8	91.87	829.79	92.26
872.79	92.37	889.78	92.06	1073.76	92.77	1114.76	92.61	1231.74	92.97
1259.61	94.95	1279.3	94.58	1308.82	90.88	1351.46	91.02	1377.71	91.39
1407.23	90.8	1436.75	90.65	1446.6	90.37	1482.68	91	1515.48	90.91
1535.17	91.19	1554.85	90.58	1564.69	90.96	1600.77	91.33	1669.66	91.12
1689.34	90.78	1731.99	91.32	1745.11	91.1	1764.79	91.29	1777.91	90.97
1810.72	91	1836.96	90.76	1859.92	91.55	1882.89	91.59	1889.45	91.17
1928.81	91.01	1948.49	90.58	1968.18	91.06	2020.66	91.02	2037.06	91.52
2050.19	90.82	2063.31	90.96	2086.27	90.62	2109.23	91.3	2138.76	90.5
2187.96	90.43	2220.77	90.66	2247.01	90.47	2276.53	91.41	2289.66	90.88
2312.62	91	2329.02	90.63	2388.07	90.49	2394.63	90.68	2453.68	90.33
2470.08	90.78	2479.92	90.61	2499.6	90.95	2529.13	90.66	2561.93	91.49
2578.33	91.43	2601.3	90.93	2627.54	91.12	2643.94	90.66	2689.87	90.7
2709.55	90.38	2716.11	90.75	2745.63	91.13	2765.32	91.79	2785	91.91
2807.96	92.46	2830.92	92.5	2840.77	92.19	2860.45	92.31	2876.85	92.78
2912.94	92.28	2919.5	91.89	2958.86	91.97	2998.23	91.38	3037.59	91.64
3050.71	91.18	3142.56	91.99	3188.49	91.94	3280.34	90.75	3342.67	90.91
3372.19	90.59	3398.44	91.04	3418.12	91.63	3447.64	91.85	3470.61	91.02
3490.29	91.13	3513.25	90.7	3565.74	90.85	3572.3	90.68	3598.54	91.08
3624.78	90.79	3644.47	91.22	3716.64	91.28	3726.48	92.17	3746.16	91.59
3759.28	92.27	3765.84	91.79	3788.81	91.6	3811.77	91.87	3844.57	90.96
3877.38	90.68	3897.06	90.25	3929.86	91.15	3936.42	91.02	3959.39	91.63
3979.07	91.71	3992.19	91.41	4051.24	91.84	4061.08	91.71	4087.32	92.04
4107.01	92.63	4116.85	93.3	4159.49	94.68	4166.05	95.72	4175.9	96.14
4195.58	94.33	4228.38	94.39	4231.66	94.73	4251.34	94.36	4274.31	94.96
4300.55	94.21	4349.76	94.42	4362.88	93.71	4369.44	93.89	4395.68	93.54
4415.37	93.6	4425.21	93.09	4441.61	90.42	4448.17	89.86	4480.97	89.36
4546.58	89.48	4556.42	89.08	4582.67	89.29	4608.91	89.88	4628.59	90.04
4667.96	88.96	4713.88	88.96	4727.01	88.63	4763.09	89.32	4795.89	89.28
4802.46	88.97	4822.14	89.17	4851.66	89.01	4864.78	89.34	4900.87	88.68
4959.92	88.63	4996	89.21	5038.65	88.44	5058.33	88.3	5107.53	88.72
5117.38	88.44	5130.5	88.8	5156.74	88.9	5169.86	88.45	5199.39	88.83
5205.95	88.32	5232.19	88.25	5248.59	88.78	5268.28	88.88	5291.24	89.44
5333.88	89.71	5360.13	89.63	5373.25	90.01	5389.65	89.88	5409.33	90.23
5432.3	90.15	5455.26	90.53	5514.31	90.22	5543.83	89.32	5556.95	89.47
5576.64	89.19	5586.48	89.58	5612.72	89.63	5645.52	89.43	5711.13	89.61
5776.74	90.1	5786.58	90.87	5809.54	90.24	5829.23	90.36	5871.87	90.28
5898.12	90.03	5944.04	90.49	5967.01	91.01	5980.13	90.94	6019.48	92.27
6042.43	92.01	6055.55	92.68	6091.62	92.69	6114.58	93.47	6137.53	93.37
6144.09	93.86	6167.04	93.18	6176.88	93.72	6203.12	93.43	6212.95	90.97
6235.91	73.95	6249.03	68.61	6264.31	66.56	6284.31	59.86	6304.31	61.86
6314.31	61.86	6334.31	63.86	6354.31	64.06	6374.31	65.86	6394.31	66.06
6403.15	68.05	6409.71	68.64	6422.83	76.19	6426.11	77.23	6435.94	78.04
6445.78	80.3	6462.18	79.76	6478.58	82.09	6494.97	83.54	6511.37	87.15
6531.04	89.24	6540.88	87.74	6550.72	88.52	6570.39	89.04	6613.02	88.81
6655.66	88.28	6672.05	88.41	6731.08	88.13	6767.15	88.16	6799.94	88.39
6822.9	88.84	6849.13	89.76	6858.97	89.36	6868.81	90.35	6878.65	89.94
6888.48	90.46	6908.16	90.72	6927.83	89.86	6944.23	90.61	6963.91	90.5
6996.7	90.72	7016.37	90.47	7065.56	90.58	7101.64	90.33	7173.78	90.14
7206.57	90.19	7213.13	89.96	7324.62	90.07	7341.02	89.85	7390.21	89.86
7501.71	89.27	7514.82	89.56	7527.94	89.2	7541.06	89.39	7577.13	89.23
7616.48	89.38	7698.46	88.84	7760.77	89.03	7813.24	88.81	7823.07	88.53
7846.03	88.71	7868.98	88.47	7882.1	88.63	7931.29	88.33	7947.69	88.46
8000.15	88.12	8042.78	88.14	8114.93	87.8	8121.49	87.94	8160.84	87.75
8229.7	87.82	8282.17	87.62	8419.9	87.49	8429.74	87.23	8455.97	87.72
8478.93	87.49	8498.6	87.78	8600.26	87.76	8610.1	87.99	8636.33	87.93
8701.92	88.19	8721.6	88.07	8783.9	88.43	8819.98	88.35	8842.93	88.5
8931.47	88.45	9157.74	89.06	9220.05	89.13	9243	89.29	9285.64	89.25
9361.06	89.77	9459.44	89.88	9472.56	89.35	9482.39	89.79	9502.07	92.54
9511.91	92.56	9525.02	93.37	9547.98	91.5	9584.05	92.28	9633.24	92.09
9636.52	92.76	9643.08	92.04	9675.87	92.16	9725.06	91.96	9748.02	92.07
9764.41	91.86	9869.35	91.71	9938.22	91.69	9971.01	91.5110000.52		91.79
10016.92	91.5710033.32		91.7910072.67		91.7510187.44		91.2510233.35		91.33
10289.1	90.9210338.29		90.7810348.13		90.4310397.32		90.410443.23		90
10462.9	89.67 10495.7		89.6310597.35		88.9910692.45		88.6510715.41		88.69
10787.55	88.5210813.79		88.7110872.82		88.4310918.73		88.4611007.27		88.3
11053.18	88.4411059.74		8811079.41		88.5111092.53		90.5711102.37		90.97
11118.76	93.0811125.32		93.1211135.16		92.1411148.28		94.6411171.23		94.82
11187.63	93.4911200.75		94.0211233.54		94.1711243.38		93.911282.73		94.11
11331.92	94.0611341.75		93.4411358.15		94.4511377.83		94.311400.78		92.8
11459.81	92.6711502.44		92.6911636.89		92.4411692.64		92.2311754.95		92.41
11807.42	92.2711817.25		91.9511836.93		92.0311859.88		91.7411899.24		91.63
11925.47	91.77 11984.5		91.611991.06		91.78 12063.2		91.9412112.39		91.71
12164.86	91.8212276.35		91.7712318.99		91.5712400.97		91.7212473.11		91.63
12505.91	92.3212519.02		92.1112587.89		91.9212643.64		92.1712689.55		92.1
12705.94	92.2612748.57		92.0112764.97		92.1 12886.3		91.9413046.99		92.09
13096.18	92.0413132.25		91.8313191.28		91.6913276.54		91.64 13299.5		91.43
13342.13	91.3613358.52		91.5813388.04		91.34 13440.5		91.4213519.21		90.73
13558.56	90.2613620.87		89.9413650.38		89.313686.45		88.9313889.77		87.46
13961.91	86.1813971.75		86.2713981.59		87.0813994.71		85.7714014.38		85.67
14020.94	86.114037.34		89.3614060.29		92.3514066.85		93.9114076.69		97.46
14086.53	98.5814102.92		99.19						

```
Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .172 5776.74    .066 6235.91    .015 6409.71    .066 6531.04    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6144.09 6531.04           855.55 4265.19 3099.28            .1       .3
Left Levee      Station=  146.91      Elevation=  105.03
Right Levee     Station=14102.92      Elevation=   99.19
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    63.1  4175.9   91.4111168.4514197.18   91.41

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.64    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                0.157      0.047     0.067
  W.S. Elev (ft)            101.62    Reach Len. (ft)          855.55    4265.19    3099.28
  Crit W.S. (ft)             92.66    Flow Area (sq ft)       61697.42    9859.99   84232.78
  E.G. Slope (ft/ft)      0.000072    Area (sq ft)            61697.42    9859.99   84232.78
  Q Total (cfs)           125000.00     Flow (cfs)             23568.82   22367.43   79063.75
  Top Width (ft)          13933.28    Top Width (ft)           5974.45     386.95    7571.88
  Vel Total (ft/s)            0.80    Avg. Vel. (ft/s)            0.38       2.27       0.94
  Max Chl Dpth (ft)          41.76    Hydr. Depth (ft)           10.33      25.48      11.12
  Conv. Total (cfs)       14711690.0     Conv. (cfs)            2773897.0  2632501.0  9305289.0
  Length Wtd. (ft)          2616.99    Wetted Per. (ft)         5977.32     398.91    7576.86
  Min Ch El (ft)              59.86    Shear (lb/sq ft)            0.05       0.11       0.05
  Alpha                        2.34    Stream Power (lb/ft s)      0.02       0.25       0.05
  Frctn Loss (ft)              0.30    Cum Volume (acre-ft)    74003.41   35040.04   100905.00
  C & E Loss (ft)              0.00    Cum SA (acres)          11860.67    1625.14   12902.88


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 144

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections, Section along left levee updated with
             2017 survey
Station Elevation Data    num=     443
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    91.9    34.6   91.98    69.2   94.65  108.14   97.69  147.08   98.18
  208.43    90.1  269.79   88.45  331.14      89  392.49   89.85  453.85   90.76
   515.2      91  637.91      91  699.26   91.23  760.61   91.53  773.47   92.06
  806.27    92.9  819.39   92.13  839.06   92.56   865.3   92.22  907.93   92.84
  917.77   92.19  937.45   92.53 1035.84   92.08 1052.23   92.61 1071.91   92.36
 1147.34   93.79 1180.14   94.01 1212.93   93.55 1262.13   94.13 1294.92   93.69
 1337.56   94.04 1357.24   93.01 1380.19   92.85 1419.55   94.33  1458.9   95.25
 1472.02   94.94 1494.98   95.44 1534.33   93.38 1550.73   93.02 1580.25   93.49
 1613.04   93.54 1645.84   92.49 1681.92   92.39 1691.75   93.07 1708.15   92.67
 1744.23   93.01 1777.02   92.42 1816.38   92.58 1855.73   93.29 1881.97   90.88
 1911.49    91.2 1970.52   90.15  2518.2   90.15 2560.83   91.03 2596.91   91.01
 2616.58   90.64 2652.66   90.69 2675.61   91.58 2695.29   91.03 2744.48   90.67
  2757.6   91.16 2803.51    91.1 2833.03   90.63 2865.83   91.48 2905.18   90.82
 2941.25   90.83 2954.37   91.47    2997   90.49  3046.2   90.51 3095.39   91.43
 3115.07   90.93 3154.42   90.67 3236.41   90.99 3272.48   90.62 3292.16      91
 3308.56   90.61 3344.63   90.51 3364.31   90.88 3423.34    90.6 3443.02   90.99
 3495.49   91.07 3515.17   90.59  3557.8   91.32  3574.2   90.75 3616.83   91.27
  3652.9   90.56 3692.26   90.32 3767.69   90.48  3780.8   91.11 3803.76    91.2
 3826.72   90.56 3872.63   91.37 3898.87   90.41 3948.06   91.06 3997.25   91.31
 4049.72   90.56 4056.28   91.07 4079.24   95.11 4105.48   95.94 4151.39   95.41
 4171.07   96.51 4210.43    94.5 4308.82   95.17 4387.53    94.9 4397.37   95.13
 4443.28   94.07 4449.84   94.44 4476.08   93.93 4499.04   94.15  4538.4   93.66
 4548.23   93.15 4558.07   94.11 4590.87   94.08 4617.11   95.06 4626.95   94.28
 4653.18    94.6 4685.98   94.39  4699.1   93.78 4738.46   94.81 4777.81    94.3
 4790.93    92.9 4813.89    92.6 4823.73   93.27 4846.69   92.99 4879.48   95.65
 4889.32   95.82 4902.44   94.44 4915.56   95.97  4958.2   95.33 4971.32   95.93
 4997.55   95.92 5013.95   95.03 5027.07   96.01 5046.75   95.64 5072.99   95.79
  5102.5   97.69  5118.9   96.02  5135.3   95.52 5154.98   96.22 5171.38   92.09
 5197.61   90.28 5230.41   89.22 5253.37   89.58 5276.33   90.65 5309.12   91.56
 5423.91   91.56 5443.59   92.04 5476.39   91.88 5525.58   92.43  5571.5   91.76
 5643.65   92.07 5653.49   92.56 5676.45   92.06 5715.81   92.88    5765   92.96
 5787.96   91.08 5804.36   91.09 5866.67    93.1 5892.91   92.18 5909.31   92.85
 5922.43   92.63  5942.1   93.28  5958.5   92.43 5988.02   91.96 6010.98    92.2
 6030.66   91.78 6086.41   92.32 6106.09   92.12 6145.45   93.09 6194.64   92.03
 6263.52   92.16 6283.19   91.91 6355.35   92.72 6391.42    93.6 6453.74   94.08
 6473.42   94.63 6486.53   93.68 6519.33    92.6 6601.32   91.18 6630.84   89.74
  6686.6    90.4 6709.55   91.16 6755.47   91.19 6778.43   91.92  6830.9   91.66
 6873.54   91.69 6899.78   91.23  6912.9   92.15 6939.13   91.37 6991.61   91.22
 7017.85   91.79 7086.72   91.21 7165.43   92.61 7224.47   92.17  7250.7   91.68
 7270.38   92.57 7290.06   92.59 7303.18   94.97 7313.02   95.44 7326.14   93.37
 7335.98   94.24 7342.54   93.55 7385.17   92.55 7408.13   93.24 7417.97   94.81
 7463.88   95.21 7473.72    93.7 7490.12   95.17 7499.96   93.52 7519.64   93.43
 7529.48   94.88  7542.6   93.53 7555.72   94.38 7575.39    94.1 7608.19   91.83
 7624.59   93.19 7640.99   92.35 7677.06   91.85 7690.18   93.06 7706.58   92.35
 7745.94   92.67 7759.06   93.82 7778.73   94.28 7798.41   92.94 7811.53   93.58
 7827.93   92.52 7841.05   92.66 7860.73   95.65 7893.52   95.21 7919.76   95.68
 7936.16   94.26 7955.84   90.12 7968.96    88.8 7985.36   88.56 8027.99   90.76
 8047.67   90.49 8073.91   88.76  8106.7   88.57 8165.74   89.27 8214.93   88.96
 8231.33   89.71 8287.08   89.65 8313.31   90.49 8359.22   90.28 8382.18   90.73
 8408.41   89.28 8451.04   90.96 8460.88   90.94 8490.39   87.04 8526.46   86.74
 8674.05   87.84 8690.45   87.55 8742.92    87.4 8756.04   87.82 8782.28   87.51
 8805.24   88.31 8851.16   89.26 8903.64    88.8 8923.32   88.05    8943   89.08
 8985.63    88.9 8998.75   88.26 9038.11   88.64 9054.51   88.21 9077.47   88.54
 9106.99   88.07 9136.51   88.63 9175.87   88.65 9215.22   88.17 9228.34   88.54
 9290.66   88.16 9326.74   88.37  9366.1   88.97 9408.74   88.51 9428.42   88.88
 9474.33   88.66 9497.29   89.18 9536.65   88.51 9589.13    88.4 9648.17   88.56
 9667.85   90.17 9680.97   90.15 9710.48   88.56 9733.44   89.33 9749.84    90.5
  9789.2   89.58 9851.52   91.56 9864.64   92.83 9881.04   93.14 9897.44   94.95
 9910.55   92.76 9920.39   92.37 9933.51   93.55 9949.91   93.95 9985.99   93.25
10002.39    93.410038.47   87.8610064.71   88.6110074.55   90.5310090.95   90.89
10100.79   90.0110123.75   86.4210136.87   84.9310146.71   85.1210166.39   89.48
10192.62   88.9110235.26   90.7510258.22   89.8410274.62   93.0610281.18   93.15
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 10310.7   89.1510333.66    87.810350.06   86.0110382.86   87.07 10392.7   87.81
10402.54   86.6710409.09   87.2510428.77   86.1710441.89   88.4510464.85   86.77
10481.25   86.5610491.09   87.5110507.49   85.8710520.61   86.3710537.01   88.81
10556.69   88.8510576.37   88.2110592.77   83.2610605.89   82.1410632.13   84.98
10638.69   84.1810648.52   80.7210655.08   79.7610671.48   79.6410694.44   81.13
10710.84    77.7 10733.8   73.7210753.48   74.84 10766.6   76.8710776.44   76.53
10792.84   74.08 10799.4   74.5110809.24   78.52 10815.8   78.7110822.36   75.88
 10832.2   69.1610842.04   67.09 10849.4   66.3110905.08   62.9310915.66   57.62
10950.27    67.110963.39   69.8310983.07   76.2310992.91   88.5510996.19   91.03
11019.15   90.4911028.99      9111097.87   90.8811225.78   90.3611242.18   90.55
11281.54   89.9211317.62   90.4611327.46   89.6911370.09   90.0611422.57   89.53
11550.43   89.5411576.66   89.0711606.17   89.9211632.39   89.7611652.06   89.11
11694.68   89.5611760.25   89.57 11842.2   89.3711894.66   89.5711956.95   89.32
12002.84   89.4412065.13   89.2612097.91   89.6612127.42   89.5812176.59   90.42
12189.71   93.8412209.38   92.3312229.05   93.2512337.23   93.3412386.41   93.53
12442.14   92.2812448.69   93.5112455.25   92.1612465.08   92.4912510.98   91.99
12589.66   92.2612733.91   92.1112786.36   91.9612835.54    92.212887.99      92
12973.22   91.9412999.45    92.213045.35   92.0713133.86   92.4313176.48   91.93
13209.26   92.2613261.72   92.0813425.63   92.1813517.43   92.1313556.77   92.32
13596.11   92.0413684.62   92.0913740.35   92.3713782.97   92.1113937.05   92.19
13950.16   91.8813976.39   92.5613992.78   93.6414002.62   93.2514019.01   97.62
14025.57   98.2414051.79   97.5714068.18   93.1914084.58   91.9714100.97   94.04
 14110.8   93.2414146.86   92.2714182.92   92.0714196.04   90.8714212.43   86.66
14235.38   85.8614287.83   85.6614343.56   85.9214356.68    85.714422.24    86.3
14448.47   86.28 14458.3   87.1514471.42   91.8214487.81   94.3314500.92   97.94
14517.31   99.2414536.98   98.9414546.82   94.6214553.38   93.2814661.56   93.28
14668.12   93.7814677.95   97.8414707.46   96.95

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .172 10766.6    .06610842.04    .01510950.27    .06611694.68    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10537.0110992.91          1039.03 1363.41 2237.29             .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       010537.01   88.81       T
Left Levee      Station=  147.08      Elevation=   98.18
Right Levee     Station=14025.57      Elevation=   98.24
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1494.98 4171.07   93.81

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.34    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.172      0.117     0.067
  W.S. Elev (ft)            101.32    Reach Len. (ft)          1039.03    1363.41    2237.29
  Crit W.S. (ft)             92.00    Flow Area (sq ft)       95183.12   11805.85   37072.08
  E.G. Slope (ft/ft)      0.000208    Area (sq ft)            96498.28   11805.85   37072.08
  Q Total (cfs)           125000.00     Flow (cfs)             51380.24   18452.89   55166.87
  Top Width (ft)          14707.46    Top Width (ft)          10537.01     455.90    3714.55
  Vel Total (ft/s)            0.87    Avg. Vel. (ft/s)            0.54       1.56       1.49
  Max Chl Dpth (ft)          43.70    Hydr. Depth (ft)            9.03      25.90       9.98
  Conv. Total (cfs)       8666470.0     Conv. (cfs)            3562283.0   1279371.0   3824816.0
  Length Wtd. (ft)         1575.76    Wetted Per. (ft)        10556.20     472.25    3726.19
  Min Ch El (ft)             57.62    Shear (lb/sq ft)            0.12       0.32       0.13
  Alpha                       1.94    Stream Power (lb/ft s)      0.06       0.51       0.19
  Frctn Loss (ft)             0.25    Cum Volume (acre-ft)    72449.88   33979.33   96589.63
  C & E Loss (ft)             0.00    Cum SA (acres)          11698.52    1583.87   12501.37


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 143.5

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections, Section along left levee updated with
             2017 survey
Station Elevation Data    num=     448
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.59   34.56   92.16   69.12   92.85  104.63   96.23  140.15   98.25
  200.91   94.17  261.67   86.97  322.44   88.59   383.2   89.31  443.96   90.25
  504.72   90.75  565.49   90.95  626.25      90  687.01   89.98  747.77   89.55
  763.48   90.81  806.12   90.34  848.77   91.34  868.46   90.29  888.14   91.77
  897.98    93.7  907.82   92.41  920.95   92.38  940.63   93.17  950.47   92.69
  973.44   92.54 1002.96   93.69 1012.81   93.08 1032.49   93.32 1039.05   92.92
 1058.73   93.26 1088.26   92.83 1107.94   93.18 1160.43   93.16 1189.96    93.6
 1222.77   93.66 1291.66   93.12 1304.78   93.75 1331.03   93.94 1344.15    93.6
 1360.55   94.05 1380.24   93.55 1409.76   94.13 1416.32    93.8 1442.57   94.62
 1472.09   93.88 1481.94    94.4 1514.74   94.64 1537.71   94.39 1550.83   95.21
 1563.95    94.3 1583.64   94.97 1593.48    94.5 1629.56   94.86 1642.69   95.56
 1668.93   95.03  1708.3   92.76  1724.7   93.33 1741.11   92.29 1773.91   92.91
 1813.28   91.18 1829.68   92.33 1849.37   91.43 1865.77   91.85 1878.89   91.33
 1901.86   91.47 1934.66   91.01 1941.22   90.59 1977.31   90.42 2000.28   91.39
 2010.12   90.87 2036.36   92.08 2059.33   91.83 2082.29   92.53 2092.13   92.08
 2141.34    92.1 2164.31   92.43 2180.71    91.1 2206.96   90.15 3686.54   90.15
  3709.5   90.77  3725.9   93.44 3739.03    93.4 3752.15   94.76 3778.39   96.61
 3788.24   95.65  3794.8   96.28 3814.48   95.34 3824.32   95.86 3850.57   93.59
 3870.25    93.2  3880.1   93.54 3926.02   93.26 3965.39    93.6 4004.76   92.67
 4044.13   92.78 4073.66   92.49 4103.18   93.32 4122.87   93.02 4152.39   93.43
 4165.52   93.95 4198.32   94.46 4231.13    95.4 4257.38   94.74 4273.78   95.21
  4286.9   96.25 4300.03   94.89 4309.87   95.13 4319.71   93.82 4349.24   94.01
 4365.64   93.55 4375.48   93.96 4385.33   93.22 4418.13   92.23 4467.35   92.16
 4483.75   91.83 4536.24   92.39  4542.8   92.02 4578.89   92.53  4595.3   92.28
 4631.38   92.79 4660.91   92.44 4677.31   92.85 4693.72   92.44 4706.84   92.93
 4779.02   92.79 4792.14    93.2 4808.54   92.82 4834.79   93.59 4854.48   93.43
 4893.84   93.74 4933.21   93.71 5028.36    92.9 5077.57   93.86 5090.69   93.42
 5110.38   93.71 5189.11   92.63 5215.36   93.12 5238.32   92.28 5254.73   92.38
 5277.69   91.88  5294.1   92.36 5313.78   91.96 5333.47   92.32 5349.87   92.08
  5379.4   92.59 5422.05   92.48 5454.85   92.13 5530.31   93.09 5576.24   92.32
 5592.65   92.71 5618.89   92.26 5628.74   92.81  5668.1   92.49  5720.6   92.68
 5786.21   93.96 5815.74   93.56 5828.86   94.06 5861.67   94.31 5894.48   95.72
 5910.88   93.21    5924   95.21 5950.25    95.3  5976.5   94.89 5996.18   93.61
  6009.3      94 6032.27   93.22 6055.23   91.81 6065.08   90.46  6078.2   87.61
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  6094.6   89.79 6104.45   88.41 6120.85   87.83 6156.94   87.42  6179.9   88.43
 6212.71   88.38 6245.52    89.4 6261.92   89.48 6301.29   90.34 6330.82   89.81
 6360.35   89.95 6399.71   89.47 6406.28   89.76 6458.77   88.98 6507.98   89.52
 6553.91   89.43 6586.72   90.19 6629.37   90.68 6672.02   90.86 6698.26   89.13
 6737.63   87.29 6767.16   87.21 6793.41   87.78 6859.02   89.63 6881.99   89.75
 6914.79   90.36 6964.01   90.77 7026.34   90.68 7049.31   90.89 7062.43   90.53
 7078.83   90.84  7101.8   90.38 7137.89   90.84 7144.45   90.56 7190.38   90.15
 7236.31   89.28 7259.27   89.24 7275.68   88.79 7292.08   88.98 7328.17   88.26
  7357.7   88.58 7367.54   88.36    7443   88.21 7485.65   88.45 7511.89   88.94
 7547.98   89.19 7564.38   89.78 7574.23    89.5 7600.47   90.26 7620.16   89.94
 7652.97   90.64  7698.9   90.55 7725.14   91.49 7734.98    92.8 7744.83   92.84
 7764.51   94.16 7780.92   91.62 7797.32   91.97 7836.69   91.71 7843.25   92.28
 7859.65   95.42 7879.34   92.49 7895.74   92.97 7908.86   94.62 7921.99   93.55
 7958.08   92.17 7977.76   93.18 8000.73   92.42 8010.57   92.94 8043.38   92.29
 8063.06   93.66 8076.18   93.75 8095.87   92.92 8108.99   93.45 8161.48   94.19
 8200.85   93.52 8233.66    93.9 8246.78   94.52  8259.9   94.18 8305.83   94.75
 8315.67   93.83 8332.08   89.69 8338.64   88.87 8358.32   87.97 8384.56   88.28
 8394.41   89.05 8410.81   88.56 8433.77   88.73 8460.02   89.38 8489.54   90.67
 8515.78   90.67  8528.9   89.95 8571.55   89.25 8584.67   89.86 8601.07   88.99
 8660.11   90.14 8689.64    91.6 8709.32   91.63 8722.44    89.5 8735.56   89.15
 8758.52   90.08 8771.64   89.14 8811.01   88.86 8827.41   90.06 8866.77   89.93
 8876.61   89.47  8945.5   91.43 8968.46   90.94 8988.14   91.52 8997.98   90.88
 9020.94   91.35 9053.75   90.79 9070.15   91.11 9102.95   90.63 9132.47   87.32
 9158.71   86.48 9191.52   84.14 9221.04   82.74 9263.68   82.63 9299.77   83.23
 9312.89   84.55 9326.01   83.72 9362.09   83.68 9378.49   84.37  9427.7   84.42
 9457.22   84.82 9506.42    85.1 9512.98   85.43 9542.51   85.07 9581.87   85.86
 9683.56   85.86 9713.08   86.61 9752.44   87.17 9850.85   87.83 9873.81   88.21
 9883.66   87.66 9919.74   87.37 9955.82   88.83  9975.5   88.19 9995.18   88.73
10057.51    87.710073.91   87.7910106.71   89.1510116.54   89.1810136.21   88.13
10146.04   89.0810172.27   88.6910198.49   86.9410208.32   85.6210221.43   85.44
10234.55   83.5910264.05   83.2810277.16   83.8810286.99   85.5410303.38   86.91
10309.94   86.0310323.05   82.8310339.44   84.7910345.99   84.7510359.11   81.23
10378.77   79.0210388.61   78.9410401.72   80.6510418.11   78.110431.22   77.59
10450.89   73.8310460.72   73.2510480.39   74.9610490.22   76.6210506.61   72.28
10526.28   73.7710532.84   72.210539.39   67.3510542.67   66.710555.62   61.45
10570.75   53.9910584.69   53.63 10599.7   49.5710609.93   50.8910638.43   51.59
10660.15   52.5910670.38   52.6110673.79   66.710683.62   70.2410700.01   74.05
 10716.4   75.410732.79   80.110749.18   88.5410759.01   90.6110785.24   90.97
10804.91   90.5310847.52   90.5110899.97   89.9610932.75      9010991.75    90.4
11021.25   91.4911037.64   91.57 11073.7   89.6711093.37   89.8111116.31   89.35
11155.65   89.6611204.82   89.6111231.04   90.1411240.88   89.9611286.77    90.4
 11296.6   90.1511332.66   90.6711417.88   90.3511444.11   90.0711493.27   90.37
11532.61   90.13 11591.6   90.3111653.87   90.0211683.37   90.5411706.31   90.13
11742.36   90.5611752.19   90.3411807.91    91.811840.68   92.0311860.35   91.79
11873.46   92.1911899.67   91.3611912.78   91.6611922.62   90.6311942.28   90.63
11955.39   90.0112020.94   89.9212043.88   89.3112050.43   89.7812115.98   89.78
12145.47   89.9912197.91   89.7112253.63   89.8812355.22   89.7212374.89    89.9
12410.94   89.72 12460.1   89.9412502.71   89.8212581.36   89.8812666.57   89.79
12709.18      9012791.11   89.8912859.94   90.0812915.65   90.1413004.14    90.2
13040.19    90.113102.46    90.413109.01   90.2513194.22   90.4613289.27   90.46
13344.98   90.6513397.42   90.6213426.92    90.813479.35   90.6113535.07   90.86
13548.18   90.6813590.78    90.9   13617   90.8113721.88   90.8513980.79   91.29
   14066   91.2214079.11   91.414174.15   91.4514203.65    92.114206.92    91.2
14246.25   93.2814256.08   94.8614265.92    98.814275.75   99.3814288.86   98.85
14308.52   99.3414315.08   98.7214321.63   94.9814328.19   93.2414436.34   93.24
14439.62   93.5314449.45   98.3814472.39   98.13

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .07  140.15     .1210542.67    .02510673.79     .0710899.97    .066
14275.75    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10146.0410749.18          1673.73 2335.33 3367.52             .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
      010116.54   89.18       T
Left Levee      Station=  140.15      Elevation=   98.25
Right Levee     Station=14275.75      Elevation=   99.38
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1642.69 3778.39    93.4

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.09    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.119      0.096      0.066
  W.S. Elev (ft)            101.07    Reach Len. (ft)          1673.73    2335.33    3367.52
  Crit W.S. (ft)             83.88    Flow Area (sq ft)       92815.91   15995.74   38478.16
  E.G. Slope (ft/ft)      0.000122    Area (sq ft)            96694.95   15995.74   38478.16
  Q Total (cfs)           125000.00    Flow (cfs)             55925.49   23660.12   45414.38
  Top Width (ft)          14472.39    Top Width (ft)          10146.04     603.14    3723.21
  Vel Total (ft/s)            0.85    Avg. Vel. (ft/s)            0.60       1.48       1.18
  Max Chl Dpth (ft)          51.50    Hydr. Depth (ft)            9.15      26.52      10.33
  Conv. Total (cfs)       11299770.0    Conv. (cfs)             5055564.0   2138832.0   4105378.0
  Length Wtd. (ft)         2563.00    Wetted Per. (ft)        10162.53     626.48    3730.14
  Min Ch El (ft)             49.57    Shear (lb/sq ft)            0.07       0.20       0.08
  Alpha                       1.50    Stream Power (lb/ft s)      0.04       0.29       0.09
  Frctn Loss (ft)             0.28    Cum Volume (acre-ft)    70145.77   33544.24   94649.46
  C & E Loss (ft)             0.00    Cum SA (acres)          11451.85    1567.30   12310.36


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 143.25

INPUT
Description: RGV-01, Updated on left with new survey to Station 1138.37.
             Bathymetric elevations translated from IBWC 2008 Cross-sections,
             Section along left levee updated with 2017 survey
Station Elevation Data    num=     436
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.17   13.92   91.88   27.85   97.41    37.8   97.76   44.76   95.62
   58.69   95.62   62.67   96.78   89.52   99.79  101.46  104.36  119.43  104.09
  166.42   88.02  190.42    86.9  206.42   90.72  278.42   89.24  306.42   86.02
  343.41   84.72  384.41   83.74  464.41   83.32   503.4   84.36   544.4   84.45
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   564.4   84.84   641.4    85.1  683.39   85.82  805.39   87.51  865.38   88.16
  905.38   88.31  927.38   88.75 1024.38   88.86 1064.37   89.58 1138.37    89.9
 1140.77   91.43 1157.17   92.35 1206.38   92.02 1222.78   92.86 1242.47   93.07
 1255.59   92.55 1265.43   93.13 1304.79   93.28 1327.76   93.68 1344.16   93.42
 1363.84   90.86 1376.96   92.69 1396.65   93.32 1406.49   93.04 1419.61   93.91
 1449.13   93.36 1475.38   93.36  1488.5   93.77  1521.3   92.72 1580.35   92.68
 1613.15   92.27 1626.28   92.86 1652.52   92.05 1665.64   92.16 1701.73   91.62
 1708.29   91.85 1767.34   91.06  1806.7   91.99 1819.82   91.42 1859.19   91.57
 1882.15   92.69 1928.08   92.63 1964.16   93.08 1980.56   92.34 1996.97   88.76
 2006.81   89.64 2029.77    89.8 2052.73   88.46 2095.38   89.72 2180.67      90
 2210.19   90.64 2216.75   91.14 2239.72   90.79  2259.4   91.15 2272.52   91.91
 2282.36   91.79 2315.17    92.5 2347.97   92.77 2390.62   92.56 2416.86   93.11
  2443.1   93.02 2498.87   93.76 2521.83   93.47  2528.4   93.91  2561.2   93.53
 2584.16   94.21 2610.41   94.09 2626.81    93.1 2656.33   92.87 2676.02    92.1
 2702.26   92.12 2715.38   92.53  2728.5   93.66 2794.11   93.75 2810.51   94.23
 2840.04   94.42 2869.56   93.44  2895.8   93.29 2928.61   93.86 2964.69   93.32
 3007.34   91.95 3027.02   92.39 3040.14   91.98 3066.39   91.97 3076.23   92.43
 3099.19   91.96 3125.43    92.5 3135.28   92.24 3177.92    93.4 3223.85   93.07
 3233.69   93.76 3250.09   93.98 3269.77   95.14 3279.61   94.19 3302.58    93.7
 3318.98   93.81 3358.35   95.09 3371.47   94.28 3400.99   94.68 3410.83   95.76
 3420.67   95.15 3460.04   95.19 3473.16    95.7 3479.72    95.2 3489.56   95.92
 3515.81   95.65 3535.49    96.5 3578.13   96.43  3633.9   96.12 3647.02   97.66
 3660.15   97.53 3669.99    96.4 3683.11   97.16 3712.63    96.1 3732.31   95.93
 3742.16    96.4 3778.24   93.98 3794.64   92.57 3863.53   90.65 3893.06    90.9
 3912.74   91.65  3935.7    91.4 3981.63    92.1 4027.55   91.74 4060.36   92.21
 4073.48   91.73 4096.44   92.59 4119.41   92.24 4135.81   92.75 4158.77    92.7
 4168.62    93.4 4185.02   92.57 4207.98   93.24 4217.82   93.04 4309.68   94.16
 4316.24   93.55 4349.05   92.91 4365.45   93.49 4381.85   93.11 4411.38   93.85
  4424.5   93.52 4467.15   94.27 4490.11   94.06 4562.29   94.37 4581.97   94.71
 4598.37   93.89 4624.62   94.57 4637.74   94.08 4647.58   94.58 4693.51   94.08
 4719.75   95.24 4732.88   94.71 4755.84   94.48 4775.52   95.04 4795.21   94.65
 4801.77    95.2  4864.1   95.37 4890.35   94.83 4906.75   95.49 4929.71   94.79
 4952.68   95.28 4978.92   95.06 4995.32    94.3 5018.29   94.46 5034.69   93.63
 5044.53   94.17 5060.94   93.91 5077.34   92.19 5093.74   91.74 5106.86   90.82
 5142.95   90.36 5159.35   90.54 5182.32   91.57 5198.72   90.79 5215.12   91.04
 5244.65   90.67 5257.77   90.18 5290.58   89.91 5333.23   90.03 5366.03   90.73
 5385.71    91.7 5425.08   91.52 5441.48   92.14 5461.17    91.9 5477.57   92.46
 5503.82   92.71 5536.62   92.19 5546.46   92.91 5559.59   92.68 5585.83   93.45
 5595.67   94.58 5602.23    94.1 5621.92   88.34 5635.04   87.65 5648.16   88.48
 5674.41   88.13 5690.81   89.03 5700.65   88.39 5746.58   87.83 5756.42   88.49
 5772.82   87.32 5808.91   88.18 5831.88   88.22 5851.56   87.26 5887.65   90.19
 5904.05   87.18 5930.29    87.7 5943.42   88.49 5956.54   89.98  5979.5   91.28
 6009.03   91.19 6018.87   90.66 6028.71   91.19 6068.08   89.36 6091.04   87.37
 6104.16   88.43 6114.01   88.18 6150.09   88.24 6163.22   89.23 6179.62   88.43
 6192.74   89.25  6215.7   88.68 6228.83    89.2 6241.95   88.44 6274.76   88.43
  6284.6   88.89 6291.16   87.87 6314.12   89.04 6327.24   87.89 6353.49   87.56
 6373.17   87.88 6383.01   87.53 6409.26   87.52  6419.1    88.2 6455.19   88.16
 6468.31   88.56 6478.15   88.13 6514.24   88.06 6547.04   88.86 6599.53   88.72
 6609.38   87.94 6629.06    88.2  6638.9   87.67 6665.15   87.74 6674.99   88.52
 6694.67   87.53 6737.32   88.06 6763.56   87.34 6806.21   87.15 6825.89   88.03
 6878.38   88.46 6911.19    87.9 6927.59   87.98 6950.56   87.46 7026.01   87.56
 7081.78   88.61 7104.75   88.87  7163.8   88.65    7213   88.19 7288.46   88.62
 7304.86   89.11 7317.98   88.88 7367.19   88.91 7409.84    89.6 7442.65   92.62
 7455.77   93.24 7495.14   92.79 7531.22   93.67 7570.59   93.06 7580.43   94.04
 7590.27   93.37  7603.4   94.39 7613.24   93.17 7629.64   92.09 7649.32   92.14
 7665.73   90.21 7695.25   90.47 7714.94   92.36  7754.3   92.66 7773.99   92.55
 7793.67   91.88  7829.7   91.75 7859.17   93.27 7872.27   92.91 7918.11   93.59
 7937.76   92.89 7950.86   93.32 7973.78   93.24 7993.43   92.49 8003.26   92.94
 8019.63   92.67    8036   93.03 8052.38   92.21 8072.03   92.22  8101.5    92.7
  8114.6   93.42 8140.79   93.62 8166.99   93.35 8186.64   90.96 8196.46   92.94
 8216.11   93.49 8255.41   93.35 8281.61    92.3 8311.08   92.81  8320.9   93.87
 8340.55    94.8 8363.47   94.38 8373.29   95.03 8389.67   94.43 8419.14   94.25
 8438.79   94.87 8458.44   94.83 8468.26   91.06 8478.08   84.38 8487.91   76.41
 8494.46   72.47  8514.1   67.35 8520.65    62.3 8533.65    62.7 8547.65    59.3
 8558.65    60.8 8579.65      61 8612.65    62.1 8623.65      62 8645.09    66.7
 8651.62   68.79 8661.43   73.37 8677.77    75.8 8690.84   81.48 8697.37   83.51
 8707.17   85.18 8723.51   85.95 8756.19   80.78 8772.53   81.37  8785.6   84.02
 8834.61   85.09 8850.95   86.11 8857.48   87.08 8890.16   87.69  8916.3   87.57
 8942.44   88.02 9024.13   88.52 9063.34   88.98 9141.76   89.24 9203.85   88.82
 9262.66   89.73 9308.41    89.9 9370.49   89.59 9412.97   89.72 9432.58   89.52
 9491.51   89.38 9527.58   89.56 9586.59   89.24 9606.27   89.34 9681.67   89.03
  9724.3   89.11 9734.13   90.58 9747.25   90.75 9773.48   87.81 9802.98   88.57
 9868.56   88.15 9924.29   88.18 9943.96   88.01 9993.14   88.1110061.99   88.02
10075.11   88.4210114.45   88.41 10229.2    89.310265.27    89.110399.69   89.24
10425.92    89.110471.82   89.3510504.61   89.0410543.95   89.0810599.69   88.87
10625.92   89.13 10675.1   88.7910757.06   88.5210786.57   88.2210809.52   88.67
10835.75   88.3910865.26   88.5910875.09   89.0510901.32   88.1610947.22    87.7
11055.42   87.1611071.81   87.4511173.45   87.3311281.64   86.9411324.26   86.55
11363.61   86.6911432.46   86.2711448.85   86.4811599.67   86.2411622.62   86.43
11730.81   86.3511776.71   86.4311852.12   86.31 11901.3   86.5911970.15   86.71
11983.27   86.8812006.22   86.2213186.52   86.2213206.19   86.7213232.42   93.72
13252.09   92.9113278.32   93.2813307.83   92.78 13327.5   93.0513370.12    92.6
13396.35   93.09 13419.3   92.3613461.92   92.2913494.71   92.9513514.38   94.03
13537.33   96.66

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .07   62.67     .12 8438.79     .07  8514.1    .025 8661.43     .07
 8890.16    .06613461.92    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      8468.26 8890.16          1772.15 3068.24 1935.18             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 8468.26   91.06       T
 8890.1613537.33   87.69       T
Left Levee      Station=  101.46      Elevation=  104.36
Right Levee     Station=13537.33      Elevation=   96.66
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1327.76 2584.16   93.58

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            100.81    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.120      0.057      0.066
  W.S. Elev (ft)            100.78    Reach Len. (ft)          1772.15    3068.24    1935.18
  Crit W.S. (ft)             91.09    Flow Area (sq ft)       68042.13   10639.32   56681.41
  E.G. Slope (ft/ft)      0.000099    Area (sq ft)            77168.63   10639.32   59460.16
  Q Total (cfs)           125000.00     Flow (cfs)             34094.11   23478.50   67427.39
  Top Width (ft)          13408.22    Top Width (ft)          8339.15     421.90    4647.17
  Vel Total (ft/s)            0.92    Avg. Vel. (ft/s)           0.50       2.21       1.19
```

Max Chl Dpth (ft)	41.48	Hydr. Depth (ft)	8.16	25.22	12.20
Conv. Total (cfs)	12533120.0	Conv. (cfs)	3418446.0	2354071.0	6760606.0
Length Wtd. (ft)	2157.68	Wetted Per. (ft)	8348.55	435.27	4652.83
Min Ch El (ft)	59.30	Shear (lb/sq ft)	0.05	0.15	0.08
Alpha	2.05	Stream Power (lb/ft s)	0.03	0.33	0.09
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	66805.55	32830.26	90863.77
C & E Loss (ft)	0.00	Cum SA (acres)	11096.71	1539.82	11986.81

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 143

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from IBWC 2008 Cross-sections, Section along left levee updated with 2017 survey
Station Elevation Data num= 456

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.8	33.35	91.19	66.71	93.66	127.75	100.52	189.25	94.12
250.74	86.91	312.24	85.67	373.74	85.31	435.23	86.43	496.73	87.21
558.22	87.3	619.72	87.17	681.21	87.15	742.71	87.72	747.71	88.9
770.67	89.29	839.55	89.02	875.63	89.69	888.76	89.11	954.36	89.16
1006.84	88.69	1042.92	88.91	1065.88	89.52	1082.29	88.94	1098.69	89.89
1151.17	90.06	1167.57	90.84	1210.21	91.81	1223.33	93.39	1233.18	92.24
1262.7	92.2	1321.74	93.24	1354.54	93.19	1387.35	94.22	1416.87	94.02
1456.23	93.13	1521.83	94.34	1528.39	93.9	1571.04	93.92	1580.88	94.5
1616.96	93.58	1676	93.37	1702.25	93.93	1715.37	93.52	1784.25	93.53
1826.89	94.18	1859.7	93.25	1885.94	93.8	1908.9	93.47	1958.1	94.24
1974.5	93.61	2010.59	93.97	2020.43	93.12	2043.39	93.16	2082.75	94.01
2131.95	93.42	2194.28	93.73	2207.4	94.55	2217.24	93.71	2250.04	94.75
2315.64	93.4	2348.45	94.06	2387.81	93.4	2407.49	93.93	2430.45	93.38
2476.37	93.94	2486.21	93.28	2541.98	93.49	2555.1	94.04	2581.34	93.45
2620.7	93.92	2650.22	93.39	2692.86	94.14	2705.99	93.54	2742.07	94.45
2778.15	93.94	2784.71	94.85	2801.11	93.87	2817.51	94.58	2830.63	94.03
2896.24	94.18	2974.96	94.68	3007.76	94.07	3043.85	94.16	3060.25	93.05
3083.21	90.27	3102.89	90.1	3148.81	88.47	3181.61	89.02	3191.45	88.42
3253.78	88.94	3280.02	89.78	3332.5	89.95	3352.18	90.97	3388.27	91.43
3414.51	90.93	3434.19	91.63	3450.59	91.04	3457.15	91.75	3493.23	92.43
3509.63	91.9	3535.87	93.31	3552.27	92.07	3575.24	92.61	3601.48	91.91
3650.68	92.06	3670.36	92.84	3680.2	92.41	3722.84	93.61	3735.97	92.15
3811.41	93.18	3834.37	93.01	3854.05	93.62	3867.17	92.98	3893.41	92.88
3922.94	94.55	3942.62	92.87	3965.58	94.22	3985.26	93.57	3995.1	94.97
4008.22	94.57	4027.9	95.48	4044.3	95.16	4054.14	96.4	4096.79	95.04
4129.59	96.1	4152.55	95.17	4168.95	96.46	4188.63	94.99	4214.87	95.5
4244.39	94.69	4257.52	95.01	4300.16	94.34	4319.84	94.83	4352.64	97.11
4369.04	95.42	4392	95.69	4434.65	94.94	4454.33	95.81	4460.89	95.33
4526.49	95.92	4556.01	95.06	4565.85	95.73	4598.66	94.91	4611.78	95.45
4641.3	95.4	4674.1	92.11	4706.9	90.48	4756.1	92.78	4805.31	91.56
4838.11	91.66	4854.51	91.22	4913.55	93.59	4923.39	92.95	4933.23	93.84
4949.64	92.41	4975.88	92.06	4985.72	92.58	5005.4	91.53	5011.96	89.63
5044.76	88.54	5067.72	89.97	5087.4	89.87	5110.37	90.67	5156.29	88.86
5195.65	89.73	5254.69	89.33	5323.58	89.57	5333.42	90.08	5353.1	89.25
5382.62	90.3	5399.02	89.9	5435.1	90.7	5458.06	89.92	5467.91	90.93
5520.39	90.7	5530.23	89.62	5559.75	91.57	5589.27	92.17	5612.23	91.54
5638.48	87.53	5687.68	88.1	5697.52	87.79	5720.48	90.86	5799.21	91.83
5832.01	91.46	5851.69	90.15	5871.37	90.22	5910.73	87.21	5933.69	88.79
5946.81	88.2	5979.62	89.81	5992.74	89.8	6009.14	87.87	6035.38	89.08
6061.62	87.31	6084.58	88.05	6097.7	89.17	6123.94	87.97	6137.06	88.65
6160.03	87.41	6179.71	88.53	6196.11	90.3	6209.23	89.81	6219.07	87.75
6255.15	88.88	6271.55	88.17	6291.23	90.7	6324.04	89.43	6347	90.15
6379.8	89.05	6409.32	90.93	6419.16	93.15	6445.4	94.62	6458.52	94.39
6530.69	94.8	6573.33	94.01	6599.57	94.62	6615.97	93.89	6638.93	94.09
6678.3	92.3	6701.26	93.25	6737.34	93.17	6776.7	94.42	6819.34	93.28
6842.31	91.4	6861.99	91.55	6891.51	94.94	6901.35	92.93	6934.15	93.48
6960.39	92.14	6980.07	93.35	7003.03	92.91	7045.68	93.12	7078.48	93.81
7127.68	91.86	7157.2	92.37	7186.73	91.69	7252.33	91.2	7304.81	89.84
7334.33	90.48	7367.14	90.37	7386.82	88.29	7396.66	89.04	7429.46	88.97
7452.42	93.03	7498.34	94.48	7518.02	96.08	7534.43	94.24	7583.63	93.46
7606.59	94.06	7655.79	93.68	7682.03	93.87	7698.44	95.62	7708.28	94.3
7731.24	93.76	7757.48	95.52	7780.44	93.29	7800.12	93.85	7839.48	92.47
7882.13	92.73	7911.65	92.15	7931.33	92.57	7944.45	91.97	7970.69	92.43
8010.05	91.98	8023.17	92.37	8039.58	91.57	8069.1	91.86	8078.94	91.04
8121.58	91.07	8164.22	91.52	8229.83	90.84	8252.79	91.52	8262.63	90.94
8295.43	90.64	8324.96	91.78	8338.08	91.2	8374.16	91.46	8390.56	90.4
8433.2	89.79	8466.01	90.67	8482.41	90.29	8518.49	90.61	8564.42	91.52
8577.54	92.29	8597.22	91.82	8603.78	92.43	8643.14	91.92	8656.26	92.32
8679.22	91.78	8698.91	92.07	8708.75	90.95	8738.27	92.51	8764.51	92.53
8800.59	91.86	8823.56	92.63	8839.96	91.86	8853.08	92.27	8905.56	91.38
8918.68	92.24	8984.29	91.36	9020.37	91.4	9063.02	91.91	9099.1	91.87
9167.99	92.31	9233.59	91.61	9286.08	92.46	9299.2	91.57	9312.32	92.14
9348.4	91.82	9368.08	90.31	9433.69	92.09	9463.21	91.81	9476.33	92.71
9541.94	91.87	9551.78	92.36	9620.66	92.22	9646.91	92.86	9666.59	92.39
9699.39	93.35	9748.59	91.27	9768.28	92.15	9840.44	92.57	9860.12	92.42
9869.96	93.12	9889.65	92.6	9951.97	92.46	9968.37	93.610001.17		93.36
10040.54	92.5710060.22		90.46	10079.9	92.6810099.58		92.32	10112.7	93.97
10129.11	91.3910178.31		93.0910224.23		93.0710257.04		92.2310270.16		93.13
10316.08	93.3510325.92		92.8110339.04		93.6210348.88		92.0310371.85		90.8
10391.53	90.7510411.21		91.8310421.05		91.6110444.01		92.7310460.41		91.6
10480.09	93.05 10512.9		91.1810565.38		91.1210588.34		91.8810637.55		91.88
10663.79	92.3210676.91		93.210719.55		92.0410739.24		93.0910768.76		92.03
10785.16	93.8810798.28		92.910831.08		94.7410850.77		93.1310870.45		94.23
10886.85	93.310896.69		93.9610922.93		92.7710955.73		93.910985.26		93.95
11008.22	92.7511024.62		93.5711050.86		93.22 11077.1		94.2411086.95		93.6
11132.87	93.3311152.55		93.7611221.44		93.5511237.84		90.2511267.36		90.09
11283.76	87.7511365.77		87.9611405.13		86.6511421.53		86.6911451.06		88.15
11467.46	89.7 11510.1		89.32 11526.5		89.7411546.18		89.2311624.91		89.24
11634.75	87.2511660.99		84.811683.96		85.1911703.64		86.2511729.88		81.85
11762.68	77.4711772.52		77.8 11792.2		75.9411811.89		78.2611834.85		71.81
11847.97	66.4711891.97		58.411927.97		56.911937.97		56.911947.97		56.2
11956.97	56.711976.97		5612001.97		56.512016.97		55.812028.97		55.7
12034.94	66.47 12041.5		6712051.35		73.0912074.31		75.3212087.43		79.47
12100.55	81.0312116.95		81.6912126.79		83.512143.19		89.0412162.88		89.42
12176	88.912218.64		89.7912251.44		89.9312280.96		90.5712300.65		90.27
12340.01	90.8312369.53		90.1212405.62		90.25 12425.3		89.7412477.78		89.65
12500.74	90.2112517.14		91.7112540.11		90.7912589.31		93.7912648.36		92.62

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 12674.6   93.1912727.08   91.6212766.45   88.8812818.93   86.22 13655.4   86.22
13678.36   87.8913694.76   91.3413707.88   92.5613730.85   91.7913760.37   92.66
13770.21   94.1813796.45   94.2213809.57   93.5213835.81   93.9913852.22   96.66
13868.62   98.0813878.46   97.2913894.86    98.213914.54   97.7613924.38   93.24
14026.07   93.24

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .07  312.24     .1211729.88     .0711847.97    .02512034.94     .07
12251.44    .06612540.11    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      11624.9112143.19           889.07  960.39  837.85             .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       011624.91   89.24       T
Left Levee      Station=  127.75      Elevation=  100.52
Right Levee     Station=13868.62      Elevation=   98.08
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       011152.55    91.5

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            100.52    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.119      0.068      0.081
  W.S. Elev (ft)            100.48    Reach Len. (ft)           889.07     960.39     837.85
  Crit W.S. (ft)             82.44    Flow Area (sq ft)       90862.39   14734.03   21174.97
  E.G. Slope (ft/ft)      0.000177    Area (sq ft)            91165.23   14734.03   21174.97
  Q Total (cfs)           125000.00    Flow (cfs)              59957.54   39147.74   25894.72
  Top Width (ft)          13897.96    Top Width (ft)          11496.80     518.28    1882.88
  Vel Total (ft/s)            0.99    Avg. Vel. (ft/s)            0.66       2.66       1.22
  Max Chl Dpth (ft)          44.78    Hydr. Depth (ft)            7.90      28.43      11.25
  Conv. Total (cfs)       9389057.0    Conv. (cfs)             4503559.0   2940483.0   1945016.0
  Length Wtd. (ft)          915.56    Wetted Per. (ft)        11504.06     532.31    1892.53
  Min Ch El (ft)             55.70    Shear (lb/sq ft)            0.09       0.31       0.12
  Alpha                       2.81    Stream Power (lb/ft s)      0.06       0.81       0.15
  Frctn Loss (ft)             0.12    Cum Volume (acre-ft)    63381.39   31936.65   89072.64
  C & E Loss (ft)             0.05    Cum SA (acres)          10693.22    1506.71   11841.76


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 142.5

INPUT
Description: RGV-01, Updated on left with new survey to Station 1146.86.
             Bathymetric elevations translated from IBWC 2008 Cross-sections,
             Section along left levee updated with 2017 survey
Station Elevation Data    num=     457
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.15       6   91.95      16   96.69      28   97.16      33   95.43
   69.99   98.42   81.99   103.2  105.99  103.18  159.98    85.6  174.98   83.96
  196.97    84.9  228.97   83.57  265.97   83.31  306.96   84.15  344.96   85.49
  425.95   87.67  506.94   87.67  551.93   88.83  585.93   91.73  632.92   92.21
  670.92   89.71  715.91   88.82   778.9   88.46  866.89   88.86  905.89   88.39
  937.89   88.68 1026.87    88.8 1063.87   89.37 1105.86   89.39 1146.86   89.89
 1174.32    91.2 1207.12   90.49 1216.96   91.73 1262.88   91.52 1279.28   91.98
 1338.32   91.83 1426.89   92.25 1440.01   91.89 1462.97   93.08 1482.65   92.55
 1502.33   94.07 1544.97   93.17 1571.21   92.13 1581.05   91.04 1600.74   92.37
 1626.98   89.16 1676.18   87.13 1699.14   85.77 1718.82   85.61  1754.9   86.15
 1777.86   86.93 1843.47   87.73 1853.31   88.21 1869.71   87.57 1882.83   87.95
 1945.15   87.52 1974.67   88.23 1997.64   87.34 2027.16    87.1 2056.68   87.52
 2109.16   87.44 2128.84   86.97 2197.73      87 2305.98   86.29 2328.94   86.84
 2355.18   86.16 2394.55   86.38 2407.67   85.95 2447.03   85.88 2469.99   87.04
 2512.64   87.64 2538.88   86.35 2574.96   86.77 2607.77   85.84 2647.13   87.36
 2670.09   86.14 2699.61   85.89 2778.34    87.2 2830.82   86.75 2883.31   89.06
 2919.39   90.09    2985    89.8 2994.84   89.19 3063.72   89.06 3093.25    88.3
 3132.61    87.8 3142.45   88.15 3178.53   87.15 3214.62   87.66 3240.86   87.14
  3250.7   87.82 3290.06   87.76 3322.87   88.88 3362.23      89 3388.47   88.71
 3404.87   89.33 3496.72   88.07 3506.56    88.4  3516.4   87.27 3588.57   88.02
 3608.25   89.22 3637.77   89.31 3680.42   91.71 3690.26    92.9 3703.38   91.52
 3729.62   93.18 3742.74    92.4 3762.42   93.14 3778.82   94.55 3788.67   92.65
 3801.79   92.06 3824.75   93.55 3850.99   91.08 3877.23    91.2 3890.35   93.02
 3900.19   92.23 3929.72   92.16 3942.84   93.42 3969.08   93.83 3985.48   92.94
 4011.72   93.47 4018.28   92.89 4031.41   94.22 4041.25   93.55 4074.05   94.01
 4080.61    94.8 4093.73   93.57 4110.13   94.16 4146.22   93.31 4156.06   94.11
 4208.54   93.52 4224.94   94.68 4241.34    93.3 4254.46   94.43 4267.59   94.21
 4277.43   95.16 4352.87   93.74 4369.27   94.79 4388.96   95.18 4434.88   94.49
 4444.72   95.27 4467.68   94.56 4477.52   95.36 4516.89   95.15 4530.01   94.26
 4549.69   94.93 4608.74   95.25 4628.42   94.51 4644.82   95.64 4677.62      95
 4694.02   94.03 4726.83   94.85 4739.95   94.12 4766.19   94.11 4792.43   94.75
 4798.99   94.35 4858.04   94.82 4867.88   95.82 4884.28   94.71  4913.8   94.88
 4923.64   95.68 4940.04   94.98 4959.73   95.98 4992.53   94.43 5015.49   95.55
 5031.89      95 5071.26   95.43 5094.22   94.87 5110.62    95.3 5136.86   94.68
 5149.98   95.15 5182.79   94.76 5199.19   95.43 5238.55   94.81 5264.79   96.48
 5300.88   94.78    5314   90.72 5336.96   88.58 5373.04   89.18    5396   90.59
 5435.37   91.62 5471.45   90.79 5517.37    91.1 5533.78   90.81 5573.14    92.2
  5579.7   93.01 5605.94   92.64 5622.34   88.49 5632.18   88.21 5658.43   91.45
 5678.11   91.59 5694.51   90.39 5707.63   87.83 5750.27   88.01  5763.4   89.23
 5792.92   87.49  5845.4   87.65  5861.8   88.12 5891.33   87.63 5901.17   88.67
 5950.37   87.69 6002.86   87.58 6038.94   89.46 6065.18   87.47 6084.86   88.65
 6091.42   90.13 6130.79   87.13 6153.75   88.44 6179.99    87.3 6202.95   88.07
 6216.07   87.52 6239.04   88.44 6255.44   88.37 6304.64   91.11 6324.32   91.76
 6360.41    91.4 6426.01    90.1 6485.06   90.02  6527.7   89.08 6567.06   89.49
 6583.47   89.16 6593.31   89.87 6662.19    88.9 6704.84   89.08 6714.68    89.6
 6786.84   87.45 6845.89   87.88 6859.01   89.55 6881.97   88.49 6891.81   89.52
 6901.65   87.65 6921.33   87.27 7019.74   87.37  7026.3    87.9 7055.83   87.48
 7068.95   88.29 7111.59   87.66 7206.72   87.86 7288.73    87.7 7314.97   87.43
 7347.77   88.77 7364.17   87.62 7377.29   89.17 7400.26   95.49 7419.94   93.33
 7436.34   93.76 7469.14   93.68 7498.67   92.75 7534.75   92.93 7547.87   92.13
 7603.63   92.79 7623.32   92.27 7656.12   92.44 7672.52   91.85 7702.04   92.18
 7751.25   91.73 7761.09   92.17 7800.45   92.16 7820.13   91.33 7836.53   91.98
 7889.02   91.77 7915.26    92.1 8000.55    91.2 8033.35   91.76 8069.43   91.35
 8112.08   91.47 8121.92   92.01 8167.84   91.35 8295.77   91.73 8328.58   91.51
  8358.1   92.17 8384.34   91.91  8423.7   92.09 8446.67   91.57 8469.63   91.82
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 8492.59   91.18 8518.83   91.49 8587.72   92.91 8617.24   94.08 8650.04   94.13
 8679.57   95.39 8715.65   95.33 8728.77   94.75 8745.17   95.44 8794.38   94.59
 8820.62   94.53 8837.02   92.97 8863.26   89.24  8889.5   88.35 8955.11   88.37
 8968.23   89.05 8991.19   88.65 9066.64   89.45 9125.68   90.73 9188.01   89.84
 9207.69   90.37 9263.45   90.57 9365.14   89.77 9404.51   90.14 9463.55   91.86
 9489.79   91.37 9516.04   89.89 9558.68   89.84 9581.64   89.44 9643.97   89.66
 9666.93   89.51 9693.17   89.97 9706.29   89.45 9742.37   89.93 9801.42    89.7
 9824.38   90.32 9860.46   90.33 9873.58   90.94 9893.27   90.66 9916.23    91.6
 9932.63   91.42 9978.55   91.84 9994.96   92.69 10021.2   91.8910090.08   92.18
10113.04    91.910155.69   92.1410172.09   92.5810195.05   92.1510221.29    88.5
10240.98   88.1410293.46   88.0910329.54   88.9410395.15   88.5610437.79   89.23
10480.44   91.26 10503.4   91.3610523.08   90.8110575.56   91.1710605.09   90.72
10628.05    91.110657.57   90.9110683.81   91.8610710.05   90.9410755.98   91.26
10792.06   90.3810860.95   90.3210923.27   90.6510956.08   91.99 10969.2   90.72
10998.72   90.8511028.24    90.211041.36   90.8711074.17   91.4111116.81    92.9
11129.93   92.4511179.13   92.72 11251.3   93.51 11284.1   92.9111303.78   93.33
11326.75   95.1811356.27   92.9111369.39    90.211412.03   93.2211421.87   90.74
11441.56   91.1111448.12   90.07 11467.8   89.54   11517   90.8311530.12   90.17
11546.52   91.1111582.61   89.8211605.57   90.2311615.41   91.1211641.65   90.37
11664.61   90.5311694.14   88.7311720.38   91.41 11749.9   90.4411769.58   84.78
11799.11   83.0811828.63   83.1611858.15   86.9811884.39    86.311897.51   84.73
11907.35   85.0611923.76   87.2811956.56   86.31 11999.2   86.4612025.44   87.57
12051.69   86.0312061.53   86.0312091.05   81.4612107.45   84.4212130.41   81.56
12140.25   81.1912153.38   82.1912173.06   76.3112186.18   74.3412196.02   75.41
12202.58    73.212212.42    66.5 12218.7   66.04 12238.7   60.64 12318.7   56.94
 12338.7   60.1412340.35   66.2412356.75   67.7312373.15   71.2112382.99   77.75
12389.55   85.6612396.12   89.9312419.08   90.6712438.76   90.5412501.08   91.67
12556.85   92.1612566.69   91.4312586.37   91.7712619.17   91.5112632.29    92.5
12638.86   91.7112661.82   92.7912674.94    91.512717.58   90.95 12747.1   91.23
12753.67   92.0312766.79      9112819.27   91.2112835.67    92.512852.07   90.78
12884.88   90.3312927.52    90.412950.48   90.0813022.65   90.0913166.98   90.91
13186.66   92.32 13196.5   91.3513209.62   92.4313271.95   92.6713311.31   92.08
13327.71   92.3713406.44   91.8413475.33   92.5413540.93    92.413580.29    92.1
13609.82   92.3313642.62   91.6213665.58   91.6313691.82   92.4313714.79    91.9
13727.91   92.3413747.59   91.6413770.55   92.3413780.39   91.8713813.19   92.06
13832.88   93.4513842.72   96.8513859.12   99.1613882.08   98.1113905.04   98.42
13918.16   93.5113937.84   93.24

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .19211720.38    .06612202.58    .01512373.15    .06612501.08    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      12025.4412501.08           741.16 2145.86 2675.39             .1       .3
Left Levee      Station=   81.99      Elevation=   103.2
Right Levee     Station=13859.12      Elevation=   99.16
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   31.5511720.56   90.4612564.5113976.34   91.15

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            100.35    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.50    Wt. n-Val.                 0.173      0.019      0.074
  W.S. Elev (ft)             99.85    Reach Len. (ft)          741.16    2145.86    2675.39
  Crit W.S. (ft)             88.24    Flow Area (sq ft)       100950.10   11020.26   11060.54
  E.G. Slope (ft/ft)      0.000107    Area (sq ft)            100950.10   11020.26   11060.54
  Q Total (cfs)           125000.00    Flow (cfs)               37375.39   78699.12    8925.49
  Top Width (ft)          13821.64    Top Width (ft)           11909.24     475.64    1436.76
  Vel Total (ft/s)            1.02    Avg. Vel. (ft/s)            0.37       7.14       0.81
  Max Chl Dpth (ft)          42.91    Hydr. Depth (ft)            8.48      23.17       7.70
  Conv. Total (cfs)       12076740.0    Conv. (cfs)              3610983.0   7603431.0   862326.9
  Length Wtd. (ft)         1657.74    Wetted Per. (ft)         11918.79     493.17    1445.70
  Min Ch El (ft)             56.94    Shear (lb/sq ft)            0.06       0.15       0.05
  Alpha                      31.19    Stream Power (lb/ft s)      0.02       1.07       0.04
  Frctn Loss (ft)             0.21    Cum Volume (acre-ft)     61420.83   31652.74   88762.63
  C & E Loss (ft)             0.14    Cum SA (acres)           10454.36    1495.75   11809.84


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 142

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections, Section along left levee updated with
             2017 survey
Station Elevation Data    num=     450
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    90.3   34.96   91.78   69.92   94.26  113.47   98.39  157.01   98.03
  217.67   89.24  278.34   84.19  339.01   85.72  399.67   86.28  460.34    86.9
  521.01    87.8  581.68   89.09  642.34   88.48  703.01   84.32  773.61   84.45
  783.45   84.88  845.77   85.43  868.73   86.79  908.09   88.18  957.29   87.34
  976.96   88.28  996.64   87.15 1009.76   87.73 1032.72    87.5 1065.52   87.82
 1154.07   87.88 1177.03   87.74 1216.39   88.08 1252.47   87.64 1268.87   88.22
 1295.11   88.23 1357.42   87.46 1380.38    87.8 1406.62   87.57 1413.18   88.02
 1436.14   87.07 1455.82   87.38 1514.85    87.3 1534.53   86.98 1583.73   86.88
 1606.69   87.75 1623.09   87.63 1682.12    88.1 1705.08   87.94 1760.84   88.58
 1803.48   88.77 1832.99   88.43 1859.23   88.82 1951.07    87.4 1967.47   87.44
 2000.26   86.67 2013.38   87.24 2065.86   87.29 2072.42   87.76 2138.02    87.7
 2160.97   88.29 2203.61   87.99 2216.73   88.54 2262.65   88.89 2305.29   90.08
 2338.08   89.81 2364.32   88.37 2406.96   88.11  2449.6   88.79 2521.76   89.29
 2544.71   89.15 2577.51   89.75 2669.35   88.48 2702.15   88.55  2725.1   87.84
 2748.06   88.14 2767.74   87.84 2784.14   88.24 2797.26    87.7 2833.34   88.88
 2879.26   89.05 2895.65   89.64 2928.45   89.02 2938.29    89.6 2974.37   88.87
 3020.29   89.59 3039.97   89.24 3072.77   89.98 3105.56   89.24 3121.96   89.69
 3144.92   89.04  3164.6   89.58    3181   89.21  3213.8   89.58 3243.32   89.01
 3282.67   89.62 3295.79   89.35 3354.83    90.4 3420.43   90.36 3449.94    90.9
 3459.78   90.36 3535.22   90.28 3548.34   90.85 3564.74   90.36 3633.61   91.22
 3646.73   90.73 3692.65   91.45 3715.61   91.07 3738.57   92.06 3777.93    90.8
 3784.49   91.26 3814.01    90.6 3866.48   91.09 3882.88   90.52  3912.4    90.3
 3922.24   91.11 3941.92   91.42 3991.12   91.31 4027.19   92.21 4040.31   92.88
 4079.67   93.38 4089.51   91.98 4119.03   92.02 4132.15   92.71 4181.34   92.62
 4210.86   93.67 4233.82   92.79 4273.18    93.4 4292.86   93.03 4309.26   94.61
 4322.38   93.34 4335.49   93.66 4348.61   92.94 4394.53   92.59 4410.93   93.18
 4433.89   92.71 4456.85   93.23  4496.2   93.49 4525.72   92.37 4574.92   93.12
 4584.76   92.66 4614.28   93.14 4656.91   92.36 4692.99    93.3 4709.39   92.97
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 4722.51   93.67 4755.31   93.87 4765.15   93.43 4784.82   93.96 4824.18   93.55
 4889.78   94.33  4919.3   94.21 4938.97   94.73 4945.53   94.25 5011.13   93.57
 5027.53   92.06 5057.05    90.7 5070.17   90.93 5099.68   90.33 5109.52   88.75
  5129.2    88.2 5188.24   87.39 5214.48   87.48 5237.44   88.29 5250.55   87.56
 5270.23   87.52 5293.19   88.52 5322.71   89.06 5335.83   88.66 5352.23   89.27
 5371.91   88.82  5404.7   90.54  5437.5   90.54 5457.18   91.62 5476.86    91.5
  5503.1   92.54  5535.9   91.78 5552.29   92.33 5585.09   92.36 5611.33   91.66
 5644.13   92.01 5653.97   91.68 5686.77   92.73 5699.88   92.38 5732.68   92.68
 5739.24   92.15 5781.88   93.07 5854.03   92.75 5880.27   93.08 5991.79   92.02
 6001.62   92.64 6080.34   91.62 6126.26   92.86 6155.77   92.33 6188.57   91.17
 6241.05    91.1 6260.73   92.18 6273.85   91.24 6300.09   91.32 6323.04   89.91
  6362.4   91.11 6391.92   90.54  6411.6   91.99 6424.72   92.11 6447.68   89.55
 6526.39   92.01 6546.07   91.05 6572.31      92 6591.99   90.75 6608.39   90.83
  6621.5      90 6647.74   90.24 6664.14   90.98 6710.06    91.6 6762.54   90.37
 6782.21   90.42 6808.45   91.37 6844.53   91.07 6883.89   91.44 6910.13   90.51
 6959.32   90.37 6969.16   89.82  6995.4   90.57 7005.24   89.87  7044.6    90.2
 7054.44   90.88 7083.95   89.75 7103.63   89.45 7169.23   91.08 7192.19   90.93
 7205.31   90.06 7234.82    90.1 7244.66   90.61 7290.58   90.95 7297.14    90.4
 7329.94    90.1  7369.3   90.75 7388.97   89.96 7411.93   89.82 7464.41   91.11
 7484.09   90.45 7493.93   89.37 7513.61   89.85 7523.45   90.84 7552.96   89.96
 7572.64   90.86 7625.12    91.2 7634.96   91.87 7671.04   92.69 7684.15   92.32
 7713.67   92.43 7756.31   92.15 7769.43   92.71 7798.95   92.82 7848.14   92.35
 7884.22   91.41 7894.06   91.77  7936.7   90.84 7959.66   91.29 8018.69   91.13
 8061.33   91.59 8094.13   91.12 8143.32   92.14 8189.24   91.62 8208.92   92.25
 8251.56   91.69  8277.8   91.77 8287.64   92.38 8320.44    92.4 8353.23   91.77
 8389.31   91.89 8405.71   93.01 8422.11   92.54 8448.35   88.11 8461.47   87.28
 8487.71   88.96 8504.11   87.77 8530.35   87.59 8579.54   87.83 8595.94   88.27
  8651.7   87.87 8687.78   87.94 8697.62   88.32 8736.98   87.94 8776.34   88.37
 8815.69   88.02 8832.09   88.59 8917.37      88 8963.29   88.32 9005.93   88.08
  9074.8   88.54 9120.72    88.5 9127.28   88.78 9212.56   89.16 9245.36   90.72
 9268.32   91.22 9297.83   91.09 9304.39   91.51 9330.63   89.48 9363.43   89.01
 9399.51   89.19 9429.03   88.56 9455.27   89.14 9497.91   89.37  9530.7   90.55
 9553.66   90.03 9570.06   90.83 9602.86   90.83 9615.98   91.33  9678.3   91.47
 9714.38   91.93 9770.13   91.05 9806.21   89.78 9845.57   90.77 9868.53   89.63
 9898.05    90.5 9904.61    89.9 9940.69   90.39 9953.81   89.78  9986.6   89.87
 9993.16   91.0710006.28   89.4610029.24   88.64 10068.6   88.0410098.12   88.19
10137.46   87.86 10160.4   89.81 10189.9   88.7110206.29   89.1910235.78   91.08
10265.28   90.4910288.22   88.7610301.33   88.5510330.83   89.0210343.93    89.7
10366.88   89.3910399.65   87.7210432.42    89.910445.53   90.3310468.47   89.87
10481.58   90.2910497.97   89.7810514.36   90.1110547.13   89.9410586.46   90.85
10625.79   92.4810671.67   92.22 10681.5   92.5210701.16   89.52   10711   89.16
10737.21   90.0410743.77   89.2110763.43   83.6510773.27   81.9910789.65   83.22
10812.59   88.9610838.81    90.110848.64   89.5210868.31   86.1910881.42   77.05
10894.53   72.9510910.91   66.6910920.75   66.0710964.75      5811000.75    56.5
11010.75    56.511020.75    55.811029.75    56.311032.18   66.0711058.39   81.02
11091.17   88.24   11101   92.5211114.11   94.41 11130.5   93.1911159.99   92.88
11169.82   93.6911218.98   92.7811251.76   93.0911277.98   91.5211294.36   92.43
 11317.3   92.2311350.08   92.55 11376.3   92.2111454.95    92.211500.83   91.96
 11520.5   91.4111546.72    92.811579.49   92.9511615.54   93.4911635.21   92.79
11671.26   90.88 11772.9   90.85 11838.5    91.111864.75    91.911897.55   92.13
11923.79   91.7411940.19   90.7411982.83   90.4712064.84   90.82 12087.8    89.9
12100.92   91.2612133.73   92.3212202.61   91.3612225.58   91.5712251.82   91.04
12310.86   91.2712353.51   90.9212399.43   91.3812448.63    91.112560.16   90.96
12602.81   91.0712730.74   90.8612747.14   91.2212789.78   90.4612829.15   90.72
12943.96   90.4412983.32    90.613039.08   90.3313193.26    90.213206.38   89.55
13242.46   90.5713281.82   89.7213396.63   89.7313498.32   89.5513531.12   89.75
13652.49    89.5 13668.9   89.2213698.42    90.813704.98      8713711.54   86.18
13727.94   92.74 13734.5   93.8413757.46   91.8613839.47    92.713901.79   92.61
13914.92   93.2413941.16   93.3914006.76   92.9714019.88   92.4914075.65    92.6
14082.21   92.2514134.69   92.2814144.54   91.8514193.74   91.5614210.14   90.59
14252.78   89.7214305.27   89.3814357.75   90.0114374.15   89.75   14384   90.68
14393.84   94.0614406.96   96.8914446.32   97.2914462.72   93.2414557.85   93.24

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .07  113.47     .12 10681.5     .0710920.75    .02511032.18     .07
11114.11    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     10838.81   11101          2632.84 1550.77 1580.34             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
      010838.81    90.1       T
Left Levee      Station=  113.47      Elevation=   98.39
Right Levee     Station=14446.32      Elevation=   97.29

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            100.00    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.118      0.053      0.066
  W.S. Elev (ft)             99.96    Reach Len. (ft)          2632.84    1550.77    1580.34
  Crit W.S. (ft)             93.37    Flow Area (sq ft)       97384.98    7588.28   29786.36
  E.G. Slope (ft/ft)      0.000156    Area (sq ft)           107371.70    7588.28   29786.36
  Q Total (cfs)           125000.00     Flow (cfs)            66104.98   23764.27   35130.75
  Top Width (ft)          14557.85    Top Width (ft)         10838.81     262.19    3456.85
  Vel Total (ft/s)            0.93    Avg. Vel. (ft/s)           0.68       3.13       1.18
  Max Chl Dpth (ft)          44.16    Hydr. Depth (ft)           8.98      28.94       8.62
  Conv. Total (cfs)       10006810.0     Conv. (cfs)           5292001.0   1902437.0   2812375.0
  Length Wtd. (ft)         1967.27    Wetted Per. (ft)       10856.35     281.24    3468.27
  Min Ch El (ft)             55.80    Shear (lb/sq ft)           0.09       0.26       0.08
  Alpha                       2.90    Stream Power (lb/ft s)     0.06       0.82       0.10
  Frctn Loss (ft)             0.25    Cum Volume (acre-ft)    59648.56   31194.39   87508.25
  C & E Loss (ft)             0.02    Cum SA (acres)          10260.83    1477.58   11659.56


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 141.9

INPUT
Description: RGV-01, Updated on left with new survey to Station 1106.92.
             Bathymetric elevations translated from IBWC 2008 Cross-sections,
             Section along left levee updated with 2017 survey
Station Elevation Data    num=     453
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   95.38      30   98.56      46  103.31      60   102.8      84   95.06
```

```
     114   86.31  138.99   82.78  152.99   82.03  162.99   84.24  219.99   84.75
  282.98   85.83  310.98   86.69  364.98   85.91  430.97   85.67  447.97    85.2
  504.96   86.25  517.96   85.67  548.96   85.96  597.96   85.96  635.95   87.57
  684.95   88.56  725.95   88.69  801.94   89.26  829.94   87.36  842.94   87.22
  885.94   85.83  915.93   82.01  937.93   80.89  964.93   80.72 1106.92   81.65
 1328.43   83.92 1348.11   84.55 1371.07   86.17 1387.47      86 1420.27   86.76
 1430.11   86.34 1469.48    87.1 1489.16   88.04 1518.68    88.3  1548.2   87.97
 1558.04   88.37 1590.84      88 1623.64   88.68    1663   88.86  1712.2   89.58
 1741.72   89.13 1774.52   89.47 1790.92   89.03 1840.12   89.13 1869.64   89.86
 1895.88   89.81 1922.12   90.34  1974.6   90.13 1987.72   89.45  2007.4    89.8
 2020.52   89.32 2059.88   89.85    2073   89.21 2115.64   88.99 2128.76   89.42
 2148.44   88.53 2164.84   88.96 2194.36   88.32 2207.48   88.88 2217.32   88.37
 2259.97   88.64 2269.81    89.2 2299.33   88.65 2345.25   88.61 2374.77   89.08
 2381.33   88.66 2410.85    89.2 2417.41   88.84 2440.37   89.28 2483.01   89.03
 2496.13   88.48 2535.49   89.22 2568.29   89.51 2594.53    89.3 2630.61   89.95
 2640.45   89.63 2679.81   89.75 2702.77   90.12 2722.45    89.6 2758.53   90.35
 2771.65   89.96 2833.97   90.66 2856.93   90.43 2879.89   90.88 2889.73   91.62
 2948.77   91.23 2971.73   91.28 2981.57   92.14 3001.26    92.2 3017.66   94.52
 3034.06   93.29 3099.66   93.42 3119.34      94  3142.3    93.3  3191.5   93.49
 3214.46   94.07 3237.42   93.55 3250.54    93.9 3309.58   93.99 3342.38   93.44
  3355.5   95.03  3371.9    90.7 3378.46   90.15 3398.14   91.25 3430.94   91.15
  3470.3   90.24 3483.42   90.92 3526.06   90.07 3558.86   90.63 3598.22   89.41
 3627.74   89.32  3634.3   88.78  3650.7   89.34 3680.22    89.2 3709.74   89.68
 3722.86   88.98 3758.95   89.02 3804.87    89.9 3867.19   89.37 3893.43   88.68
 3932.79   88.66 3975.43   89.46 3995.11   88.47 4031.19   88.29 4047.59   88.89
 4083.67   89.48 4123.03    88.9 4152.56   89.01 4168.96   89.72 4198.48   90.26
 4214.88   90.11 4237.84   91.04  4244.4   90.51 4283.77    90.8 4300.17   89.95
 4326.41   90.24 4352.65   89.55 4392.02    89.5 4454.34   90.29 4467.46   89.52
 4496.98   90.58 4533.07    89.6 4552.75   89.96 4595.39   89.31 4657.72   89.94
 4664.28   89.68 4697.08   90.39  4726.6   89.68 4756.13   90.54 4792.21   89.91
 4802.05   90.18 4825.01   89.54 4831.57   88.46 4844.69   88.18 4870.94   86.58
  4893.9   89.16 4933.26   89.14  4943.1   87.89 4962.78   88.92 4985.74   87.02
 4998.87   87.96 5015.27      87 5028.39   88.63 5041.51   88.81 5061.19   87.15
 5087.43   87.54 5100.55   88.17 5113.68   86.86  5143.2   87.55 5156.32   88.87
 5189.12   88.29 5205.52   89.21 5228.48   88.79 5271.13   89.47 5297.37   89.37
 5320.33   88.36  5359.7   89.26 5385.94   89.07  5408.9   87.54 5422.02   87.46
 5438.42   88.56 5451.54    88.4 5461.38   87.31 5494.19   87.69 5520.43   88.51
 5543.39   88.34 5566.35   89.06 5582.75   88.77    5609   89.01 5654.92    90.4
 5664.76   90.04 5687.72   90.44 5694.28   91.13 5727.09   90.81 5799.25   91.13
 5815.65   91.44 5871.42   91.25 5897.66   90.79 5937.02   91.98 5946.86   90.78
 5963.27   91.31 5992.79   90.82 6032.15   90.95 6051.83   90.39 6064.95   91.13
 6104.32   91.25 6146.96   90.67 6160.08   91.23 6166.64   90.57 6225.69   91.11
 6251.93   90.94 6284.73    91.2 6317.54   92.23 6330.66   93.45 6353.62   92.56
 6363.46   93.61 6386.42   91.85 6412.66   93.14 6435.63   92.23 6484.83      92
 6491.39   92.51 6514.35   91.95 6547.15   93.96 6570.12   93.07 6583.24   92.06
 6599.64   92.12 6612.76   93.44  6622.6   92.89    6639   93.31 6658.68   92.98
 6665.24   93.64 6694.77   93.35 6704.61   92.75 6770.21   93.29 6786.61   92.89
 6803.02    93.6 6842.38   93.39 6852.22   92.58 6875.18   92.72  6904.7    94.4
 6934.23    93.4 6950.63   93.83 6970.31   92.83 6983.43   93.04 7003.11   92.09
 7016.23   90.63  7039.2   90.55 7078.56   89.75 7117.92   90.46 7131.04    90.1
 7140.88   90.82 7190.09   90.94 7206.49   91.39 7226.17   89.78 7242.57    89.7
 7255.69   90.73 7268.81   90.18 7298.34   86.76 7311.46   85.92 7350.82   85.06
  7386.9   85.33 7455.79   85.43 7547.64   85.36 7573.88   85.08 7636.21   85.31
 7649.33   85.09 7701.81    85.7 7734.61   85.57 7773.98   85.96 7796.94   85.87
  7869.1   86.41 7931.43   87.47 7957.67   87.47 7983.91   88.31 7997.04   87.92
 8065.92   87.71 8161.05   88.23 8184.01   88.65 8233.21   88.55 8315.22   89.29
 8403.79    89.4 8410.35   89.05 8443.15   89.03 8459.55   89.91 8525.16   89.98
 8557.96    90.5 8580.92   90.05 8603.89   90.44 8617.01   90.01 8633.41   90.57
 8646.53   90.34 8682.61    91.7  8718.7    91.3 8728.54   91.79 8761.34   91.42
 8771.18   92.01 8794.14   91.99 8836.79   90.96 8853.19   91.13 8866.31   92.11
 8876.15   91.48 8899.11   92.14 8938.47   92.32 8951.59   91.44 8977.84   92.18
 9010.64   90.95 9027.04   91.12 9053.26   92.68 9089.24   89.72 9118.68   89.18
 9157.93   89.08 9174.28   89.92 9197.18   88.93 9223.35   89.02 9246.25   89.74
 9269.14   91.98  9285.5   91.67 9298.58   92.58 9314.94    92.7 9344.38   86.72
 9370.54   82.38 9383.63   82.85  9409.8   77.62 9422.88   78.61 9439.24   77.28
 9455.59   74.51 9475.22   76.31 9485.03   73.51 9494.84   73.58 9504.66   66.24
  9511.2    59.8  9533.2    59.2  9564.2   59.31  9593.2   57.57  9601.2   57.51
  9634.2   55.73  9648.2   56.23  9668.2   58.35 9681.29   66.07  9691.1   67.74
    9714    77.7 9720.54   81.58 9727.08   87.38 9730.36   88.13 9746.71   86.37
 9772.88   86.06 9789.24   89.46 9805.59   91.79 9831.76   90.63  9861.2   91.91
 9867.74   90.78 9877.55   91.3310041.33   91.4110159.39   91.5410195.46   91.91
10261.05   91.9310306.96   92.34 10316.8   92.9410320.08   91.8210329.92   92.19
 10395.5    92.410467.65   91.8410556.19    91.810687.36   91.0910703.76    91.2
10775.92   90.9310913.74   90.6810923.58   90.4410976.08   90.4511081.08    90.7
11117.17   90.4411159.83   90.6611212.32   90.3911238.57   90.5311277.95   90.05
11291.07   90.5311310.76   89.7211346.85   89.9811359.98   92.1311363.26   90.98
11369.82   92.6211382.95    90.211405.91   88.9611435.45   89.8811471.54   89.88
11629.04   90.1911773.41      9011802.94   90.1611989.97   90.1412016.22   90.29
12170.43   90.2512229.49    90.112268.87   90.24 12298.4   90.0212390.27   90.34
12406.68   89.8212446.05    90.212452.62   89.6312475.58   90.1912544.49   90.28
12619.96   90.0912731.52   90.2112816.83   90.0712895.58   90.2512934.95   90.02
12977.61   90.1413069.48   89.87 13135.1   89.8613226.98   90.0213312.29   89.86
13391.04   90.1113430.41    89.713476.35   90.5113489.47   91.7213499.32   91.62
13515.72   89.4913532.13    88.613538.69    89.313620.72   88.7713663.38   89.01
   13729   88.7713794.62   88.8813879.93   88.6614132.59   88.6414171.96   88.37
14198.21   89.0714204.77   88.0514227.74   89.69 14234.3   87.2114240.87   86.44
14247.43   89.2914257.27   90.33 14270.4   89.6314280.24   87.24 14322.9   86.78
14365.55   87.3614381.96   88.2714401.64   87.1514427.89   87.3914454.14   90.66
14470.55   95.7914477.11   96.6714513.21   97.5314532.89   93.2114641.17   93.21
14651.01    96.314673.98    95.914677.26    95.2

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066      30     .12 9314.94     .07 9455.59    .025  9691.1     .07
  9861.2    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9314.94  9861.2            2997    3385 3501.58            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 9314.94    92.7       T
  9861.214677.26   91.91       T
Left Levee      Station=      46      Elevation=  103.31
Right Levee     Station=14513.21      Elevation=   97.53

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             99.74    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.19    Wt. n-Val.                0.120      0.029     0.066
  W.S. Elev (ft)             99.55    Reach Len. (ft)         2997.00    3385.00    3501.58
  Crit W.S. (ft)             83.09    Flow Area (sq ft)       62584.70   13502.50   36135.36
  E.G. Slope (ft/ft)      0.000104    Area (sq ft)            96186.42   13502.50   44293.43
```

Q Total (cfs)	125000.00	Flow (cfs)	28293.95	64918.89	31787.18
Top Width (ft)	14607.18	Top Width (ft)	9244.86	546.26	4816.06
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)	0.45	4.81	0.88
Max Chl Dpth (ft)	43.82	Hydr. Depth (ft)	6.77	24.72	7.50
Conv. Total (cfs)	12244990.0	Conv. (cfs)	2771672.0	6359447.0	3113869.0
Length Wtd. (ft)	3324.83	Wetted Per. (ft)	9252.92	562.19	4825.67
Min Ch El (ft)	55.73	Shear (lb/sq ft)	0.04	0.16	0.05
Alpha	9.87	Stream Power (lb/ft s)	0.02	0.75	0.04
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	53496.86	30818.97	86164.46
C & E Loss (ft)	0.05	Cum SA (acres)	9653.89	1463.19	11509.49

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 141.5

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
IBWC 2008 Cross-sections, Section along left levee updated with
2017 survey
Station Elevation Data num= 447

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.89	35.03	91.62	70.06	92.76	123.94	96.7	177.81	95.83
239.23	85.82	300.65	83.57	362.07	85.58	423.5	85.96	484.92	85.92
546.34	85.86	607.76	85.91	669.18	86.32	730.61	87.31	745.11	88.24
771.34	88.13	784.46	89.25	804.14	89.89	817.25	89.57	846.77	87.11
873	86.44	912.35	87.7	935.31	87.99	954.98	87.82	984.49	88.82
1027.12	88.64	1059.92	89.14	1069.75	89.71	1099.27	89.19	1115.66	87.16
1125.5	84.37	1132.06	83.92	1469.82	83.92	1486.21	85.59	1525.56	87.72
1568.19	89.27	1607.54	90.02	1643.62	89.48	1676.41	88.31	1709.2	88.21
1781.34	89.34	1817.41	88.44	1833.81	88.73	1866.6	88.23	1892.84	88.58
1922.35	89.48	1942.02	90.49	1978.1	90.23	1991.21	89.6	2001.05	90.02
2030.56	89.89	2050.24	90.42	2125.66	90.09	2155.17	90.73	2178.12	90.76
2217.47	91.36	2227.31	91.08	2250.26	89.06	2276.5	87.29	2289.61	86.94
2312.57	87.29	2345.36	89.05	2397.82	89.15	2420.78	90.26	2440.45	90.38
2499.48	89.83	2525.71	90.28	2561.78	90.04	2588.01	90.56	2604.41	90.1
2620.8	90.82	2640.48	90.19	2656.87	90.79	2666.71	90.29	2702.78	90.61
2709.34	90.28	2738.85	91.21	2781.48	91.39	2794.6	92.43	2801.15	92.03
2850.34	92.34	2863.46	93.1	2909.36	93.18	2938.88	92.76	2974.95	92.62
2988.06	93.04	3011.02	92.32	3024.13	91.49	3047.09	91.41	3076.6	92.52
3089.72	93.54	3119.23	93.66	3142.18	93.35	3155.3	92.69	3181.53	88.27
3194.65	87.22	3234	85.99	3273.35	86.72	3302.86	87.72	3312.69	88.71
3335.65	88.55	3378.28	89.38	3427.46	89.5	3443.86	89.24	3453.7	89.87
3463.53	89.32	3499.6	89.51	3506.16	89.87	3542.23	89.82	3558.63	89.31
3568.47	89.77	3617.65	89.83	3640.61	89.44	3660.28	89.82	3709.47	88.89
3761.93	88.8	3811.12	89.18	3837.35	88.82	3853.75	89.43	3863.58	88.61
3889.82	89.08	3909.49	88.81	3975.07	89.22	4004.59	88.9	4086.56	87.28
4155.43	86.66	4194.78	86.08	4270.2	86.71	4280.04	86.54	4306.28	87.16
4348.91	87.14	4368.58	86.73	4424.33	87.45	4466.96	87.29	4483.36	87.76
4499.76	87.44	4525.99	87.64	4532.55	87.17	4562.06	87.13	4604.69	87.91
4627.65	87.55	4637.49	88.09	4667	88.42	4689.95	87.53	4696.51	88.3
4712.91	88.74	4735.86	88.47	4775.22	88.65	4817.85	87.95	4850.64	88.11
4903.11	89.28	4916.23	89.01	4942.46	89.53	4981.81	89.13	4991.65	88.34
5011.33	88.18	5024.44	89.07	5057.24	89.4	5080.19	88.96	5096.59	88.14
5122.82	89.44	5149.06	88.65	5172.01	89.37	5185.13	89.15	5234.32	89.17
5247.44	89.58	5267.11	89.19	5296.62	89.21	5375.33	89.88	5385.17	89.28
5427.8	90.05	5450.75	89.79	5519.62	89.83	5545.85	89.53	5588.48	90.13
5601.6	89.4	5634.39	90.02	5650.79	89.71	5673.74	90.08	5686.86	89.82
5726.21	89.97	5739.33	89.59	5759.01	89.95	5788.52	89.6	5814.75	89.89
5821.31	90.41	5834.43	89.91	5844.27	90.37	5873.78	90.73	5900.02	90.58
5952.48	91.26	6024.63	92.5	6060.7	91.98	6086.94	92.62	6100.05	92.18
6116.45	90.54	6152.52	88.77	6162.36	88.71	6178.76	87.61	6214.83	87.29
6254.18	87.28	6260.74	87.03	6303.37	86.95	6313.21	86.52	6359.12	85.92
6405.03	86.03	6450.94	86.53	6470.59	85.95	6490.24	86	6532.81	87.28
6568.84	88.05	6581.94	87.33	6624.51	87.13	6640.89	87.73	6676.92	88.27
6706.39	88.15	6726.04	89.04	6745.69	89	6758.79	88.03	6778.44	85.6
6801.37	85.7	6827.57	88	6837.39	89.59	6853.77	90.69	6873.42	90.39
6883.24	87.21	6899.62	83.15	6909.44	81.76	6922.54	80.94	6948.75	80.88
6974.95	81.22	7001.15	83.44	7010.97	85.49	7017.52	85.39	7040.45	81.93
7047	81.58	7060.1	83.27	7073.2	82.61	7079.75	83.05	7099.4	85.86
7112.5	83.41	7122.32	79.74	7128.87	78.34	7138.7	79.12	7148.52	78.5
7161.62	76	7168.17	77.8	7181.27	77.26	7187.82	74.97	7194.37	69.28
7200.92	66.05	7244.92	57.98	7280.92	56.48	7290.92	56.48	7300.92	55.78
7309.92	56.28	7329.92	55.58	7348.3	66.07	7361.4	71.94	7367.95	76.82
7377.78	81.74	7384.33	87.29	7390.88	90.97	7397.43	92.28	7410.53	91.65
7430.18	92.27	7440	90.08	7446.55	91.1	7462.93	90.01	7498.95	91.17
7525.15	90.01	7554.63	90.38	7580.83	89.89	7633.23	90.62	7643.06	90.07
7692.18	90.11	7744.58	89.79	7796.98	89.83	7849.38	89.46	7964.01	89.41
7983.66	89.18	8062.26	89.35	8124.54	89.04	8137.66	89.28	8213.11	89.43
8255.75	89.36	8400.08	89.44	8416.49	89.64	8475.53	89.58	8534.58	89.86
8580.5	89.77	8774.04	89.98	8787.16	89.83	8862.6	89.85	8961.01	90.04
9016.78	89.64	9033.18	89.95	9046.3	90.81	9052.86	90.08	9069.26	91.69
9085.66	89.64	9098.78	90.6	9128.3	90.33	9170.95	90.77	9187.35	90.55
9259.52	90.2	9338.24	90.41	9387.45	90.32	9433.37	89.91	9449.77	90.07
9512.1	89.71	9630.19	89.53	9689.23	88.84	9833.56	88.13	9951.65	88.22
9971.33	88.55	9997.58	88.1910020.54		92.47	10027.1	92.0510040.22		92.67
10050.06	90.88	10076.3	90.7410092.71		91.1310128.79		90.910164.87		91.26
10207.51	90.9710223.92		91.3910315.76		91.2710381.37		91.610414.17		91.44
10588.03	91.6710683.15		91.5710712.68		91.0710732.36		92.5610745.48		91.33
10863.57	91.2710873.41		91.0410922.61		91.6110965.26		91.610994.78		91.25
11070.23	91.2611122.71		90.9811148.95		91.111211.28		90.7411221.12		90.89
11352.33	90.511404.81		90.6411486.82		90.4911578.67		90.6411640.99		90.47
11660.68	90.5911778.77		90.6211801.73		90.4511834.53		90.6911844.37		91.7
11850.93	90.5811896.86		90.8711995.26		91.0412008.38		91.2212093.67		91.23
12113.35	91.3512208.48		90.8712234.72		91.612241.28		92.3112244.56		91.15
12251.12	91.8812260.97		89.9412277.37		89.512283.93		88.6212293.77		89.27
12375.78	89.0712444.66		89.0712457.78		89.2212572.59		89.212690.68		89.42
12782.53	89.512831.73		89.5112933.42		89.4412956.38		89.2513044.95		89.35
13104	89.2513182.72		89.4813222.09		89.313304.09		89.3713327.05		89.16
13343.46	89.6613356.58		89.1513372.98		90.09 13386.1		89.5213395.94		89.83
13438.58	89.5213661.64		89.2313714.13		89.4513733.81		89.213809.25		89.42
13858.46	89.31 13901.1		89.5213969.99		89.5214035.59		89.2814058.56		89.53
14114.32	89.2714219.29		89.1414255.37		89.3714294.74		89.114517.79		89.08
14580.12	89.1514589.96		89.3214642.44		89.2514717.89		89.4414760.53		89.42
14780.22	89.1314826.14		89.6214842.54		89.3514891.75		89.4314937.67		89.23
14970.47	89.4915039.36		89.3715108.24		89.4815137.77		89.2415200.09		89.77
15206.65	87.2215213.21		87.2715219.77		90.315229.61		91.4115252.58		89.26

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15285.38   90.3815301.78   88.1415324.74   87.5815334.58   88.0215344.42   89.91
15357.54   88.5715373.95   88.9215396.91    90.715406.75    92.415419.87   93.42
15442.83   96.8515469.07   97.9915475.63      9715482.19   93.1715590.44   93.17
   15597   93.3815610.12   97.3715633.09    96.515639.65   94.8415659.33   94.74
15669.17   92.7315672.45   90.93

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .07  123.94     .12 7161.62     .07 7200.92    .025 7462.93     .07
 7744.58    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6853.77 7397.43          1939.57 3724.88  726.46             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6853.77   90.69       T
 7397.4315672.45   92.28       T
Left Levee      Station=  123.94      Elevation=    96.7
Right Levee     Station=15469.07      Elevation=   97.99
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 6086.94   90.62

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             99.24    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.119      0.088     0.065
  W.S. Elev (ft)             99.22    Reach Len. (ft)          1939.57    3724.88     726.46
  Crit W.S. (ft)             86.63    Flow Area (sq ft)       56770.18   12924.08   56833.68
  E.G. Slope (ft/ft)      0.000179    Area (sq ft)            59621.14   12924.08   75549.06
  Q Total (cfs)           125000.00     Flow (cfs)             38793.85   23740.71   62465.44
  Top Width (ft)          15672.45    Top Width (ft)           6853.77     543.66    8275.02
  Vel Total (ft/s)            0.99    Avg. Vel. (ft/s)            0.68       1.84       1.10
  Max Chl Dpth (ft)          43.64    Hydr. Depth (ft)            8.28      23.77       6.87
  Conv. Total (cfs)       9343602.0    Conv. (cfs)              2899794.0  1774590.0  4669218.0
  Length Wtd. (ft)           1603.30    Wetted Per. (ft)         6863.89     561.31    8290.52
  Min Ch El (ft)               55.58    Shear (lb/sq ft)            0.09       0.26       0.08
  Alpha                         1.42    Stream Power (lb/ft s)      0.06       0.47       0.08
  Frctn Loss (ft)              0.19    Cum Volume (acre-ft)    48136.95   29792.18   81347.68
  C & E Loss (ft)              0.00    Cum SA (acres)           9100.08    1420.84   10983.32


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 140.74

INPUT
Description: RGV-01, Updated on left with new survey to Station 1591.79.
             Bathymetric elevations translated from IBWC 2008 Cross-sections,
             Section along left levee updated with 2017 survey
Station Elevation Data    num=     413
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   89.91      10   90.23      23   96.65      60   95.25   85.99   97.74
  105.99  103.12  123.99  103.08  193.98   83.77  209.98   81.35  231.98   81.34
  245.97   82.95  297.97   83.16  412.95   84.39  514.94   85.14  592.93   87.69
   813.9   87.31   840.9   86.86  863.89   84.85  911.89   85.08  951.88   87.17
  983.88   87.18 1018.87   84.72 1147.85   85.87 1262.84   86.52 1421.81   86.35
 1438.81   88.05 1458.81   87.95  1503.8   82.13  1517.8   81.35 1591.79   81.27
 2069.85   83.56 2076.42   84.44 2092.82   83.56 2617.66   83.56 2647.19   83.72
 2693.11   83.59 2752.15   84.17 2781.68   83.78 2801.36   84.24  2811.2   84.05
    2844   84.46 2857.12   84.42 2889.93      85 2932.57   85.06 2945.69   85.42
 2998.18   85.33 3040.82   85.75 3090.03   86.96 3145.79   86.88 3175.31   87.26
 3185.15   87.72 3208.12   87.36 3234.36   87.72 3247.48   87.55 3273.72   88.03
  3293.4   87.73 3319.65   87.91 3329.49   88.33 3359.01    88.1 3391.81   88.74
 3411.49   88.72  3427.9   88.27 3437.74   88.45 3447.58   87.91 3463.98   88.76
  3477.1   88.57  3493.5   89.41 3513.18   89.46 3516.46   88.63  3526.3   83.09
 3532.87   81.32 3539.43    80.7 3552.55    77.9 3562.39   73.36 3568.95   66.93
 3589.23   59.96 3609.23   59.26 3649.23   59.76 3709.23   61.56 3719.23   64.46
 3732.96   69.28 3749.36   77.04 3759.21   82.56 3772.33   86.94 3798.57   83.66
 3808.41    83.1 3818.25   83.78 3828.09   85.29 3841.21    84.4 3857.61   84.91
 3867.45   86.36 3874.02   88.58 3880.58   88.87 3890.42   87.43 3900.26   87.24
 3916.66   87.92 3933.06   87.39 3949.46   87.26 3982.26   87.93 4008.51   89.64
 4018.35   89.44 4034.75   87.68 4064.27   87.17 4077.39   87.29 4113.48   86.97
 4156.12    87.4  4192.2   87.44 4221.73    87.3 4238.13   87.65 4274.21   87.74
 4300.45   88.04 4310.29   87.85 4379.18   88.26 4431.66   88.29 4477.59   87.93
 4500.55   88.25 4536.63   87.89 4556.32   88.24 4595.68   88.28 4635.05   87.94
 4674.42   88.24  4694.1   88.08 4736.75   88.09 4746.59   87.91 4799.08   88.01
 4825.33   87.66 4858.13    87.9  4881.1   87.68 4927.03   87.78 4959.83   87.49
 4969.67   87.69 5038.57   87.21  5100.9   87.31 5153.39   87.11 5163.23    87.2
 5215.72   86.88 5245.24   87.03 5287.89   86.83 5297.73   87.05  5337.1   86.81
 5360.07    87.1 5405.99   86.72  5422.4   86.94  5455.2   86.74 5474.89   86.97
  5524.1   86.96 5550.34    87.6 5583.15    87.5 5606.11   88.05 5619.23   87.67
 5632.36   88.21 5648.76   87.92  5658.6   88.54 5694.69   88.11 5711.09   87.67
 5740.62   87.66 5753.74   87.89 5796.39   87.75 5865.28   88.01 5976.82   88.09
 5983.38   88.24 6026.03   88.12 6039.15   87.68 6052.27   88.12 6068.68    87.9
  6114.6    88.1 6127.73   87.97 6157.25   88.15 6242.55   88.19 6252.39   88.38
 6288.48   88.17 6422.98   88.37 6465.63   88.26 6511.56   88.57 6550.93   88.61
 6603.42   88.43 6646.06   88.52 6764.17   88.61 6790.41   88.97 6816.65   88.76
 6865.86   88.91 6892.11   88.73 6938.04   89.03 6990.53   88.75 6993.81    89.8
 7000.37   89.03 7052.86   89.09  7079.1   89.36 7115.19   89.24 7157.84   89.28
 7269.38   89.56 7295.62   89.45 7410.44   89.41 7472.78   89.54 7535.11    89.4
 7630.24   89.57 7731.94   89.61  7807.4   89.47 7813.96   89.59 7899.25    89.7
  7941.9    89.5 7951.74   89.63 8046.88   89.28 8069.85   89.69 8082.97   89.49
 8096.09   90.05 8102.65   89.29 8125.62    88.4  8145.3   91.44 8158.42    91.8
 8171.54   90.96 8187.95   90.38 8220.76   90.24  8299.5   90.56  8384.8   90.53
 8450.42   90.76 8466.83   90.65 8601.35   90.68 8650.56   90.51 8739.15   90.53
 8771.95   90.46 8808.04   90.85 8844.13   90.67  8850.7   91.91 8860.54   91.28
 8893.35   91.33  8919.6   92.07 8949.12   91.69 8972.09   91.99 8991.78    91.6
 9011.46   91.98 9040.99   91.58 9063.96   91.51 9093.49   91.78 9129.58   91.64
 9145.98   92.11 9159.11   91.33 9175.51   91.57 9198.48   90.76 9260.81   90.76
  9280.5   90.96 9319.87    90.9    9333   90.64 9339.56   91.32 9342.84   90.53
  9349.4   91.25 9352.68   90.66 9392.05   90.96 9421.58   90.74 9490.48   90.65
 9513.45   90.79 9549.54   90.65 9628.28   90.58 9661.09   90.67 9690.62   90.54
 9825.14   90.35 9854.66   90.38 9939.97   90.1110018.71   90.13 10038.4   90.01
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10136.82      9010163.07   90.2110205.72    90.110281.19   90.2410333.68   90.12
10369.77   90.3210379.61   90.1510428.83   90.3510461.64   90.2810481.32   90.49
10550.22    90.710602.72   90.7510658.49   91.1110688.02   91.0310697.87   91.59
10704.43   90.5910710.99   91.6810714.27   90.7810740.52   90.9710773.33   90.66
10776.61    91.410783.17   89.9910786.45   91.1410796.29    90.810809.42   91.13
10815.98   91.8310825.82   91.6510835.66   89.0510852.07   88.1910865.19   88.94
10884.88    88.6   10898   88.83 10966.9   88.7511042.36   88.8111062.05    88.7
 11104.7   88.9311127.67   88.8211196.57   89.0211239.22   88.8611265.47   88.98
 11311.4   88.92 11327.8   89.0611373.74   88.8611432.79   89.07 11465.6   88.75
11485.29   89.8911495.13    92.311514.82   92.8711521.38   90.3811531.22   89.31
11547.63    88.711570.59   88.9711629.65   88.9111649.34   89.1211711.67   89.07
11731.36    89.211790.42      8911813.38   89.2411823.23   89.0411892.13   89.15
11924.94   89.63 11931.5   88.8911938.06   89.52 11947.9   88.6611957.75   88.65
11961.03   89.9811964.31   88.9711980.71   88.6811993.84   89.08 12016.8   88.82
12105.39   89.0812128.35   88.9512184.13   89.1712210.38   88.9812239.91    89.2
12259.59   89.0312312.09   89.2312331.77   89.0312390.83    89.212407.23   89.09
12476.13   89.1812492.54   89.0312548.31   89.2412610.65   89.1112676.27   89.27
12738.61   89.1912761.58   89.3412817.35   89.06 12843.6    89.212866.57   88.96
12886.25   89.0712938.75   88.8113004.36   89.0113020.77   88.8713056.86   89.01
13089.67   88.8313148.73   88.93 13204.5   88.8813240.59   88.9913283.24   88.75
13312.77    88.913329.18   88.7713355.42   89.0613378.39   89.6313384.95   88.02
13391.52   87.9913401.36   89.1113417.76   92.4113430.89   93.3613437.45   93.18
13460.42   91.5513493.22    91.213499.79   91.4313512.91   90.8913555.56   91.08
13624.46   91.01 13634.3   91.2313673.68   91.2113683.52   90.9513709.77   91.06
13729.45   90.7313752.42   90.6713762.26   90.3113788.51   90.1513847.57   90.78
13857.41   90.4413867.25   91.3313873.81   90.3813883.66   90.0213903.34   90.09
13926.31   89.6313942.71   90.2213952.56   89.39 13962.4    89.513972.24   87.88
13985.37   87.7113995.21   89.8714008.33   90.3714028.02   94.7314044.42   97.23
14050.98   97.1214083.79   98.2914096.92   94.0414103.48   93.1714205.19   93.17
14208.47   93.2914218.31   97.4814224.87   97.8514241.28   97.12 14254.4   95.41
14260.96   95.5914274.09   94.5514280.65   93.34

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .183 2998.18    .066 3562.39    .015 3732.96    .066 3867.45    .068

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3513.18 3772.33          3623.66 4885.99 2026.76             .1       .3
Left Levee      Station=  105.99      Elevation=  103.12
Right Levee     Station=14083.79      Elevation=   98.29
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   27.04 3506.48   89.46 3876.06 8410.14   89.59

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             99.05    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.144      0.037      0.068
  W.S. Elev (ft)             99.00    Reach Len. (ft)          3623.66    4885.99    2026.76
  Crit W.S. (ft)             92.32    Flow Area (sq ft)       32029.69    8057.99   95671.73
  E.G. Slope (ft/ft)      0.000083    Area (sq ft)            32029.69    8057.99   95671.73
  Q Total (cfs)           125000.00     Flow (cfs)             13537.82   28195.32   83266.86
  Top Width (ft)          14141.88    Top Width (ft)           3374.41     259.15   10508.32
  Vel Total (ft/s)            0.92    Avg. Vel. (ft/s)            0.42       3.50       0.87
  Max Chl Dpth (ft)          39.74    Hydr. Depth (ft)            9.49      31.09       9.10
  Conv. Total (cfs)       13700240.0    Conv. (cfs)            1483771.0   3090262.0   9126210.0
  Length Wtd. (ft)          3016.35    Wetted Per. (ft)         3375.71     271.22   10522.92
  Min Ch El (ft)              59.26    Shear (lb/sq ft)            0.05       0.15       0.05
  Alpha                        3.88    Stream Power (lb/ft s)      0.02       0.54       0.04
  Frctn Loss (ft)              0.26    Cum Volume (acre-ft)    46096.51   28895.08   79919.94
  C & E Loss (ft)              0.01    Cum SA (acres)           8872.37    1386.52   10826.70


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 140

INPUT
Description: RGV-01, Updated on left with new survey to Station 1127.85.
             Bathymetric elevations translated from IBWC 2008 Cross-sections,
             Section along left levee updated with 2017 survey
Station Elevation Data    num=     432
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   90.73   36.99   91.04   73.99   93.07  101.98  102.21  120.98  101.02
  162.98   87.08  186.97   85.85  205.97   88.15  217.97   90.89  241.97   90.51
  346.96   90.58  380.95   88.03  410.95   87.88  449.94      90  465.94   90.32
  529.93    89.3  552.93   86.72  568.93   86.15  598.93   87.03  625.92   89.11
  655.92   89.56  702.91   89.33  713.91   87.88   759.9   87.49   774.9   84.62
   792.9   83.43  896.88   83.23 1018.87    83.6 1060.86    84.6 1127.85   84.91
 1144.48   86.54 1190.39   86.77 1193.67   87.15  1219.9   87.06 1226.46   87.38
 1242.86   87.08 1288.77   87.41 1315.01   87.97 1324.84   87.44  1347.8   87.26
  1364.2   88.09 1370.75    87.7 1406.83   88.05 1439.62   87.95 1482.25    88.1
 1492.09   87.73 1551.12   88.24 1560.96   88.59 1597.03   88.46 1603.59   88.77
 1626.54   88.53 1675.73   88.92 1692.13    88.8 1715.08   89.14 1734.76   89.16
 1741.32   88.81 1774.11   89.26 1797.07   89.38  1823.3    89.2 1842.98   88.82
 1882.33   89.18 1898.73   88.86 1915.12   89.39  1934.8   89.46  1951.2   90.01
 1964.31   89.67 1977.43    90.2 1997.11    90.2 2010.22   89.73  2029.9   90.39
 2036.46   90.22 2065.97   90.59 2075.81   90.14 2118.44   90.26  2141.4   89.31
 2151.24   88.16 2180.75    87.6 2203.71   88.18 2226.66   86.61 2233.22   87.15
 2266.02   86.92 2285.69   86.86 2308.65   86.82    2348   87.18 2357.84   87.76
 2380.79    88.3 2407.03   88.49 2439.82   87.39  2459.5   88.95 2482.45   88.27
 2498.85      87 2515.25   86.63 2534.93    85.6 2597.23   84.73 2623.47   85.58
 2643.15   85.78 2692.34   87.16 2721.85      87 2757.92   87.39 2764.48   86.98
 2780.88    86.9 2810.39   87.25 2813.67   86.96 2846.47   86.92 2856.31   87.12
 2902.22   86.96 2951.41   87.24 2964.53   87.08    3017   87.11 3026.83   86.81
 3072.75   86.75  3112.1   86.47 3128.49   86.91 3161.29   86.54  3190.8   86.88
 3246.55   86.37 3292.46   86.33  3302.3   86.63  3318.7   86.43 3348.21   86.97
 3361.33   86.99 3403.96   86.51 3433.48   86.96 3443.32   86.54 3462.99   86.36
 3485.95   86.54 3495.79   86.94  3525.3   87.27  3541.7   87.21 3564.65   88.02
 3594.17      88 3610.57   88.28 3663.04   88.48 3669.59   88.14 3708.95   88.43
 3735.18   88.01 3774.53    88.8 3810.61   88.88 3840.12   88.63 3869.64   88.86
  3876.2   88.65 3905.71   89.16 3925.39   89.72 3941.78   89.51 3951.62   89.01
 3964.74   89.49 3984.42   91.36 4000.81   92.09 4013.93   91.71 4040.17   91.79
    4050   92.36 4056.56    90.9 4063.12   88.24 4076.24    85.4 4095.92   86.96
 4112.31   87.76 4128.71   87.62 4154.94   87.96  4177.9   87.84 4197.57   88.37
 4207.41   89.28 4223.81   88.88 4246.76    89.2 4253.32   89.83 4282.84   90.03
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 4299.23   90.55 4328.75   90.12 4341.86   88.67  4368.1   87.98 4433.69   89.26
 4450.08   88.37 4476.32   87.44 4492.71    86.2 4509.11   86.43 4538.37   86.09
 4548.11   85.65 4583.82   86.23  4609.8      86 4632.53   86.09  4658.5   86.61
 4687.73   87.89 4700.72   88.84 4723.44   89.01 4733.19    89.4 4759.16   89.01
  4768.9   88.31 4778.64   88.54 4794.88   86.23 4807.87   85.73 4817.61   86.12
 4856.92   84.87 4879.87   83.46 4889.71   83.51 4909.38   82.82 4925.77   82.84
 4932.33   83.23    4952      86 4974.95   86.91 5001.18   83.43 5014.29   82.38
 5020.85   83.07 5033.96   86.14 5060.19   86.74 5070.03   87.73  5089.7   85.76
 5096.26   86.02 5102.81   85.23 5115.93   80.77 5122.48   79.28 5129.04   79.39
  5135.6   80.71 5145.44   83.63 5161.83   82.57 5171.66   80.48 5178.22   78.23
 5184.78   77.06 5197.89   77.23 5204.45   78.71 5217.56   76.38 5230.68    75.2
 5240.51   76.53 5250.35   74.71 5260.19   73.62 5266.74   72.03 5283.14   71.03
 5299.53   71.65 5309.36   72.74 5312.64   72.27  5319.2   69.45 5325.76   68.45
 5335.59   69.27 5342.15   68.35 5351.99   65.87 5395.99    57.8 5431.99    56.3
 5441.99    56.3 5451.99    55.6 5460.99    56.1 5480.99    55.4 5505.99    55.9
 5520.99    55.2 5532.99    55.1 5535.59   65.87 5542.15   67.89  5548.7   73.86
 5558.54   78.71  5565.1   83.09 5574.93   88.16 5578.21    89.2 5647.06    89.2
 5663.45   89.06 5706.08   89.14 5758.57    88.8 5771.69   88.95 5840.59   88.68
 5952.13   88.36 5971.82   88.55  6007.9   88.38 6037.43   88.05 6053.83   88.94
 6070.24   91.58 6080.08    90.7 6086.64   89.28 6099.76   88.61 6126.01   88.69
 6135.85   88.37 6204.75   88.33 6230.99   88.54 6240.83   88.32 6286.76    88.5
 6375.34   88.32 6385.19   88.52 6421.27   88.37 6460.64   88.62 6486.89   88.46
 6532.82   88.52 6585.31   88.38 6618.12   88.51 6693.57   88.53 6716.54   88.42
 6785.43   88.45 6818.24   88.75 6837.92   88.63 6870.73   88.87 6883.85   88.61
 6949.47   89.01 6975.71   88.92  6995.4   89.53 7008.52   90.32 7015.08   89.25
 7038.05   89.58 7054.45   89.41 7090.54    89.9 7133.19    89.8 7143.03   90.36
 7162.72   89.29 7228.33   89.21 7287.38   89.04 7359.56   89.01 7408.77   88.81
  7454.7   88.96 7530.16   88.66    7540   88.41 7585.93   88.68 7631.86   88.21
 7749.96    88.4  7812.3   88.12 7877.91   88.16 7887.75   88.01 7943.52   88.07
 7966.49   87.92 8074.75   88.01 8107.56   87.93  8117.4    88.1 8140.37   87.86
 8153.49   88.01 8209.26   87.97 8222.38   87.16 8261.75   87.02 8297.83   87.28
 8333.91   87.09 8376.55   87.22  8402.8   87.15 8425.76   87.36 8494.64   87.15
 8560.25   87.36 8671.78   87.25 8698.02   87.39 8727.54   87.21 8760.35   87.44
 8786.59   87.34 8806.27   87.55 8832.51   87.34    8885    87.5 8894.84   87.74
 8940.76    87.5 8960.44   87.65 9052.29   87.62 9085.09   87.91  9117.9    87.2
 9131.02   88.25 9137.58   87.49 9160.54    87.1 9170.38   87.38 9190.06   87.24
 9213.02   87.55 9235.99   88.72 9245.83   88.86 9268.79   90.31 9281.91   90.61
 9311.43   89.79 9337.67    89.8 9344.24   90.08 9396.72   90.15 9406.56   89.92
 9459.04   89.73 9482.01   90.02 9531.21   89.94 9567.29   90.19  9583.7   89.88
 9613.22   90.05 9688.66   89.94 9728.03   90.14 9760.83   90.05 9862.52   90.14
 9944.53   89.9510062.62      9010105.26   89.8110144.62   89.9710170.86   89.85
10183.99   90.0410239.75   89.8210279.11   89.8610292.23   90.0610374.24   89.96
10443.13   89.9910466.09   89.8510475.93   90.3310482.49   89.6110489.05   90.41
10495.61   89.8210639.94   89.6910712.11    89.910787.56   89.6710810.52   89.83
10840.04   89.5510885.96   89.7910941.73   89.7711004.05   89.5711076.22   89.81
11161.51   89.64 11279.6   89.4911305.84   89.2811335.36   89.53 11361.6   89.37
11423.93   89.4111482.97   89.2511496.09   89.4611522.34   89.2811535.46   89.52
11555.14   88.9811571.54   88.1211617.46   88.5211637.15   88.1111669.95   88.16
11706.03   88.5311715.87   89.1511732.27   89.4211774.92   88.8511801.16   89.36
11860.21   89.5511896.29   89.5611909.41   89.3311952.05   90.4211978.29   89.99
 11994.7   90.5812001.26   93.0212017.66   96.0212037.34      9812050.46   97.74
12073.42   98.0712079.98   94.4812086.54   93.1712194.79   93.1712204.63    96.1
12214.47   97.8912230.88   97.5212240.72   96.59 12260.4   98.4812266.96   96.88
12270.24   95.0112280.08   91.65

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066   73.99     .12 5070.03     .07 5342.15    .025  5548.7     .07
 5574.93    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5070.03 5574.93          1951.2    1010 1431.32            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 5070.03   87.73       T
Left Levee      Station=  101.98      Elevation=  102.21
Right Levee     Station=12037.34      Elevation=      98

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             98.79    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.120      0.054      0.066
  W.S. Elev (ft)             98.75    Reach Len. (ft)          1951.20    1010.00    1431.32
  Crit W.S. (ft)             80.89    Flow Area (sq ft)       51108.70   14558.94   64266.66
  E.G. Slope (ft/ft)      0.000090    Area (sq ft)            55240.17   14558.94   64266.66
  Q Total (cfs)           125000.00    Flow (cfs)              28394.81   34910.91   61694.28
  Top Width (ft)          12152.27    Top Width (ft)           4942.22     504.90    6705.15
  Vel Total (ft/s)            0.96    Avg. Vel. (ft/s)            0.56       2.40       0.96
  Max Chl Dpth (ft)          43.65    Hydr. Depth (ft)           10.34      28.84       9.58
  Conv. Total (cfs)       13211710.0    Conv. (cfs)             3001152.0   3689862.0   6520693.0
  Length Wtd. (ft)         1385.25    Wetted Per. (ft)         4949.10     525.00    6717.40
  Min Ch El (ft)             55.10    Shear (lb/sq ft)            0.06       0.15       0.05
  Alpha                       2.30    Stream Power (lb/ft s)      0.03       0.37       0.05
  Frctn Loss (ft)             0.18    Cum Volume (acre-ft)    42466.62   27626.64   76199.13
  C & E Loss (ft)             0.01    Cum SA (acres)           8526.45    1343.67   10426.24


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 139.85

INPUT
Description: RGV-01, Updated on left with new survey to Station 1127.46.
             Bathymetric elevations translated from IBWC 2008 Cross-sections,
             Section along left levee updated with 2017 survey
Station Elevation Data    num=     438
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   90.81   44.74   90.62   56.66    91.4   69.59   95.11   87.55  102.04
  107.55  101.41  140.55   89.66  157.54   85.23  171.54    84.5  197.54   85.76
  211.54   89.54  233.54   89.99  275.53   89.55  323.53   89.96  366.53   90.05
  383.53   89.58  404.52   84.45  443.52   82.89  461.52   82.94  486.52   82.29
  526.51   82.48  604.51   82.27   724.5   82.33  761.49   83.17  804.49   83.17
  846.48   84.35  943.48   84.42 1031.47   84.78 1085.46   84.47 1127.46   85.09
 1164.44   87.13 1197.24   87.71  1220.2   88.62 1256.28   88.38 1275.96   88.85
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  1302.2   88.63 1325.16   88.93 1331.72   88.67 1348.12   89.39 1387.47   89.82
 1423.55   89.87 1433.39   90.53 1446.51    89.8 1472.75   90.13 1489.15    89.7
 1521.95   90.76 1535.07   89.89  1577.7   89.42 1584.26   89.08 1603.94   89.67
 1620.34   89.48  1626.9   90.07  1643.3    89.3  1708.9   89.24 1738.42   89.69
 1767.94   89.42  1774.5   89.86 1800.73   89.67 1817.13      89 1826.97   87.74
 1853.21   86.57 1879.45   87.41 1892.57   86.41 1912.25   86.41 1945.05   85.42
 1977.85   85.21 2007.36   84.73 2013.92   84.18 2063.12   85.06 2125.44   84.58
 2161.52    83.3 2204.15   82.97 2236.95    82.9 2309.11   81.55 2345.19   81.19
 2387.83   81.28 2404.23   80.99 2420.62   81.25 2437.02   80.98 2482.94   81.51
 2496.06   82.02 2515.74   82.14 2541.98   82.94 2597.74   83.45  2604.3    84.1
 2630.53   83.97 2673.17   85.13 2712.53    88.5 2722.37   90.17 2742.05   90.81
 2751.89   88.31 2758.45   84.92 2765.01   83.08 2794.53   82.81 2801.09   82.26
 2820.76   81.79  2830.6   84.94 2837.16   92.58 2840.44   93.29    2847   86.72
 2856.84   82.67 2869.96   82.37  2879.8   81.26 2886.36   81.35  2896.2      85
 2906.04   92.16 2909.32   92.88    2929   93.35 2942.12   92.81 2971.64   93.61
  2978.2   92.77 2984.76   93.66 2991.32   92.87 3004.44    93.4 3017.56   90.67
 3030.67   90.74 3047.07   89.41 3053.63   89.48 3073.31   88.06 3092.99   86.23
 3106.11   85.51 3122.51   85.39 3148.75   84.11 3171.71   84.23 3181.55   85.66
 3191.39   88.95 3201.23   88.35 3211.07   89.58 3227.47   87.71 3234.03   87.83
 3243.86   86.41 3273.38   85.79 3293.06   85.72  3368.5   86.04 3440.66   85.92
 3499.69   85.94 3512.81   86.28 3545.61   85.95 3575.13   86.38 3594.81   85.84
  3709.6      86 3745.68   86.26 3752.24   87.23 3768.64    86.2 3811.28   86.18
  3824.4   86.52 3919.51   86.22 3949.03   86.23 3955.59   86.87 3978.55   86.26
 3998.23   86.68 4008.07   86.22 4031.03   86.36 4053.99   86.11 4073.66   86.49
 4119.58   86.17  4132.7   86.42  4149.1   86.08 4168.78   86.28 4234.38   86.05
 4277.02   86.04 4286.86   86.35 4303.26   86.02  4345.9   86.34 4368.85   86.05
 4496.77   85.93 4542.69   85.72 4611.57   85.88 4654.21    85.6  4703.4   85.81
  4719.8   85.61    4769   85.82  4801.8   85.67 4893.64   85.63 4910.04   86.06
 4936.28   85.64 4946.12   86.42 4952.68   89.09 4959.24   93.46 4962.52   94.05
 4972.36   93.37  4982.2    90.8    5015   80.87 5028.11   78.88 5067.47    79.2
 5080.59    78.9    5097   77.79 5126.52   78.62 5146.21   79.98 5159.33   79.15
 5169.17   76.47 5192.14   73.38 5201.98   73.01 5211.82   71.72 5238.07   71.25
 5247.91   71.89 5257.75    73.7  5300.4   72.88 5323.37   73.39 5339.77   72.01
  5369.3   77.47 5379.14   80.53  5385.7    81.2 5398.83   79.47 5402.11   79.85
 5411.95    83.5 5428.35   85.11 5448.04   81.32 5457.88   78.65 5464.44   78.53
 5474.28   82.47 5480.84   82.12 5500.53   75.74 5510.37   74.79 5513.65   73.39
 5523.49   66.02 5530.77   64.84 5540.77   61.04 5570.77   59.64 5610.77   60.14
 5630.77   59.84 5650.77   61.34 5670.77   61.04 5690.77   60.34 5694.09   65.78
 5700.66   66.34 5713.78   73.48 5720.34   78.93 5736.74   85.39 5746.59   89.86
 5766.27   89.94 5789.24   88.67 5858.13    88.3 5927.03   88.43 5953.27   88.21
 5995.92   88.32  6084.5   87.77 6100.91   87.96 6133.72   87.69 6156.68   87.78
 6232.14   87.28 6281.35    87.1 6353.53    87.1 6386.33   86.88 6422.42   86.97
 6543.81   86.78 6560.21   86.91 6593.02   86.53 6615.99   86.74 6694.73      86
 6737.38   86.32  6750.5   86.75 6776.75   86.62 6806.27   85.86  6819.4   86.16
 6829.24    85.7 6888.29   85.31 6904.69   85.66 6940.78   85.13 6967.03   85.36
 6999.84   85.32 7032.64    84.8 7068.73   84.74 7085.14   85.13 7124.51   85.05
 7134.35   85.35 7147.47   84.95  7193.4   85.91 7209.81   85.78 7232.77   84.83
 7252.46   84.77 7436.18   84.77 7455.86   85.43 7488.67   85.74 7524.76   87.34
 7531.32   87.87 7567.41   88.73 7573.97   89.41 7593.65   89.65 7610.06   89.27
  7619.9   89.62 7626.46   90.84  7636.3   89.47 7649.43   89.55 7669.11   88.77
 7695.36   89.06 7724.89   87.97 7744.57   87.98 7754.41   88.38  7774.1   87.54
 7826.59    87.3 7885.64   87.76 7915.17   87.75 7934.85    88.8 7957.82   88.32
 7964.38    88.6 7987.35    88.1 8007.03   88.16 8016.87   85.12 8026.72   85.09
 8043.12   87.91 8066.08   87.04 8072.65   87.47 8092.33   86.69 8118.58   86.45
 8141.54   86.76 8164.51   86.69 8213.72   86.02 8239.97   85.42 8305.58   85.08
 8351.51   85.43 8476.19   85.59 8535.24   86.16 8581.17   86.79 8587.74   87.26
 8604.14   87.17 8640.23    87.9 8676.32   88.24 8709.13    89.4 8718.97   89.18
 8771.46   89.75 8830.52   90.04 8866.61   89.81 8896.14   89.98 8909.26   89.69
 8928.94   89.98 8935.51   89.63 8968.31   89.78 9010.97   89.06 9024.09   89.67
 9033.93   89.37 9063.46   89.76 9089.71   89.29 9112.67   89.92 9135.64   89.53
 9145.48   90.26  9158.6   89.73 9171.73   92.12 9188.13      91 9197.97   91.84
 9214.38      92 9230.78   90.65 9250.47   89.78 9299.68   89.08  9312.8    89.5
 9352.17   88.95 9375.14   89.39 9388.26   89.03 9398.11   89.42 9427.63   88.75
 9460.44   89.13    9467   88.57 9473.57    89.7 9496.53    88.9 9526.06    88.5
 9545.74   88.56 9575.27   88.18 9594.96   88.69 9614.64   88.42 9624.48   88.71
 9647.45   88.45  9690.1   88.53 9703.22   87.82 9778.68   87.72 9831.18   88.23
 9850.86   89.48 9867.27   88.55 9880.39   88.55 9896.79   87.75 9906.64   85.58
  9913.2   85.23 9926.32   88.58 9959.13   88.2510014.91   88.4610041.15   88.32
10057.56   87.7810093.65   88.3710149.42   88.1610234.72   88.0810316.74   87.71
10356.11   87.8110421.73   89.2910428.29    88.710441.42   90.4410454.54   89.93
10497.19   90.1410575.93   88.9710602.18   89.5310631.71   87.8810671.08   87.45
10717.01   87.6110815.43   87.4710831.84    87.210861.36   87.2910926.98   86.62
10959.79   86.6111051.65   86.0211084.46   86.1111140.24   85.7911179.61   85.79
11205.85   86.0111268.19   85.9511330.53   86.3211353.49   86.6811360.05   86.39
11379.74   87.64 11386.3    86.411399.42   86.4611409.27   88.5511422.39   87.22
11474.88   87.6511497.85   88.44 11524.1   90.2211547.06   90.8511573.31   92.85
11579.87   91.9511592.99   87.5411619.24   87.53 11625.8   88.2711635.65   90.74
11648.77   88.7211658.61   91.2911675.02   91.63 11694.7   95.6411707.82   96.64
11724.23   96.6211747.19   97.1411757.04   93.1711868.58   93.1711871.87   93.28
11881.71   97.3511894.83   96.8311914.52   96.8411921.08   93.4611930.92   93.02
11940.76   90.7711947.33   92.0811960.45   92.32

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .157 5428.35    .066 5523.49    .015 5700.66    .066 5746.59    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5428.35 5746.59          1378.43 1433.33 1501.58             .1       .3
Left Levee      Station=   87.55      Elevation=  102.04
Right Levee     Station=11747.19      Elevation=   97.14
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   47.32 4962.25   94.07 7625.9211959.44   90.82

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             98.59    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.14    Wt. n-Val.                 0.157      0.042     0.074
  W.S. Elev (ft)             98.46    Reach Len. (ft)          1378.43    1433.33   1501.58
  Crit W.S. (ft)             86.22    Flow Area (sq ft)       30835.51    9404.80  54173.53
  E.G. Slope (ft/ft)      0.000211    Area (sq ft)            30835.51    9404.80  54173.53
  Q Total (cfs)           125000.00    Flow (cfs)              13697.57   44367.21  66935.22
  Top Width (ft)          11844.61    Top Width (ft)           5312.51     318.24   6213.86
  Vel Total (ft/s)            1.32    Avg. Vel. (ft/s)            0.44       4.72      1.24
  Max Chl Dpth (ft)          38.82    Hydr. Depth (ft)            5.80      29.55      8.72
  Conv. Total (cfs)       8595464.0    Conv. (cfs)              941895.8   3050855.0  4602714.0
  Length Wtd. (ft)         1462.51    Wetted Per. (ft)         5318.23     333.48   6224.33
  Min Ch El (ft)             59.64    Shear (lb/sq ft)            0.08       0.37      0.11
  Alpha                       4.99    Stream Power (lb/ft s)      0.03       1.76      0.14
  Frctn Loss (ft)             0.28    Cum Volume (acre-ft)    40538.80   27348.82  74253.24
  C & E Loss (ft)             0.01    Cum SA (acres)           8296.78    1334.12  10213.99
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Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 139.57*

INPUT
Description: RGV-02,
Station Elevation Data num= 432

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.11	36.98	92.45	46.83	93.49	72.37	101.94	90.7	101.31
120.95	91.7	136.52	87.6	149.36	86.71	166.58	88.36	203.03	88.69
219.57	87.92	288.89	87.66	410.98	87.96	433.79	87.62	461.96	84.16
514.29	82.9	538.44	83.03	571.98	82.59	625.64	82.61	723.67	82.27
730.29	82.08	810.29	82.12	834.95	82.68	863.61	82.68	891.61	83.47
956.27	83.52	1025.78	83.83	1109.62	83.77	1133.23	83.6	1185.58	83.94
1195.3	88.78	1217.18	88.99	1230.85	88.7	1258.19	89.39	1269.13	88.8
1304.66	88.51	1310.13	88.28	1326.54	88.67	1340.21	88.52	1345.68	88.91
1359.35	88.39	1414.03	88.37	1438.64	88.64	1463.25	88.46	1468.72	88.76
1490.58	88.63	1504.25	88.19	1512.46	87.35	1534.33	86.58	1556.2	87.16
1567.14	86.51	1583.55	86.53	1610.89	85.83	1638.23	85.76	1662.83	85.43
1668.3	85.07	1700.93	85.58	1733.68	83.15	1744.59	83.21	1760.96	84.95
1766.42	85.18	1791.34	84.28	1815.54	83.88	1854.22	83.59	1914.37	82.77
1944.44	82.55	1979.99	82.65	2020.99	82.44	2059.27	82.81	2108.49	83.73
2154.97	84.08	2160.44	84.52	2182.3	84.44	2217.85	85.23	2250.66	87.46
2258.86	88.58	2275.27	89.03	2283.47	87.37	2288.94	85.1	2294.41	83.87
2319.02	83.66	2340.88	82.97	2349.08	85.08	2354.55	90.18	2357.29	90.66
2362.75	86.28	2370.96	83.6	2381.89	83.46	2395.57	82.78	2403.77	85.21
2411.97	89.98	2414.7	90.46	2431.11	90.77	2442.05	90.41	2466.65	90.96
2472.12	90.41	2477.59	91.01	2483.06	90.48	2494	90.85	2504.93	89.04
2515.86	89.08	2529.53	88.19	2535	88.23	2567.81	86.06	2578.75	85.57
2592.42	85.49	2614.29	84.63	2633.43	84.72	2641.64	85.68	2649.84	87.88
2658.04	87.49	2666.24	88.31	2679.92	87.08	2685.38	87.16	2693.58	86.22
2718.19	85.82	2734.59	85.77	2797.48	85.96	2836.02	85.89	2906.84	86.01
2917.78	86.24	2945.12	86.02	2969.73	86.32	2986.13	86	3037.93	86.02
3070.67	85.81	3111.9	86	3117.36	86.66	3131.04	86	3166.58	86.04
3177.52	86.29	3245.29	86.06	3281.41	86.08	3286.88	86.51	3306.02	86.13
3322.42	86.42	3330.62	86.11	3368.9	85.99	3385.3	86.22	3448.19	85.94
3464.59	86.05	3576.7	85.92	3612.24	86.16	3631.37	85.97	3776.29	85.71
3833.7	85.76	3869.25	85.56	3910.25	85.71	3923.92	85.58	3964.94	85.72
3992.28	85.59	4068.84	85.61	4082.51	85.9	4104.38	85.58	4112.59	86.08
4118.05	87.85	4123.52	90.75	4134.46	90.74	4142.66	89.01	4170	82.35
4180.93	81	4213.74	81.2	4224.68	81.01	4238.36	80.28	4262.97	80.88
4279.38	81.78	4290.32	81.21	4298.52	79.41	4317.67	77.32	4334.07	76.2
4355.96	75.91	4364.16	76.35	4372.36	77.56	4407.91	77.02	4427.06	77.31
4440.73	76.41	4465.35	79.94	4473.55	82.2	4479.02	82.88	4489.97	82.4
4500.9	85.95	4514.57	87.86	4521.5	87.44	4529.2	84.79	4553.1	81.16
4560.69	81.16	4572.08	83.84	4579.67	83.6	4590.82	81.72	4602.46	78.64
4613.84	77.1	4619.6574	.73236	4629.03	70.91	4637.45	69.41	4649.02	64.77
4657.59	62.53	4668.01	61.06	4683.74	60.07	4697.07	60.07	4735.52	60.54
4754.74	60.4	4773.96	61.4	4805.89	60.93	4812.4	61.27	4815.3264	.82157
4821.91	66	4834.51	71.71	4841.3477	.11629	4848.29	81.21	4866.05	89.17
4877.64	88.37	4897.92	87.68	4906.62	87.64	4926.91	89.11	4947.19	87.88
4961.69	87.97	4990.66	87.73	5058.67	87.72	5086.68	87.62	5132.21	87.66
5226.77	87.29	5244.29	87.42	5279.32	87.25	5303.83	87.29	5432.28	86.88
5513.97	86.9	5548.98	86.78	5587.51	86.85	5714.66	86.72	5735.04	86.91
5769.63	86.6	5804.91	86.7	5878.21	86.27	5923.74	86.5	5937.74	86.8
5965.77	86.69	5997.28	86.17	6011.3	86.38	6021.8	86.09	6084.84	85.86
6102.35	86.07	6140.87	85.72	6171.69	85.9	6203.92	85.84	6238.94	85.51
6282.32	85.45	6291.05	85.67	6337.01	85.7	6347.51	85.9	6361.52	85.65
6407.5	86.32	6428.07	86.23	6448.25	85.72	6473.6	85.62	6611.27	85.66
6669.72	85.62	6690.73	86.07	6725.76	86.31	6764.29	87.37	6771.29	87.72
6809.82	88.29	6816.82	88.73	6837.83	88.94	6855.35	88.7	6865.85	88.93
6872.85	89.75	6883.36	88.85	6897.37	88.92	6918.38	88.38	6946.4	88.57
6977.93	87.86	7007.16	88.03	7030.46	87.62	7086.5	87.39	7152.72	87.77
7178.92	87.64	7202.07	88.43	7226.59	88.15	7233.59	88.36	7258.11	88.04
7279.12	88.08	7289.62	86.05	7300.14	86.02	7317.65	87.88	7341.93	87.34
7349.17	87.63	7370.18	87.12	7398.2	86.97	7422.71	87.16	7447.23	87.1
7499.77	86.7	7527.79	86.31	7597.83	86.08	7646.86	86.38	7779.96	86.48
7843	86.81	7892.03	87.25	7899.04	87.59	7916.55	87.51	7955.08	88
7996.91	88.25	8028.63	88.98	8039.13	88.83	8095.17	89.23	8158.21	89.44
8196.74	89.3	8228.27	89.4	8242.27	89.2	8263.28	89.41	8270.29	89.19
8305.31	89.26	8350.85	88.75	8364.86	89.18	8375.36	88.99	8406.88	89.27
8434.91	88.97	8459.42	89.42	8480.15	89.36	8483.06	89	8494.44	89.7
8508.45	89.24	8522.47	90.84	8539.97	90.09	8550.48	90.65	8568	90.76
8585.5	89.86	8619.88	89.16	8659.05	88.87	8673.06	89.14	8715.09	88.76
8739.61	89.05	8753.62	88.79	8764.13	89.07	8795.64	88.64	8830.67	88.92
8837.67	88.56	8844.69	89.33	8869.2	88.76	8900.72	88.52	8921.73	88.54
8953.25	88.32	8977.94	88.65	8995.28	88.45	9005.79	88.66	9030.31	88.49
9075.84	88.53	9089.84	88.06	9135.13	88.02	9170.06	87.75	9175.89	88.23
9196.26	88.06	9202.08	88.34	9226.44	88.58	9247.45	89.38	9264.97	88.78
9278.98	88.76	9296.48	88.24	9307	86.78	9314	86.52	9328.01	88.72
9363.03	88.48	9422.58	88.6	9450.59	88.44	9468.11	88.06	9506.64	88.47
9566.17	88.24	9632.92	88.25	9679.5	88.14	9744.79	87.85	9786.82	87.89
9856.87	88.81	9863.87	88.39	9877.89	89.55	9897.82	89.19	9937.43	89.28
10021.48	88.43	10049.5	88.7710081.03		87.6710123.06		87.3610191.83		87.43
10218.04	87.2610232.59		87.5610270.43		87.5210294.67		87.1610398.52		86.44
10418.9	86.4410526.61		85.9510564.35		85.9510613.94		85.7110665.92		85.62
10698.36	85.7810760.49		85.6910827.04		85.8710851.55		86.1210858.55		85.93
10879.57	86.7110886.57		85.8610900.58		85.910911.09		87.3 10925.1		86.38
10981.13	86.6211005.65		87.111033.68		88.2911058.19		88.6511086.21		90.01
11093.21	89.411107.22		86.4611135.24		86.4811142.24		86.9711152.76		88.61
11166.76	87.2511177.27		88.9711194.79		89.29 11210.7		92.0511219.43		92.13
11233.99	93.0711242.72		94.9111251.46		95.9511271.83		96.7311290.67		92.05
11298.74	91.211387.52		91.2611398.29		93.7711411.83		93.7311422.88		95.95
11444.03	92.811459.72		93.0611467.08		91.0811478.13		90.8911489.18		89
11496.56	89.8511511.29		90.18						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.157	4514.57	.066	4619.65	.015	4815.32	.066	4841.34	.074

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4514.57	4866.05	1378.43	1433.33	1501.58	.1	.3

Left Levee Station= 72.37 Elevation= 101.94
Right Levee Station=11271.83 Elevation= 96.73
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	4123.52	90.75	4860.58	11270.22	89.2

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 139.29*

INPUT
Description: RGV-02,
Station Elevation Data num= 438

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.4	10.89	91.87	37.01	95.58	57.18	101.83	80.51	100.1
115.51	89.96	127.17	88.92	148.78	91.61	172.88	91.06	201.15	86.83
215.27	86.05	266.81	85.64	306.7	85.8	412.25	85.71	443	85.9
484.06	85.66	519.39	83.87	590.12	82.86	622.53	83.16	772.14	82.43
847.77	82.25	896.07	81.92	936.73	82.59	969.07	82.61	991.38	82.97
1052.32	83.01	1082.36	82.77	1152.72	82.95	1223.96	82.6	1243.7	82.78
1254.84	86.65	1276.72	86.24	1305.11	86.33	1322.68	85.97	1348.8	86.29
1366.26	82.74	1375	81.46	1383.74	81.68	1388.1	82.59	1396.84	85.32
1401.21	85.99	1440.52	84.69	1471.1	84.29	1497.3	84.07	1549.72	83.9
1572.15	84.02	1604.97	83.91	1663.28	84.33	1675	84.52	1712.2	84.72
1716.58	84.94	1734.08	84.91	1762.53	85.32	1788.79	86.42	1795.36	86.99
1808.49	87.24	1815.05	86.43	1823.81	84.66	1843.5	84.51	1861	84.15
1867.57	85.22	1871.94	87.78	1874.13	88.02	1878.51	85.85	1885.07	84.52
1904.77	84.21	1911.34	85.42	1917.9	87.8	1933.22	88.18	1941.97	88
1961.67	88.32	1966.05	88.05	1983.55	88.3	1992.31	87.4	2001.05	87.42
2016.37	86.99	2042.64	85.88	2062.33	85.59	2079.84	85.15	2095.16	85.22
2101.72	85.71	2108.29	86.82	2114.85	86.63	2121.42	87.05	2143.3	86.03
2176.12	85.83	2226.46	85.88	2257.31	85.82	2313.99	86.08	2322.74	86.21
2344.62	86.1	2364.32	86.25	2377.45	86.15	2397.07	86.29	2418.91	86.11
2445.11	85.63	2478.11	85.75	2482.49	86.09	2493.43	85.79	2532.47	86.06
2584.88	85.85	2613.79	85.93	2618.17	86.15	2633.48	85.99	2683.82	85.87
2736.33	85.97	2768.33	85.77	2790.17	85.91	2820.74	85.77	2878.58	85.98
2921.21	85.72	2938.68	85.8	2969.25	85.68	3004.2	85.73	3055.84	85.64
3084.29	85.52	3161.4	85.63	3191.86	85.49	3254.98	85.73	3272.49	85.52
3279.05	85.74	3287.8	88.04	3296.56	88.1	3325.01	83.82	3333.75	83.12
3360.02	83.21	3379.72	82.77	3412.55	83.57	3421.31	83.27	3427.87	82.35
3443.2	81.27	3456.33	80.69	3473.84	80.58	3486.97	81.43	3515.43	81.15
3530.75	81.23	3541.7	80.81	3561.4	82.42	3572.34	84.56	3583.29	85.8
3589.85	88.41	3596.41	90.12216	3600.8	90.6	3612.42	90.2	3618.26	87.04
3621.17	86.18	3641.59	83.87	3656.94	83.78	3669.88	85.21	3678.5	85.08
3691.17	84.43	3708.67	80.65	3715.81	79.61821	3717.32	79.4	3726.17	76.99
3740.75	74.97	3758.25	68.21	3767	64.37	3778.85	61.85	3787.78	60.81
3796.71	60.51	3823.38	60.51	3844.26	60.87	3878.7	60.97	3897.15	61.47
3927.79	61.29	3937.09	64.51	3943.15	65.67	3951.41	68.05	3954.83	69.66
3968.46	80.42	3985.5	88.48	3991.67	88.19	3997.83	86.83	4019.4	85.99
4028.65	86.36	4037.89	87.72	4044.05	89.02	4050.21	89.62	4059.45	89.02
4071.78	87.26	4087.19	87.52	4118	87.14	4161.14	87.11	4188.87	87.01
4268.5	87	4352.32	86.74	4387.67	86.88	4442.08	86.76	4482.32	86.81
4494.7	86.72	4516.36	86.88	4547.32	86.72	4587.56	86.65	4652.56	86.73
4689.7	86.64	4717.56	86.71	4825.89	86.64	4856.85	86.74	4887.8	86.65
4909.47	86.91	4937.32	86.65	4983.75	86.76	4996.13	86.64	5061.69	86.53
5104.46	86.63	5124.99	86.86	5154.78	86.76	5188.29	86.47	5203.19	86.61
5246.84	86.36	5300	86.48	5340.97	86.32	5373.74	86.44	5408	86.37
5429.45	86.21	5478.98	86.17	5491.36	86.05	5494.46	86.7	5500.64	86.31
5575.57	86.35	5608.97	86.49	5624.45	86.78	5673.98	86.48	5773.01	86.46
5841.11	86.55	5903.27	86.47	5943.25	86.88	5949.44	86.69	6033.01	87.82
6052.22	87.84	6082	88.24	6100.63	88.12	6111.8	88.24	6119.25	88.67
6130.41	88.23	6145.32	88.29	6167.65	87.99	6197.45	88.08	6230.97	87.75
6249.67	87.79	6255.86	88.11	6262.05	87.76	6265.15	88.56	6271.34	87.83
6305.38	87.76	6320.86	87.51	6392.05	87.6	6416.81	87.77	6444.67	87.54
6453.96	87.91	6460.15	87.74	6472.52	88.11	6495.35	87.99	6502.8	88.11
6551.21	88.01	6562.38	86.98	6573.56	86.94	6592.17	87.85	6618	87.64
6625.69	87.78	6648.03	87.55	6677.82	87.49	6704.66	87.57	6717.04	87.43
6741.8	87.56	6815.61	87.2	6890.08	87.08	6942.21	87.33	6980.13	87.38
7023.47	87.3	7048.22	87.39	7100.84	87.41	7107.03	86.96	7110.13	87.65
7116.32	87.42	7150.75	87.47	7172.04	87.64	7193.7	87.62	7212.27	87.93
7228.96	87.85	7302.03	88.23	7314.41	88.16	7348.13	88.57	7376.31	88.51
7428.93	88.73	7450.6	88.69	7485.91	88.84	7560.39	88.82	7575.28	88.7
7597.62	88.83	7617.73	88.67	7642.31	88.74	7679.64	88.61	7690.73	88.44
7705.62	88.69	7716.79	88.62	7750.31	88.79	7780.1	88.65	7828.21	89.13
7831.31	88.45	7837.49	89.34	7858.3	88.76	7877.73	89.57	7891.81	89.19
7902.98	89.46	7921.61	89.52	7940.23	89.07	7976.77	88.73	8018.43	88.65
8033.32	88.77	8078.01	88.57	8104.08	88.7	8118.97	88.56	8130.15	88.72
8150.1	88.51	8177.96	88.55	8200.9	88.71	8208.35	88.55	8215.8	88.96
8241.86	88.61	8289.39	88.49	8348.2	88.5	8357.48	88.66	8372.95	88.48
8387.09	88.62	8413.17	88.54	8461.57	88.53	8476.47	88.31	8524.62	88.27
8555.57	87.98	8561.76	87.77	8567.95	88.68	8589.62	88.17	8595.81	88.67
8611.29	88.75	8644.05	89.28	8696.18	88.72	8707.36	87.97	8714.8	87.82
8729.7	88.86	8759.85	88.71	8781.52	88.79	8837.24	88.73	8878.66	88.35
8919.62	88.57	8982.92	88.31	9053.9	88.4	9081.75	88.26	9103.42	88.29
9131.27	88.13	9177.7	87.99	9217.53	87.97	9251.98	88.19	9264.37	88.13
9292.01	88.33	9299.46	88.09	9314.36	88.67	9335.55	88.43	9377.66	88.43
9416.03	88.13	9422.21	88.21	9474.83	87.86	9496.83	88	9549.12	87.26
9589.36	87.33	9595.55	87.24	9648.16	87.27	9676.02	86.96	9691.5	87.58
9716.26	87.42	9731.73	87.55	9757.5	87.11	9787.45	86.8	9793.64	86.2
9809.12	86.49	9824.59	86.34	9846.26	86.43	9867.92	86.26	9889.59	86.27
9936.02	86.13	10028.87	85.73	10078.4	85.76	10161.97	85.43	10186.72	85.55
10211.49	85.44	10248.63	85.44	10295.06	85.34	10349.6	85.55	10357.05	85.46
10379.4	85.77	10386.84	85.32	10401.73	85.34	10412.91	86.05	10427.81	85.55
10452.91	85.61	10474.58	85.51	10513.46	85.76	10543.25	86.36	10567.43	86.42
10599.11	87.17	10606.55	86.86	10621.45	85.37	10644.81	85.34	10658.69	85.66
10669.87	86.47	10684.76	85.78	10695.93	86.66	10714.55	86.95	10719.09	87.22
10725.29	88.73	10731.48	89.44	10740.75	88.36	10756.23	89.51	10765.52	93.19
10774.81	95.19	10781	95.76	10796.47	96.32	10805.43	95.34	10817.37	90.92
10823.34	89.34	10826.33	89.24	10921.84	89.24	10924.82	89.36	10933.78	93.5
10936.76	94.36	10951.79	94.18	10960.64	94.95	10964.04	94.56	10972.58	92.54
10981.54	89.98	10987.51	88.76	10996.47	88.73	11004.91	89.27	11013.09	88.71
11020.34	89.21	11037.6	87.23	11062.13	88.04				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.094	3596.41	.066	3715.81	.015	3844.26	.066	3927.79	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3600.8	3985.5		1378.43	1433.33 1501.58	.1	.3

Left Levee Station= 57.18 Elevation= 101.83
Right Levee Station=10796.47 Elevation= 96.32
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev

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  172.12 3297.76   88.05 4048.1910767.64   89.44

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 139.01

INPUT
Description: RGV-02, Updated on left with new survey to Station 1301.82.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     433
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    91.7       8   92.43      42  101.73   62.99  100.86   97.99   91.38
  104.99   91.13  130.98   94.85  159.98   93.55  173.98   89.34  193.98   85.44
  210.97   84.18  272.97   83.58  320.96   83.92  380.95    83.8  447.94   83.57
  484.93   83.83  598.92   83.52  661.91   82.84   700.9   83.32  805.89   83.01
  880.88   82.45  971.87   82.24  981.86   81.71 1007.86   82.21 1036.86   81.88
 1078.85   82.19 1113.85   81.79 1195.83   82.14 1278.82   81.45 1301.82   81.63
 1308.12   85.42 1314.67   85.31 1347.46   85.49 1376.96    85.3 1399.91   85.45
 1406.47   85.65 1439.26   85.59  1478.6   85.77 1544.17   85.67 1609.74    85.9
 1678.59   85.75 1694.98   85.98 1724.49   86.17 1757.27   86.17  1783.5   86.49
 1799.89    86.2 1819.56   85.46  1829.4   85.37 1885.13   85.83 1924.47   85.65
 1970.37   85.91 2016.27   85.64 2032.67   85.79 2062.17   85.53 2078.56    85.8
 2101.51   85.63 2153.97   85.83 2176.92   85.57 2190.03    85.7 2212.98   85.55
 2239.21   85.71 2288.39   85.47 2357.21   85.53 2380.07    85.4 2412.72   85.59
 2432.31   85.56 2451.91   85.32 2458.44   85.47 2494.36   85.18 2527.01   85.27
 2536.81   85.43 2575.99   85.16 2618.44   85.38 2631.51   85.12  2641.3   85.24
 2657.63   84.89 2664.16   85.77 2673.96    88.8 2683.75   92.96 2687.02   93.35
 2700.08   93.28 2703.35   92.96 2709.88   88.65 2713.14   87.57 2719.67   86.86
    2736   85.78  2745.8    86.3 2765.39   86.58 2778.45   86.56 2791.51   87.15
 2801.31   85.63 2811.11   83.27 2817.64   82.38 2827.43   80.29  2830.7   80.08
 2840.49   80.72 2847.03   79.83 2850.29    78.8 2856.82   75.65 2866.62   71.81
 2876.42   66.21 2879.68   65.68 2889.68   62.64 2899.68   61.24 2909.68   60.94
 2949.68   60.94 2969.68   61.34 2989.68   61.34 3009.68   61.64 3029.68   61.44
 3049.68   61.64 3065.78   65.68 3072.31   66.46 3075.58   67.88 3082.11   72.82
 3088.64   79.64  3091.9   81.82 3098.43   84.93 3101.69   87.11 3104.96   87.79
 3111.49   87.35 3118.02   85.29 3124.55   84.72 3140.87   84.29 3150.67   85.07
 3160.46   87.26 3166.99   89.22 3173.52   90.14 3183.31   89.25 3196.37   86.65
  3202.9    86.5  3212.7   87.07 3245.34   86.56 3291.05   86.48 3320.43    86.3
 3346.55   86.44  3369.4   86.42 3467.36   86.18  3493.6   86.18 3500.15   86.31
 3575.58   86.37  3588.7   86.27 3631.33   86.41 3644.45   86.32  3667.4   86.62
  3700.2   86.45 3706.76   86.56 3742.83   86.42 3769.07   86.54 3792.02   86.43
  3811.7   86.55 3851.05   86.45 3880.57   86.62 3955.99   86.57 3965.83   86.67
 3995.34   86.53 4028.14    86.7 4060.93   86.59 4074.05   86.81 4080.61   86.45
 4083.89   86.91 4093.73   86.71  4113.4   86.67 4136.36   86.82  4146.2   86.68
 4162.59   86.82 4175.71   86.69 4201.94   86.79 4290.48   86.81  4303.6   86.93
 4372.47   86.76 4418.38    86.9 4441.33   86.79 4457.73   86.95 4487.24   86.97
 4506.92   86.81 4523.31   86.92 4565.95   86.89 4575.78   86.98 4595.46    86.8
 4611.86   86.89 4634.81    86.8 4644.65   86.94 4687.28   86.88 4693.84   87.05
  4700.4   86.65 4703.68   87.59 4710.23   86.94 4726.63   86.84 4739.75   87.02
 4765.98   86.99 4802.06   87.08 4825.01   86.95 4841.41   87.25 4847.97   87.11
 4887.32   87.15 4893.88   87.31 4966.02   87.32 4979.14   87.44 4998.81   87.31
 5041.44   87.38    5048   87.24 5070.96   87.44 5087.35   87.27 5103.75   87.39
 5136.54   87.32 5169.34   87.36 5179.17   87.53 5185.73   87.22 5195.57   87.46
 5264.44   87.41 5274.27   87.57 5300.51   87.35 5330.02   87.56 5352.98   87.54
 5392.33   87.66 5431.68   87.56 5457.91    87.6 5467.75   87.77 5480.87   87.64
 5503.82   87.69 5510.38   88.13 5516.94    87.5 5520.22   88.66 5526.78   87.68
 5562.85    87.9 5579.25   87.57 5621.88   87.59 5631.72   87.83 5638.28    87.6
 5651.39    87.9 5654.67   87.59 5674.35   87.55 5680.91   87.78 5694.02   87.45
 5700.58   87.78 5710.42   87.43 5720.26   87.82 5726.82   87.42 5739.93   87.79
 5749.77   87.74 5782.56   87.93 5828.48   87.93 5864.55   87.81 5894.06   87.93
 5959.65   88.02 5985.88   87.97    5999   87.79 6025.23   88.06 6035.07   87.97
 6087.54   88.09 6192.48   88.08 6228.55   88.26 6277.74   88.33 6323.65   88.19
 6349.88   88.31 6405.63   88.24 6412.19   87.54 6415.47   88.57 6422.03   88.19
  6458.1   88.12 6481.06   88.25 6504.01   88.09 6523.69   88.27 6556.48   88.13
 6618.79   88.26  6631.9   88.06 6671.25   88.16 6697.49    88.1 6753.24    88.2
 6776.19   88.09 6815.54   88.24  6854.9   88.29 6920.48   88.19 6943.44   88.33
 6953.27   88.16 7018.86    88.3  7028.7   88.13 7077.89   88.32 7110.68   88.28
 7156.59   88.42 7176.27    88.9 7179.55    87.9  7186.1   89.07 7195.94   88.32
 7222.18   88.22 7228.73   88.43 7245.13   88.27 7307.44   88.29    7314   88.51
 7333.67   88.29 7359.91   88.48 7415.65   88.36 7455.01   88.39  7487.8   88.31
 7507.48   88.45 7517.31   88.25 7530.43   88.44 7546.83   88.37 7589.46    88.6
 7612.41   88.46 7658.32   88.58 7664.88   88.47 7710.79   88.61 7727.19   88.47
 7737.03   88.67 7753.42   88.49 7776.38   88.61 7845.24   88.52 7894.43    88.6
 7914.11   88.52  7946.9   88.11 7953.46    87.8 7960.02   89.14 7966.58   89.13
 7982.97   88.27 7989.53      89 8005.93   89.05 8019.05   89.31 8032.16   89.14
 8068.23   89.28 8087.91   89.06 8097.75   89.24 8133.82   88.98 8163.33   88.91
 8186.29   89.03 8219.08   88.86 8245.32   88.88 8255.16   88.73 8287.95   88.63
 8314.18   88.73 8389.61    88.5 8399.44   88.39 8425.68   88.59 8432.24   88.46
 8468.31   88.44 8474.87   88.55 8504.38   88.36 8527.34   88.44 8556.85   88.26
 8606.04   88.13  8612.6   88.23 8661.79   87.98 8684.74   88.04 8697.86   87.83
 8720.82   87.91 8737.21   87.76 8766.73    87.8 8773.28   87.67 8838.87   87.53
 8858.55   87.38  8865.1   87.53 8907.74    87.4 8920.85   87.23    8993   87.26
 8999.56   87.04 9042.19   87.25 9048.75    87.1 9104.49   87.11 9134.01   86.67
 9140.57   87.27  9150.4   87.61 9176.64   87.38 9193.03   87.59 9215.99   87.11
 9242.22   86.87 9252.06   86.56 9258.62   85.67 9275.02   86.17 9291.41   86.02
 9314.37   86.25 9337.32   86.08 9360.28    86.1 9383.23   85.97 9409.47   85.98
 9481.61   85.77 9507.85   85.56 9527.52   85.64 9543.92   85.51 9560.32   85.67
 9579.99   85.43 9589.83   85.56 9648.86   85.21 9675.09   85.32 9701.33   85.17
 9740.68   85.19 9789.87   84.93 9855.45      85 9891.52   84.75 9917.76   84.81
 9947.27   84.59 9957.11   84.71 9980.07   84.48 9996.46   84.5710012.86    84.4
10039.09   84.4710068.61   84.3810078.44   84.2310094.84   84.3510160.43   84.25
10166.99   84.37 10212.9   84.2910222.73   84.5910239.13   84.6110245.69   86.32
10252.25   86.8210262.08   84.5910271.92   85.0610278.48   85.9310288.32   91.47
10298.16   94.4310304.72   95.2310321.11   95.9110330.95   95.8910334.23    95.2
10344.07    89.810350.63   87.4210353.91   87.2710458.84   87.2710462.12   87.45
10471.96   93.6710475.24   94.9610478.52   95.0710501.47   94.3110514.59   90.27
10524.43   86.5610530.99   84.7310540.83   84.6710557.22   86.1210567.06   87.22
10583.46    85.510593.29   85.3510612.97    85.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .094    2736    .066 2866.62    .015 3075.58    .066  3091.9     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2687.02 3104.96          1872.8    1725 1469.48            .1       .3
Left Levee      Station=      42      Elevation=  101.73
Right Levee     Station=10321.11      Elevation=   95.91
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    6.76 2677.18   93.41 3163.94 10526.2   90.12
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CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	97.85	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.08	Wt. n-Val.	0.094	0.049	0.060	
W.S. Elev (ft)	97.77	Reach Len. (ft)	1872.80	1725.00	1469.48	
Crit W.S. (ft)	84.99	Flow Area (sq ft)	11334.20	10257.25	57652.50	
E.G. Slope (ft/ft)	0.000212	Area (sq ft)	11334.20	10257.25	57652.50	
Q Total (cfs)	125000.00	Flow (cfs)	6924.05	37408.23	80667.72	
Top Width (ft)	10538.57	Top Width (ft)	2612.62	417.94	7508.01	
Vel Total (ft/s)	1.58	Avg. Vel. (ft/s)	0.61	3.65	1.40	
Max Chl Dpth (ft)	36.83	Hydr. Depth (ft)	4.34	24.54	7.68	
Conv. Total (cfs)	8593683.0	Conv. (cfs)	476024.8	2571796.0	5545863.0	
Length Wtd. (ft)	1559.13	Wetted Per. (ft)	2617.18	431.50	7531.09	
Min Ch El (ft)	60.94	Shear (lb/sq ft)	0.06	0.31	0.10	
Alpha	2.12	Stream Power (lb/ft s)	0.03	1.15	0.14	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	37557.52	26367.80	68214.60	
C & E Loss (ft)	0.01	Cum SA (acres)	7920.53	1297.79	9504.47	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 138.69*

INPUT
Description: RGV-02,
Station Elevation Data num= 437

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	94.01	27.49	99.96	38.49	101.62	42.63	101.15	74.36	93.25
91.59	91.32	108.84	88.57	140.25	86.19	152.97	86.05	166.71	87.92
182.03	87.28	200	83.23	208.98	82.61	241.75	82.33	292.03	82.48
334.22	82.83	447.3	84.32	468.07	84.99	523.4	83.91	563.03	82.77
611.12	81.62	616.4	81.24	699.38	81.35	711.88	82.06	720.88	84.61
982.32	84.65	996.78	84.9	1055.74	84.68	1101.34	84.85	1160.29	84.59
1165.19	86.82	1191.67	86.76	1222.56	86.89	1240.22	86.84	1275.52	87.01
1324.08	86.95	1335.62	86.89	1363.8	87.11	1399.11	87.09	1419.1	87.29
1432.14	87.17	1447.79	86.78	1456.48	86.72	1499.97	86.97	1522.69	86.85
1567.79	87.05	1580.06	86.95	1617.36	86.96	1640.83	86.77	1653.87	86.98
1672.13	86.91	1713.88	87	1732.14	86.92	1747.75	87	1760.83	86.86
1781.7	86.98	1820.83	86.84	1875.59	86.97	1893.78	86.93	1919.76	87.01
1950.94	86.9	1956.14	86.99	1988.93	86.89	2018.5	87.04	2049.67	86.81
2063.47	86.91	2076.63	88.42	2085.39	88.79	2094.17	87.46	2098.55	87.78
2102.94	88.9	2119.83	89.66	2135.41	92.72	2138.02	92.72	2145.53	92.25
2152.43	92.14	2158.2	89.99	2161.08	89.39	2183.3887	86608	2186.86	87.61
2201.88	87.87	2205.64	87.78	2213.15	85	2220.67	84.26	2230.28	84.37
2238.93	83.15	2246.96	81.63	2250.72	80.61	2258.24	77.6	2264.88	75.75
2273.53	74.64	2284.53	71.6	2293.12	64.51	2304.3460	82856	2308.13	60.11
2316.96	57.61	2325.79	55.96	2334.62	54.87	2354.62	54.87	2370.23	56.48
2380.33	57.85	2391.35	58.78	2406.96	59.75	2416.72	63.63	2425.3564	91978
2428.76	65.57	2440.8	69.84	2443.81	70.67	2452.84	72.06	2464.39	72.93
2482.06	75.9	2489.23	76.74	2492.82	77.66	2497.98	79.64	2507.15	84.13
2510.73	85.27	2517.9	86.91	2521.48	88.05	2525.06	88.43	2531.86	88.2
2538.65	87.15	2545.44	86.85	2562.42	86.7	2572.61	86.99	2582.79	87.97
2589.59	88.85	2596.38	89.21	2606.56	88.42	2620.14	86.79	2637.13	86.55
2651.28	86.11	2670.22	85.84	2682.85	85.92	2701.77	85.5	2720.7	85.47
2752.26	85.18	2764.88	85.3	2780.66	85.22	2809.05	85.34	2824.84	85.33
2856.39	85.56	2878.48	85.82	2887.96	86.18	2903.75	86.4	2947.95	86.8
2982.69	86.81	3007.96	86.65	3017.43	86.71	3036.38	86.56	3072.57	86.63
3096.38	86.55	3110.08	86.63	3159.54	86.47	3169.01	86.5	3188.54	86.29
3216.37	86.27	3239.71	85.98	3289.01	85.77	3304.8	85.57	3320.59	85.65
3339.54	85.58	3364.8	85.68	3386.9	85.61	3415.33	85.81	3456.38	85.86
3465.85	85.78	3487.95	85.83	3510.06	86	3533.06	86.07	3539.88	85.94
3543.29	86.21	3570.06	86.28	3597.87	86.73	3620.59	86.85	3649.01	86.89
3671.11	86.84	3690.06	87.01	3709.01	86.84	3746.91	86.86	3762.7	86.77
3781.64	86.85	3803.74	86.65	3835.33	86.73	3885.85	86.96	3936.38	87.03
3962.84	87.18	3983.31	87.03	4005.85	87.1	4012.17	87.26	4024.8	87.21
4050.07	87.44	4056.38	87.6	4075.4	87.64	4097.43	87.9	4129.01	88.05
4144.8	88	4177.73	88.12	4184.55	87.91	4187.97	88.37	4195.33	88.03
4211.84	88.02	4245.85	88.16	4274.27	88.07	4280.59	88.14	4315.33	88.04
4338.05	88.16	4378.98	88.26	4387.96	88.36	4425.85	88.24	4470.07	88.42
4482.7	88.29	4526.9	88.37	4569.99	88.26	4587.04	88.09	4618.49	87.97
4643.74	87.72	4659.53	87.67	4689.37	87.3	4754.28	87.06	4781.46	87.17
4820.59	87.1	4839.45	87.31	4874.28	87.44	4893.23	87.59	4918.49	87.58
4982.71	87.74	5020.23	87.68	5027.05	87.9	5033.87	87.59	5037.29	88.16
5044.11	87.67	5081.63	87.8	5107.96	87.59	5160.08	87.6	5173.72	87.75
5177.13	87.59	5197.6	87.57	5204.43	87.69	5218.06	87.46	5224.89	87.62
5235.12	87.44	5245.36	87.63	5252.18	87.43	5329.02	87.88	5351.12	87.86
5404.8	87.99	5452.17	88.31	5467.96	88.29	5486.91	88.44	5521.64	88.48
5535.29	88.39	5562.57	88.53	5572.8	88.4	5651.11	88.3	5701.64	88.46
5707.96	88.37	5745.86	88.43	5767.96	88.28	5790.07	88.24	5818.48	87.95
5850.07	87.82	5913.23	87.7	5941.64	87.82	5958.24	87.81	5965.06	87.49
5968.47	88.02	5975.3	87.85	6017.44	87.71	6026.91	87.8	6049.02	87.66
6124.8	87.87	6179.96	88.17	6193.59	88.09	6219.54	88.13	6276.38	88.32
6282.7	88.41	6314.28	88.42	6336.39	88.21	6342.7	88.01	6361.65	87.8
6437.44	86.36	6462.7	86.23	6491.12	86.28	6517.64	86.62	6535.33	86.63
6544.8	86.78	6596.09	87.26	6606.32	87.13	6677.43	86.87	6699.54	86.97
6737.44	87.44	6759.82	87.61	6763.23	87.1	6770.04	87.67	6780.28	87.26
6807.57	87.18	6814.38	87.28	6831.44	87.11	6866.91	87.13	6896.25	87.05
6903.08	87.14	6923.54	87	6950.83	87.01	7005.86	87.26	7031.12	87.43
7065.86	87.2	7091.12	87.37	7104.32	87.58	7114.55	87.57	7163.75	88.33
7189.59	88.65	7226.92	88.86	7261.22	88.77	7312.18	88.16	7318.49	88.01
7343.76	87.85	7346.91	87.57	7359.55	87.43	7369.02	87.54	7406.91	87.25
7435.33	86.6	7460.6	85.9	7473.23	85.77	7527.28	85.76	7561.38	85.56
7568.21	85.4	7575.03	86.07	7581.85	86.07	7598.9	85.63	7605.72	86
7636.43	86.15	7650.07	86.07	7687.58	86.14	7708.05	86.03	7718.29	86.12
7755.81	85.99	7786.5	85.96	7810.38	86.01	7844.49	85.93	7871.78	85.94
7916.12	85.82	7943.41	85.87	8021.87	85.75	8032.09	85.69	8059.38	85.79
8066.21	85.73	8103.72	85.72	8110.55	85.78	8141.24	85.68	8165.12	85.72
8195.82	85.63	8246.98	85.57	8253.81	85.62	8304.97	85.49	8328.84	85.52
8342.49	85.42	8366.37	85.53	8389.01	85.46	8483.76	85.38	8516.44	85.47
8559.54	85.41	8597.43	85.41	8613.22	85.52	8649.48	85.52	8656.3	85.42
8700.64	85.68	8707.47	85.62	8765.44	85.85	8796.15	85.67	8813.2	86.12
8843.71	86.02	8857.54	86.14	8868.97	86.06	8891.08	86.11	8918.94	85.85
8925.76	85.43	8942.82	85.77	8957.38	85.59	8983.75	85.87	9007.62	85.82
9055.38	85.94	9077.36	85.84	9086.83	86.08	9096.31	85.9	9112.1	86.15
9121.56	85.95	9149.98	85.92	9191.03	85.74	9197.35	85.88	9219.44	85.59

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 9260.49   85.74 9298.39    85.2 9317.33   84.74 9345.74   83.89 9427.17   83.85
 9478.34   83.72 9546.55   83.76 9584.07   83.63 9611.36   83.66 9642.06   83.55
 9652.29   83.61 9676.17    83.5 9737.56   83.49 9863.77   83.38  9870.6   83.44
 9918.35    83.4 9929.87   83.64 9939.34   84.64 9945.63   84.68 9952.46   85.58
 9959.28   85.88 9969.51   84.93 9977.23   85.53 9986.56    87.6 9996.18   92.63
 9999.33   93.3710007.03   94.4810024.59   95.3110030.91   95.310038.87   94.25
10049.48   88.8510054.79   87.4310060.96   87.2710142.33   87.2710144.98   87.36
10152.94   90.4710158.25   91.1710176.81   90.7910189.75   88.6110195.39   87.98
 10200.7   87.8110211.21   89.2310229.87   90.3510241.26   89.5210249.85   88.56
10262.72   86.3410267.01   85.82

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2138.02     .07 2304.34    .025 2425.35     .07 2525.06    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2138.02 2525.06          1872.8    1725 1469.48             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 2525.0610267.01   88.43       T
Left Levee      Station=   38.49      Elevation=  101.62
Right Levee     Station=10027.63      Elevation=  95.435
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    6.88 2141.14   92.83 7226.92 9996.56   88.35

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 138.36

INPUT
Description: RGV-02, Updated on left with new survey to Station 1018.77.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     432
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   96.33   12.99  100.07   24.99  101.48   34.99  101.51   40.99  100.67
   54.98   95.78   86.98   85.59  101.97   83.69  111.97   84.01  121.97    81.8
  136.97   81.07  200.95   80.97  215.95   81.14  225.95   83.21  234.94   86.67
  240.94   84.79  250.94   80.78  367.91   80.78   416.9      81   441.9   82.41
   447.9   84.43  459.89   87.52  474.89   88.34  476.89   88.99  481.89   86.61
  498.89   87.45  598.86   87.45  622.86   87.55  982.78    87.6 1018.77   87.55
 1039.84      88 1066.08   88.15 1082.48   88.06 1089.04   88.25  1095.6   88.06
 1118.57   88.13 1131.69   88.01 1138.25   88.15 1167.77   88.19 1174.33   88.08
 1187.45   88.28 1190.73   88.13  1213.7   88.15 1216.98   87.97 1233.38   88.22
 1266.18   88.11 1298.96   88.35 1308.74   88.17 1334.81    88.3 1347.85   88.18
 1377.18   88.38  1383.7   88.29 1399.99   88.47 1419.54   88.46  1439.1   88.38
 1471.69   88.65 1478.21   88.58 1514.05   88.68 1520.57   88.44 1533.61   88.57
 1536.87   89.22 1543.39    91.5  1549.9   92.24 1553.16   91.48 1556.42    89.8
 1559.68   90.36 1562.94    92.6 1569.46   93.67 1582.49   93.41 1589.01   92.09
 1595.53    91.2 1605.31   91.38  1621.6   90.67 1631.38    89.1 1644.41   89.24
 1647.67   89.01 1654.19   83.44 1660.71   81.87 1667.23   81.81 1683.52   79.82
 1686.78   78.43  1693.3   74.01 1696.56   72.38 1706.34   68.66 1712.85   65.86
 1716.11   65.68 1723.56   55.66 1725.56    55.2 1735.56    54.8 1741.56   53.23
 1759.56    48.8 1764.56   49.42 1776.56   51.73 1787.56   54.35 1799.56   56.22
 1816.56   58.05 1827.19   65.68 1830.47   66.07  1840.3   69.57 1846.86    74.1
 1853.41   78.22 1856.69   79.88 1866.52   82.59 1886.18   85.15 1899.29   86.19
 1909.12   87.37 1915.68   87.83 1918.96   88.46 1945.17   89.08 1964.84   88.97
  1984.5   89.12 2007.44   88.62 2023.83   88.14 2033.66   87.24 2053.32   86.66
 2059.88   86.11 2076.26   85.37 2089.37   85.34 2095.93   85.11 2109.04   85.29
  2128.7   84.49 2148.36   84.47 2164.75   84.21  2171.3   84.39 2181.13   84.05
 2194.24   84.22 2210.63      84 2240.12   84.29 2246.68   84.52 2256.51    84.3
 2272.89   84.49 2289.28   84.83 2302.39   85.33 2312.23   85.41 2322.07   86.14
 2328.63   86.11 2338.47   86.63  2348.3   86.85 2384.38   87.28 2390.94   87.07
  2397.5   87.26 2420.46   87.27  2446.7   86.93 2456.54   87.08 2476.22   86.82
 2505.73   86.87 2531.97   86.78 2538.53   86.65 2594.29   86.58 2604.13   86.42
 2613.97   86.51 2627.09   86.25  2656.6   85.88 2663.16      86 2699.24    85.3
 2718.92   85.23 2732.04   84.96  2738.6   85.06    2755   84.67  2771.4   84.74
 2791.08   84.54 2800.91   84.72 2817.31   84.77 2840.27   84.63 2869.79   85.01
 2876.35   84.91 2912.43   85.17 2922.27   84.96 2945.22   84.97 2968.18   85.38
 2994.42   85.33  3014.1   85.74  3030.5   85.88 3060.02   86.65 3082.98   86.92
 3089.54   86.84 3112.49   87.06 3135.45   86.88 3155.13   87.23 3174.81   86.89
 3214.17   86.91 3230.57    86.7 3250.24    86.8  3273.2   86.45 3283.04   86.64
    3306   86.68 3332.24   86.89  3338.8   86.81 3358.48   87.04  3371.6   87.03
 3381.44   87.22 3410.95    87.1 3420.79   87.36 3443.75    87.4 3466.71   87.19
 3483.11   87.29 3489.67    87.6 3502.79   87.51 3515.91   87.83 3529.03   87.95
 3535.59   88.23 3558.54   88.52 3578.22   88.93 3611.02   89.16 3627.42   89.09
 3643.82   89.25  3679.9   89.13 3732.37   89.32 3761.89   89.09 3768.45   89.22
 3788.13   89.09 3797.97   89.26 3804.53   89.11 3879.96   89.41 3902.92   89.19
 3919.32   89.16 3935.72   89.33 3965.24   89.43 3978.36    89.2 4024.27   89.38
 4034.11   89.23 4043.95   89.34 4099.71   88.78 4109.55   88.55 4119.39   88.57
 4145.62   88.12 4162.02      88 4184.98   87.37 4194.82   87.38 4207.94   87.04
 4244.02   86.87 4253.86   86.93 4260.42    86.7 4309.61   86.83 4329.29   86.76
 4345.69   87.02 4375.21    87.3 4385.05    87.3 4404.73   87.55 4430.97   87.54
  4473.6   87.81 4499.84   87.71 4529.36    87.8 4535.92   87.68    4572   87.66
 4617.91   87.74 4627.75   87.61 4735.98   87.59 4742.54   87.46  4798.3   87.42
 4857.34   87.82  4880.3   87.79 4922.93   88.13 4936.05   88.14 4985.25   88.65
 5001.65    88.6 5021.33   88.87 5027.89   88.78 5050.84   88.98 5103.32      89
 5109.88   88.84 5162.36   88.62 5168.92   88.49 5191.87   88.52 5244.35   88.83
 5250.91   88.65 5290.27   88.73 5313.23   88.32 5336.19   88.19  5365.7   87.58
  5398.5   87.38 5405.06   87.51 5434.58   87.26  5464.1    87.1 5493.61   87.37
 5500.17   87.27 5526.41   87.52 5546.09   87.48 5572.33   87.28 5582.17   87.41
 5605.13   87.16 5624.81   87.36  5641.2   87.26 5683.84    87.6 5703.52   87.83
 5746.16   88.12 5782.23   88.14 5841.27   88.52 5847.83   88.68 5880.63   88.65
 5903.59   88.29 5910.15   87.93 5929.83   87.45 5956.06   86.39 6008.54   84.45
 6034.78   84.23 6041.34   84.36  6064.3   84.36 6083.98   84.65 6093.81   84.97
 6110.21   85.08 6120.05   85.36 6165.97   86.03 6172.53   86.23 6211.89    85.9
 6215.17   85.76  6257.8   85.44 6280.76   85.63 6300.44   85.94 6320.12   86.46
 6366.04    86.2 6405.39   86.12 6411.95   85.95 6454.59   85.98 6500.51   85.72
 6530.02   85.68 6539.86   85.52  6598.9   86.16 6612.02   86.15 6625.14   86.48
 6641.54   86.18 6661.22   86.05  6664.5    86.2 6687.45   86.39 6703.85   86.77
 6726.81   87.14 6736.65   87.53 6762.89    88.2 6798.97   88.87 6828.49   89.22
 6844.88   89.03 6867.84   88.95 6917.04   87.72  6923.6   87.44 6936.72   87.36
 6949.84   87.03 6953.12   86.51 6966.24   86.36 6976.08   86.55 6992.47    86.2
 6999.03   86.23 7015.43   85.91 7044.95   84.66 7071.19   83.28 7084.31      83
 7986.25      83  8025.6   83.24 8035.44   83.15  8074.8   83.25 8104.32   83.24
 8117.44   83.36 8133.84   83.21 8160.08   83.41 8212.55   83.41 8228.95   83.62
  8251.9   83.59  8268.3   83.79 8284.69   83.73 8320.77   83.83 8337.16   83.99
 8379.79   84.22 8386.35   84.36 8406.03   84.39 8428.98   84.61 8438.82   84.51
 8448.66    84.7 8484.73   84.61 8491.29   84.77 8507.69   84.62 8533.92   84.76
 8543.76   85.09 8556.88   85.19 8573.27   85.02  8615.9   85.41 8625.74   85.14
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 8658.53   85.57 8668.37   85.52 8707.72   85.68 8714.28    85.9  8727.4   85.91
 8733.96   85.67 8750.35    85.7 8760.19    86.2 8770.03   85.85 8786.43   86.41
 8796.26   86.03  8806.1   86.14 8812.66   85.94 8825.78   86.04 8845.45   85.92
 8852.01   86.09 8868.41   85.89 8874.97   86.15 8897.92   85.64 8911.04   85.58
 8930.72   85.98 8940.55   86.05 8956.95   85.51 8979.91      85 8989.74   84.45
 8999.58   84.19 9029.09   82.52 9632.49   82.52 9635.76   82.69  9645.6   84.68
 9671.84      85  9678.4   85.36 9684.95   86.11 9688.23   86.91 9694.79   89.33
 9701.35   92.87 9704.63   94.13 9707.91   94.54 9721.03   94.52 9734.14   94.96
  9740.7   94.69 9743.98   94.06 9747.26   92.36 9750.54   89.79 9753.82   88.09
  9757.1   87.51 9763.66   87.27 9855.48   87.27 9862.04   88.04 9868.59    90.1
 9875.15      93 9878.43   93.52 9884.99   93.63 9901.39    93.3 9907.95   91.74
 9917.78   86.93 9921.06   85.75

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 1589.01     .07 1686.78    .025 1853.41     .07 1945.17    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1589.01 1945.17             1700    1725  1637.5             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1569.46   93.67       T
 1945.17 9921.06   89.08       T
Left Levee      Station=   34.99      Elevation=  101.51
Right Levee     Station= 9734.14      Elevation=   94.96
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    5.63  474.89   87.97 8868.41 9695.77   85.89

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             97.25    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.26    Wt. n-Val.                0.066      0.027      0.066
  W.S. Elev (ft)             96.99    Reach Len. (ft)         1700.00    1725.00    1637.50
  Crit W.S. (ft)             92.44    Flow Area (sq ft)        5093.03    8142.44   62554.55
  E.G. Slope (ft/ft)      0.000162    Area (sq ft)            13607.03    8142.44   85035.32
  Q Total (cfs)           125000.00    Flow (cfs)              3236.08   51139.40   70624.53
  Top Width (ft)           9869.54    Top Width (ft)          1537.49     356.16    7975.89
  Vel Total (ft/s)            1.65    Avg. Vel. (ft/s)           0.64       6.28       1.13
  Max Chl Dpth (ft)          48.19    Hydr. Depth (ft)           3.31      22.86       7.84
  Conv. Total (cfs)       9824888.0    Conv. (cfs)             254352.8   4019511.0   5551025.0
  Length Wtd. (ft)         1670.40    Wetted Per. (ft)        1541.57     375.48    7994.01
  Min Ch El (ft)             48.80    Shear (lb/sq ft)           0.03       0.22       0.08
  Alpha                       6.20    Stream Power (lb/ft s)     0.02       1.38       0.09
  Frctn Loss (ft)             0.29    Cum Volume (acre-ft)    36606.23   25628.44   63267.07
  C & E Loss (ft)             0.06    Cum SA (acres)           7741.86    1267.13    8982.13


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 138.04*

INPUT
Description: RGV-02,
Station Elevation Data    num=     443
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   90.75   26.26   93.04    47.6   95.38   70.74  101.32   89.61   98.28
   120.2    88.5  134.47   85.38   153.5   82.22  173.87   80.73  228.65   79.83
  253.25    80.6   268.2   82.49  274.67   84.64  284.39   84.23  289.06   82.72
  310.63   79.19  369.11   79.19  418.01   79.47  442.96   80.27  460.91   82.89
  475.89   83.35  482.87    82.7  515.37   83.82  543.43   86.75  555.44   86.88
  577.48   86.28  623.57   86.47   758.8   86.55  982.78   86.61 1061.47   86.55
 1105.77   87.12 1116.85   87.21  1123.5   86.81 1134.58   87.25 1145.67   86.99
 1172.26   87.17 1194.42   87.12  1232.1   87.18 1253.25   87.28 1276.43    87.2
 1318.53   87.34 1360.35   87.21 1371.73   87.29 1424.92   87.24 1484.76   87.36
 1543.06   87.41 1568.26   87.36 1593.45   87.49 1606.05   87.41 1631.04   87.47
 1694.27    87.5 1732.07   87.41 1763.56   87.52 1776.16   87.64 1801.36   87.56
 1821.65   87.65 1865.97   87.67 1877.06   87.77 1888.13   88.18 1894.79   88.82
 1901.43   90.59  1910.3    90.6 1914.73   89.97 1921.38    87.8 1930.24   87.27
 1952.41   86.97 1967.92    87.1 1994.52   87.12 2041.06   86.94 2052.14   87.09
  2087.6   86.98 2122.66   86.99 2135.26   86.89 2162.97   86.96 2204.58   86.86
 2311.67   86.86 2322.58   86.74 2362.09   86.79 2380.21   86.69 2399.89   86.84
 2462.23   86.67 2479.97   86.87 2506.57   86.83 2526.52   86.93 2546.47   86.71
 2570.85   86.77 2588.58   86.67 2608.54   87.05 2615.18   84.33  2617.4   84.38
 2624.05   86.71 2639.57   86.05 2648.43   85.92  2688.6   85.82 2719.88   85.89
 2734.89   85.82    2795   85.76 2836.86   85.84 2876.76   85.85 2903.36   85.76
 2925.53   85.89 2951.47   85.69 2976.52   85.76 2982.78   86.08  2995.3   87.22
  3007.8   87.57 3018.8686.51429 3026.59   86.56 3032.85   87.69 3045.37   88.17
 3058.53   88.46 3062.97   89.16 3069.62   91.87 3071.83   92.32 3082.92   91.75
 3087.84   90.67 3095.22    87.5 3100.15   85.86    3110   84.27 3119.85   83.86
 3131.71   84.06 3146.36   83.67 3156.77   85.98 3161.69   85.46    3174   82.18
 3180.51   80.79 3190.7780.07285 3198.62   78.73 3203.54   78.76 3210.93   79.43
 3223.24   78.26  3229.3   75.44 3235.54   71.89 3240.47    69.6 3243.95   68.91
 3268.33   65.47 3273.22   65.35 3284.37   60.24 3287.36   59.98 3302.34   59.72
 3308.24    59.2 3323.26   57.45 3338.27   55.22 3348.27   55.22 3359.95   57.05
 3367.51   58.59 3374.5759.61816 3387.43   61.07 3394.73   65.11 3396.99   65.37
 3403.74   67.33 3412.75   71.86 3421.75   74.78 3435.26   78.76  3448.882.09691
 3457.78   84.31 3475.79   87.62 3479.86   87.88 3492.07   87.69 3500.21   88.05
 3508.73   88.01 3528.69   87.59 3541.67   87.48  3549.9   87.07 3566.37   86.85
 3585.58   86.28 3602.05   86.17 3613.03   86.32  3629.5      86 3645.97   86.08
 3673.41   85.95 3699.58   86.26 3711.77   86.07 3728.31   86.27 3736.54   86.17
 3783.21   86.73 3805.19   87.44 3833.83   87.78 3849.13   87.59 3870.46   87.77
 3895.83   87.51 3907.07   87.65 3927.42   87.43 3964.03   87.58 3980.31   87.18
 4019.44   87.21 4035.92   87.14 4057.61    86.8 4086.09   86.84 4102.37    86.5
 4114.57   86.57 4134.81   86.25 4154.04   86.14 4167.77    86.2 4200.01   86.08
 4225.45   85.81 4250.18   86.02 4297.66   86.11 4313.35   85.94 4332.58   86.07
 4354.55   85.97 4384.77   86.23  4409.5    86.6 4453.44   86.78 4472.67   86.67
 4489.15   86.87 4505.16   86.76  4538.6   86.73 4552.33    86.6 4568.81   86.63
 4588.04   86.43 4596.28   86.51 4642.98   86.55 4651.63   86.67 4670.45   86.65
 4696.38   86.81 4733.01    86.9 4763.84   86.78 4780.32   86.85 4807.79   87.26
  4843.5   87.57 4870.97   87.58  4884.7   87.48 4898.44   87.61 4907.96    87.5
 4932.36   87.55  4940.5   87.45 4964.92   87.55 5002.82   87.44  5019.3   87.24
 5046.28   87.17 5062.56   87.35 5074.77   87.22 5082.91   87.69 5099.18   88.11
 5115.45   88.16 5127.66   87.47 5152.07   87.32 5167.63   87.44 5188.69   87.11
 5209.04   86.96 5233.55    87.1 5245.65   86.83 5280.25   86.79 5306.68   86.52
 5332.44   86.42 5351.67   86.02  5370.9   85.85 5409.36   85.81 5414.85   85.68
 5453.15   85.75 5472.53   85.61 5519.23   85.85 5535.71   86.07    5563   86.24
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 5575.21   86.02 5583.35   86.13 5595.56   86.97  5603.7      87 5615.89   86.37
 5640.09   86.24 5676.92   85.74  5722.5   85.57 5758.29   85.55 5782.69   85.47
  5807.1   85.54 5835.57   85.37 5865.33   85.41 5914.78   85.61 5941.31   85.53
 5957.59   85.75  5980.7   85.78 6052.13   86.08 6104.02   86.12 6120.79   86.22
 6140.62   86.07 6194.96   86.08 6238.91   86.26  6244.4   86.17 6277.37   86.28
 6315.83   86.01 6340.54   85.69 6368.01   85.56 6373.51   85.64 6422.95   85.42
 6475.14   85.64 6502.62    85.5 6521.84   85.55 6541.07   85.34 6604.31   85.65
 6659.18   85.82 6685.66    85.8 6744.33   86.05 6771.81   86.02 6791.03   85.85
 6813.01   85.44 6860.56   84.24 6878.93   83.91 6900.91   83.75 6925.63   83.77
 6950.35   84.04 6964.08   84.08 7010.78    84.5 7031.38   84.53 7051.99    84.3
 7087.69   84.14  7123.4   84.39 7139.89   84.65 7178.34   84.52  7211.3   84.48
 7216.79   84.39 7252.51   84.41 7323.92   84.18 7395.35   84.66 7425.56   84.44
 7447.53   84.61  7480.5   84.99 7543.88   86.16 7565.65   86.39 7598.61   86.29
 7621.16   86.02 7637.43   85.47 7645.31   85.35 7667.29   85.38 7670.03   85.16
 7690.31   85.32 7702.99   85.08 7722.85   84.98  7755.4   84.12 7768.92   83.68
 7779.91   83.52 7800.14   83.57 7848.95   83.46 7865.21   83.27 7893.69   83.11
 7918.09   83.07 7938.42   83.18 7946.56   83.07 7970.97   83.44 8011.64   83.46
 8044.18    83.4 8064.52   83.21 8084.85   83.37 8101.12   83.04 8121.45   83.17
 8133.66   83.07    8154   83.16 8182.47   83.02 8227.21   83.04 8239.42   83.12
 8284.16   82.99 8320.76    83.1 8332.97   83.03 8345.16   83.25 8381.78   83.13
 8410.25   83.25 8422.45   83.18 8442.78   83.28 8450.92   82.87 8463.12   83.42
 8487.52   83.49 8495.66   83.35  8503.8   83.57 8548.54   83.73 8572.95   84.15
 8585.14   83.92 8601.42   84.09 8621.76   84.05 8658.91    84.2 8680.88   84.39
  8715.3   84.42 8731.57    84.3 8739.71   84.46 8757.79    84.4 8768.18   84.58
 8776.31    84.2 8788.52   84.03 8808.85   84.22 8829.19   84.27 8845.47   84.02
 8857.66   83.43 8886.87   83.43 8922.57   83.59 8952.78   83.54 8993.98   83.62
 9013.21   83.84 9026.94   83.75 9062.64   83.95 9070.88   83.81 9098.34   84.03
 9139.54   84.08 9156.02    84.2 9175.24   84.09 9183.49   84.34 9191.73   84.17
 9205.46   84.45  9213.7   84.26 9274.12   84.18 9279.62   84.32 9309.83   84.03
 9334.54   84.26 9367.51   83.74 9383.98   83.34 9408.69    82.5 9496.25    82.5
 9536.92   82.63 9561.33   82.85 9614.21   83.21 9634.54   83.18 9675.21   83.29
  9740.3   83.21 9768.76   83.27 9821.64   83.21 9833.85   83.32 9874.52   83.32
 9902.99   83.14 9916.79   83.21 9925.03   84.19 9947.01    84.4 9957.99   85.07
 9966.23   86.86 9974.47   89.46 9984.34   90.73 9996.54   93.9510004.68   94.76
10008.59   94.38 10016.4   92.15 10020.3   91.3410032.94   91.0410038.59   90.54
10049.89   87.6910055.54   87.2710141.35   87.2710145.96   87.5410151.62    88.9
10157.27   91.7710164.77   93.3810168.68   93.5410179.87   93.2810199.65    87.8
10203.83   87.4110213.78   85.0810219.43   84.11

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .102 3082.92    .066 3190.77    .015 3374.57    .066 3475.79    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3082.92 3475.79            1700    1725  1637.5             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3082.92   91.75       T
 3475.7910219.43   87.62       T
Left Levee      Station=   70.74      Elevation=  101.32
Right Levee     Station= 10001.4      Elevation=   94.89
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   41.31 1893.29    90.5 7566.27 9969.02   86.44

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 137.71

INPUT
Description: RGV-02, Updated on left with new survey to Station 1104.16.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     430
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   85.16   44.78   86.13   51.75   87.61   58.71   87.83   71.65   89.45
   95.53   97.01  106.48  101.13  124.39  100.73  168.36   86.62  181.36   83.06
  204.36    80.4  222.35   79.54  256.35    78.7  298.34   80.37  311.33   81.95
  320.33    84.9  330.33   82.93  340.33   79.67  370.32    77.6   479.3   78.38
   489.3   79.28  516.29   80.18  544.29   86.06  556.28    86.3  578.28   85.11
  618.27   85.39  759.24   85.54  902.21   85.53 1027.18   85.67 1104.16   85.55
  1107.7   85.97 1183.11   86.05 1268.36   86.02 1284.75   86.16 1320.82   86.09
 1330.65    86.2 1392.95   86.13 1399.51   86.22 1435.57   86.08 1484.75   86.12
 1510.98   86.49 1520.82   86.36 1537.21   86.52 1586.39   86.47 1651.96   86.53
 1668.35   86.72 1678.19   85.91 1694.58   86.77 1710.98   86.25 1720.81   86.25
 1750.32   86.59 1783.11   86.51 1815.89   86.65 1838.84   86.56 1871.63    86.7
 1904.42   86.61 1914.25   86.71 1947.04   86.66 1966.71   86.79 2015.89   86.74
  2045.4   86.87 2058.52   86.78 2124.09   86.78 2212.62   86.97  2245.4   86.89
 2258.52   86.96 2324.09   86.92 2347.04   87.01 2402.78   87.02 2429.01   87.15
 2494.58   87.18 2510.98   87.07 2586.39   87.04 2655.24   87.23 2704.42   87.12
 2710.98   87.26 2776.55   87.25 2792.95   87.47 2809.34   88.29 2819.18   89.56
 2829.01   93.09 2842.13   93.11 2848.68   91.83 2858.52   87.49 2871.63   86.48
 2904.42   85.98 2927.37   86.19  2953.6   86.04 2966.72   86.17 2989.67   86.01
  3015.9   85.98 3029.01   86.11 3035.57   85.84 3051.96   86.11  3061.8   85.78
 3071.64   85.93 3104.42   85.83 3133.94   85.93 3147.05   85.75 3170.01   85.71
 3215.92   85.81  3297.9   85.67 3311.02   85.61 3386.44   85.52 3399.56   85.65
 3452.03   85.34 3458.59   85.48 3474.98   85.36 3514.33   85.44 3537.29   85.32
 3550.41   85.49 3638.95   85.35 3658.62   85.23 3665.18    85.5 3684.86   85.56
 3724.21   85.39 3753.72   85.51 3783.24   85.24 3796.35   85.38 3806.19   85.14
 3819.31    85.3 3845.54   85.05  3868.5   85.85 3875.06   85.87 3881.62   81.81
 3884.89   80.45 3888.17   80.56 3891.45   81.95 3894.73   84.28 3898.01   85.23
 3911.13   84.61 3920.97   83.85 3934.08   83.55 3960.32   83.33 3989.83   83.35
 4055.42   83.29 4061.98   83.18    4121   83.13 4134.12   83.29 4147.24   83.15
 4199.71   83.04 4212.82   83.12 4239.06      83 4271.85   83.11 4281.69   82.91
 4301.37   83.02  4311.2    82.9    4344   83.12 4380.07   82.93 4435.82   82.95
 4481.73   82.87 4488.29   82.74 4511.24   82.81 4521.08   82.67 4540.75   83.38
 4547.31   84.83 4557.15   90.33 4560.43   91.38 4576.83   91.41 4583.39   89.69
 4593.22   83.76 4599.78   80.43  4612.9   77.24 4626.02   76.71 4639.13   77.41
 4652.25   77.64 4662.09    78.3 4665.37    79.2 4671.93   82.13 4675.21   82.79
 4681.76    81.7  4691.6   78.12 4698.16    77.2    4708   78.26 4717.84   78.51
 4721.12   78.21 4730.95   75.65 4737.51   75.99 4747.35   77.94 4760.47   77.22
 4763.75   76.61 4780.14   68.17  4786.7   65.65 4789.98   65.46 4836.98   64.94
 4856.98   64.64 4876.98   64.64 4896.98   63.64 4916.98   61.64 4936.98   61.64
 4970.34   65.46 4973.62   65.53  4976.9    66.9 4986.74   74.13 5006.41   86.17
 5009.69    86.7 5019.53   86.41 5026.09   87.05 5049.05   86.58 5058.88   86.82
 5091.68   87.18 5108.07   87.23 5147.42   87.73 5170.38   87.88 5186.78   88.51
 5196.61   87.98 5242.52   88.12  5262.2   87.99 5268.76   88.28 5285.15   88.15
 5294.99   88.41 5314.67   87.93 5324.51   88.28 5334.34   88.31 5347.46   88.03
 5354.02   88.26 5370.42   88.02 5399.93   88.36 5413.05   87.72  5452.4   87.86
 5475.35   87.52 5498.31   87.89 5511.43   87.58 5521.26   87.88 5537.66   87.53
 5570.45   87.69 5590.13   87.42 5599.97    87.1 5619.64   86.89 5639.32   87.13
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 5662.27   86.94 5668.83   87.26 5681.95   86.89 5711.46   86.62  5816.4   86.46
 5836.08   86.63 5921.34   86.35 5941.01    86.2 5954.13    86.4 5977.09   86.19
  5990.2   86.49 6009.88    86.3 6019.72   86.43 6059.07   86.19 6068.91   86.33
  6118.1   86.17 6141.05   85.87 6154.17   85.98 6160.73   85.79  6180.4   85.95
 6186.96   85.72 6206.64   85.82  6213.2   85.65 6229.59   85.73 6245.99   85.58
 6252.55   85.31 6272.22   85.17 6285.34   85.45 6295.18   85.13 6301.74   86.03
 6314.85   86.84 6327.97   87.13 6337.81   85.78 6357.48   85.27 6367.32   85.47
 6380.44   85.38    6387   84.98  6403.4   84.58 6419.79      85 6432.91   84.46
  6465.7   84.86  6482.1   84.67 6488.66   84.83 6508.33   84.84 6524.73   84.57
 6547.68   84.82  6577.2   84.61 6600.15   84.68 6609.99   84.47 6649.34   84.35
 6688.69    84.9 6698.53   84.37 6705.09   84.52 6714.93   86.14 6721.49   86.24
 6731.32   85.03 6760.84   84.51 6780.51   83.82 6806.75   83.53 6846.09    83.5
 6865.76   83.35 6885.43   83.49 6908.38   83.29 6928.05    83.4  6980.5   83.39
 6993.61    83.2 7006.73   83.49 7059.18   83.31 7124.75   83.25 7144.42   83.52
 7154.25   83.38 7183.76   83.61 7249.32   83.71 7272.27   83.89 7337.84   83.74
 7354.23   83.82 7393.57   83.71 7413.24   83.83 7446.02   83.63 7459.14   83.72
 7478.81   83.51 7501.75   83.68 7527.98   83.72 7547.65   83.57 7593.55   83.47
 7629.61   83.48 7649.28   83.37 7701.73   83.43 7734.52   83.22 7750.91   83.38
 7777.13   83.21 7819.75   83.07 7832.86   82.93  7872.2   82.99 7885.32   82.84
 8259.05   82.84 8285.27    83.4 8314.78   83.67 8331.17   83.62 8347.56   83.76
 8360.67   83.15 8377.07   83.45 8390.18   83.92 8403.29   84.11 8416.41   83.92
 8429.52   84.08 8439.35   83.91 8455.75   84.11 8481.97   84.03 8491.81   84.15
 8531.15   83.92 8544.26   83.54 8567.21   83.22 8586.88   83.13 8603.27   83.37
 8609.83   83.15  8629.5   83.89 8662.28   83.91 8688.51   83.79  8704.9   83.41
 8721.29   83.74  8734.4   83.08 8750.79   83.34 8760.63   83.13 8777.02   83.32
 8799.97   83.04 8836.03   83.09 8845.87   83.23 8881.93   82.99 8911.43   83.19
 8921.27   83.06  8931.1    83.5 8960.61   83.27 8983.56    83.5 8993.39   83.36
 9009.78   83.56 9016.34   82.73 9026.17   83.84 9045.84   83.98  9052.4   83.71
 9058.96   84.13 9078.63   84.29 9088.46   84.53 9095.02   84.36 9114.69   85.11
 9124.52   84.67 9137.64   84.96 9154.03   84.85  9173.7   85.02 9193.37   85.36
 9229.43   85.43 9242.54   85.09  9249.1   85.31 9265.49    85.2 9272.05   85.42
  9278.6   84.63 9288.44   84.32 9304.83   84.63 9321.22   84.55 9334.34   83.94
 9344.17   82.69 9350.73   82.48 9858.87   82.48 9875.26   82.71 9891.65   82.75
 9911.32   83.19 9953.94   83.89 9970.33   83.8310003.11   84.0510055.57    83.9
10078.51   84.0310121.13   83.8910130.97   84.1210163.75   84.12 10186.7   83.76
 10216.2   83.66 10232.6   84.0710245.71   84.8810252.27   86.94 10262.1   93.04
10268.66   94.8210281.77    94.510301.44   94.82   10308   93.8210311.28   92.64
10321.11   88.1210327.67   87.2710429.29   87.2710432.57   87.3610439.13   89.12
10445.69   93.3210448.96   93.9910471.91   92.9810478.47   89.4610481.75   88.53
 10488.3   85.2810494.86   83.03 10504.7   83.1310511.25   82.5210517.81   82.47

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .102 4576.83    .066 4780.14    .015  4976.9    .066 5009.69    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4576.83 5006.41          1088.69    1566 1979.92             .1       .3
Left Levee      Station=  106.48      Elevation=  101.13
Right Levee     Station=10268.66      Elevation=   94.82
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   60.85 4556.62   91.44 5394.9310289.58   88.32

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             96.52    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.12    Wt. n-Val.                 0.102      0.047      0.067
  W.S. Elev (ft)             96.40    Reach Len. (ft)          1088.69    1566.00    1979.92
  Crit W.S. (ft)             85.40    Flow Area (sq ft)       21970.31   10538.68   44549.96
  E.G. Slope (ft/ft)      0.000267    Area (sq ft)            21970.31   10538.68   44549.96
  Q Total (cfs)           125000.00     Flow (cfs)             15189.33   44915.84   64894.83
  Top Width (ft)          10379.94    Top Width (ft)           4438.96     429.58    5511.40
  Vel Total (ft/s)            1.62    Avg. Vel. (ft/s)            0.69       4.26       1.46
  Max Chl Dpth (ft)          34.76    Hydr. Depth (ft)            4.95      24.53       8.08
  Conv. Total (cfs)       7646264.0     Conv. (cfs)            929132.7   2747507.0   3969624.0
  Length Wtd. (ft)         1720.03    Wetted Per. (ft)         4441.88     443.86    5532.15
  Min Ch El (ft)             61.64    Shear (lb/sq ft)            0.08       0.40       0.13
  Alpha                       2.92    Stream Power (lb/ft s)      0.06       1.69       0.20
  Frctn Loss (ft)             0.34    Cum Volume (acre-ft)    35001.95   24884.95   58168.14
  C & E Loss (ft)             0.02    Cum SA (acres)           7508.60    1236.02    8475.12


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 137.43*

INPUT
Description: RGV-02,
Station Elevation Data    num=     445
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   85.94   24.82   85.59   39.15   86.58   48.69    86.5   82.21   93.98
   91.82   97.43  111.03  100.96  129.31   97.82  165.93   86.35  187.44   82.15
  210.91   79.99  224.74   79.18  263.96   78.41  284.96   79.25  295.95   81.51
  305.95    78.9  320.95   77.86  346.42   78.12  358.69   79.27  372.85   81.76
  436.82   81.87  476.15   82.69  505.92   85.65  518.67   85.77  542.06   85.19
  777.72   85.54  863.61   85.42  919.29   85.65  972.14   85.64 1111.32   86.21
  1157.1   86.39 1184.62   86.32 1222.44   86.41  1236.2   86.31 1294.67   86.23
 1332.06   86.31 1366.89   86.29  1411.6   86.45 1463.69   86.46 1514.78    86.1
 1549.17   86.11 1556.06   86.28 1576.69   86.19 1589.05   86.34 1598.46      86
 1614.13   86.31  1629.8   85.99 1652.34    86.1 1662.66    86.5 1672.99   86.24
  1700.5   86.48 1738.33   86.41 1748.65   86.61  1762.4   86.48 1783.37   86.57
 1844.95   86.48 1872.45   86.84  1893.1   86.62 1910.29    86.9 1927.48   86.94
 1972.19   86.58 2013.47   86.99 2037.55   86.91 2047.86    86.7 2061.62    86.9
 2075.37   86.84 2096.01   87.06 2120.08   87.53 2137.27   89.11  2147.6   89.66
 2157.92   89.88 2171.67    88.8 2178.55   88.67 2199.19   86.82 2219.82   86.46
 2240.45   86.52 2247.34   86.37  2288.6   86.48 2347.07   86.48 2357.9386.55103
 2360.83   86.57 2395.22   86.48 2422.74   86.77 2446.81   86.53 2491.52   86.58
 2549.98   86.93 2567.19   86.62 2605.01   86.87 2632.53   86.67 2646.29   86.81
 2664.08   86.76 2679.75   87.26 2689.16   87.85 2698.55    89.6  2711.1   89.62
 2717.36   88.98 2726.76   86.82  2739.3   86.33  2752.9   86.35 2780.42    86.1
 2804.49   86.35  2849.2   86.42 2869.83   86.26 2889.74    86.5 2921.08    86.3
 2955.82   86.46  2962.7   86.34 2990.04   86.44 3034.92   86.25 3055.56   86.53
 3076.19   86.24 3093.38   86.31 3124.34   86.17 3151.86   86.31 3186.24   86.31
 3203.45   86.18 3224.08   86.25 3234.39    86.1 3255.02   86.13  3279.1   86.52
 3292.86   86.41  3313.5    85.7 3375.62    85.7 3389.16   85.85 3420.12   85.71
 3464.82   85.78  3491.6   85.63 3497.87   85.76 3537.05   85.75 3557.68   85.83
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 3595.51    85.8 3609.27   85.65  3645.2   85.76 3670.28   85.62  3698.5   85.95
 3707.89   83.25 3711.03   83.31 3720.44   85.65 3742.38   84.98 3767.47    84.7
 3794.99    84.8 3825.94   84.69 3860.34   84.77 3911.92    84.7 3956.64   84.71
 3977.27   84.52 4008.22   84.56 4042.61   84.24  4077.8   84.18 4097.64   83.88
 4142.35   83.91 4166.43   84.07 4176.74   83.79 4221.46   84.13 4235.21   85.84
  4252.4   85.98 4278.5584.39748 4290.24   83.69 4317.75   83.78 4334.85   84.64
 4341.12   85.57 4350.52   88.61 4353.66    89.2 4369.33   89.36 4376.38   88.27
 4386.95   84.54 4393.99   82.49 4408.09   80.45 4422.19   79.43 4436.84   78.94
 4450.37   78.96 4460.94   79.37 4471.52   81.27 4475.04   81.58 4482.08   80.99
 4492.65   79.13  4499.7   78.62 4520.85   79.29 4525.81   79.04 4534.93   77.77
 4541.98   78.01 4552.55   79.01 4570.17    78.5 4587.79   74.51 4594.83   73.15
 4608.15 72.7091 4617.79   72.39 4636.14   72.83 4642.26   72.19 4651.43   69.36
 4654.7268.56432 4657.55   67.88 4672.84   65.08  4675.9   61.17 4691.84   61.01
 4701.15    60.7 4722.66   58.94 4734.81   58.17 4744.81   58.17 4753.02   59.32
 4774.22   59.78 4789.95   60.51 4812.95   61.28 4816.9961.86948 4819.05   62.17
  4829.2   68.13 4833.68   69.47 4839.27  72.216 4851.57   79.09 4862.75   84.25
 4873.93   86.53 4877.67   86.73 4888.87   86.19 4908.91   86.18 4922.49   85.86
 4938.05   85.77 4952.63   86.12 4955.54   86.45 4975.94   86.82 4981.77   86.58
 4993.43   86.85 5010.92    86.3 5037.15   86.42 5060.67   86.26 5079.34   86.46
 5092.53   85.99 5136.25    85.8 5172.71   85.84  5185.9   85.68 5202.58   85.89
 5224.99   85.52 5247.39   85.74 5262.33   85.45 5322.09   85.49 5337.03   85.14
 5381.84   85.25 5407.98   85.13 5434.13   85.29 5449.07   85.11 5460.27   85.24
 5478.94   85.03 5504.59   85.21 5525.06   85.16  5549.9   84.77 5620.85   84.52
 5639.65   84.58 5693.13    83.6 5710.96   83.38 5746.61   83.16 5796.38   83.05
  5818.8   83.12  5871.4   83.02  5938.3   83.36 5953.24   83.57 5979.39   83.65
 5994.32   83.91 6016.73   83.97 6072.75   84.51 6103.97   84.91 6139.05   84.92
 6166.11   84.58 6210.93   84.43  6218.4   84.27 6266.95   84.18 6315.49   83.82
 6341.64   83.73 6358.33   84.28 6378.99   80.73 6393.99   78.66 6411.81   75.09
 6438.74   74.74 6447.47    74.4 6465.29   74.66 6483.55   74.54  6498.5      74
 6535.84   74.05 6554.52   73.95 6566.42   74.85 6571.77   83.43 6586.39   83.86
 6595.16   85.13 6609.78   85.79 6621.47   85.03 6639.02   85.04 6682.88   84.31
 6688.96   84.32  6723.8   83.82 6744.98   83.77 6789.79   83.88    6801   83.57
 6808.47   83.68 6819.67   84.53 6827.14   84.57 6838.34   83.95 6871.96   83.77
  6919.7   83.01 6969.04   82.96 6991.45   82.87 7013.85   82.93 7044.49   82.83
 7080.14   82.48 7097.97   82.63 7140.75   82.43 7150.68   82.97 7171.15   85.99
 7176.99   86.48 7203.31   85.99 7212.08   86.09 7235.47   85.91 7282.25   86.07
 7319.99   86.05 7340.73   86.22 7384.58   85.96  7410.9   85.94 7445.99   86.17
  7472.3   85.93 7495.69    85.9  7533.7      86 7547.74   85.92  7583.4   85.98
 7600.94   85.86 7614.94   85.99 7652.27    85.8 7667.22   85.85 7714.97   85.77
 7744.21   85.87 7776.38   85.54 7817.31   85.47  7902.1   85.17 7954.72   85.25
 7969.34   85.07  7999.5   85.11 8039.51   84.82 8051.21   84.96 8077.52    84.8
 8100.92   85.02 8156.47   84.87 8188.62      85 8194.47   85.14 8226.64    85.1
 8247.11   84.92 8299.73    85.1 8308.51   84.96 8358.21   84.86 8375.75   84.65
 8404.99   85.04 8422.54    84.9 8448.85   85.01 8463.47   84.88 8478.08      85
  8492.7   84.82 8527.79   84.99 8536.56   84.69 8583.34   84.61 8618.42   84.86
  8638.9   84.86 8647.67   84.68 8678.99   84.71 8693.92   84.27  8712.6   84.13
 8735.38   84.17 8741.23   84.47 8755.85   84.47 8770.47   83.92 8788.01   83.92
 8802.63   83.61 8888.07   84.08 8929.14   84.05 8977.68   84.46 9000.08   85.02
 9027.76   85.01  9068.7   85.19 9085.95   85.04 9104.61   85.13 9119.54   84.79
 9138.21   84.95 9168.08   84.94 9194.22   84.77 9246.49   84.86 9287.56   84.75
 9332.36   84.72 9343.53   84.95 9377.16   84.77 9433.16   84.86 9440.63   84.41
 9451.82   84.93 9474.22   84.98 9522.76   85.24 9530.23   85.13 9552.63   85.45
 9563.83   85.23 9578.77   85.37 9597.44   85.32 9642.24   85.57  9683.3   85.61
 9698.24    85.4 9731.84   85.57 9750.51   84.97 9787.84   85.06 9802.78    84.8
 9813.98    84.2 9821.45    84.1 9858.12   84.09 9875.66   84.18 9931.22   84.17
 9939.99   84.09    9978   84.1410004.31   83.7210018.94   83.7510048.17   82.56
10056.94   81.4410181.73   81.6410235.21   81.6510270.86   81.5310288.69   81.23
10324.34   81.5610400.14   82.1510437.47   82.5710498.44   83.8910548.14    84.2
10624.15   83.9610644.62   84.0110670.94   83.8210698.82   83.7710711.87   83.89
10773.49   83.5610805.44   83.5210820.05   83.8510822.98   84.2510834.67    88.4
10848.16   90.0610859.36   93.2510866.83   94.2410887.11   92.6910891.16   91.78
10899.27   88.1110903.33   87.4410909.65   87.2710966.18   87.2710972.27   88.19
10978.35   90.6310992.54   90.12 10996.6   88.3611006.74   85.1511020.93   84.87

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066  111.03    .085 4369.33     .07 4608.15    .025 4789.95     .07
 4839.27    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      4369.33 4873.93          1088.69    1566 1979.92            .1       .3
Left Levee      Station=  111.03      Elevation=  100.96
Right Levee     Station=10866.83      Elevation=  94.235
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   48.19 4364.89   89.37 4888.12 10829.6   86.68

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 137.14

INPUT
Description: RGV-02, Updated on left with new survey to Station 1118.49.
             Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     440
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   86.72   25.84   85.51   40.75   87.18   50.69   86.47   77.59   94.92
   85.58   96.24   95.58  100.22  115.58  100.79  159.58   86.93  171.58   83.48
  185.58   81.78  231.57   78.61  254.57   78.66  271.57   78.13  298.56   78.46
  311.56   80.69  320.56   84.55  326.56   85.57  346.56    85.7  361.56   85.59
  419.55   85.19  509.55   85.27  560.54   85.11  678.53   85.26  755.52   85.55
  846.51   85.31  905.51   85.73   961.5   85.65  1063.5   86.28 1118.49   86.88
 1123.97   86.62 1160.05   86.66 1173.17   86.49 1228.95    86.3 1297.84    86.5
 1340.49   86.79 1363.45   86.47 1379.86   86.59 1412.66   85.98 1438.91   85.73
 1471.71   85.71 1478.28   86.05 1497.96   85.81 1520.92   86.12 1540.61   85.71
 1570.13   85.79 1579.97   86.47 1589.82    85.9 1616.06   86.45 1652.15    86.2
 1661.99   86.64 1675.11   86.36 1717.76   86.52 1734.17   86.28 1753.85   86.29
 1766.97   86.79 1780.09    86.9 1786.66   86.52 1799.78   86.48 1816.18   87.05
 1826.02    86.8 1832.58   87.12 1842.43    86.6 1848.99   86.75 1875.23   86.38
  1914.6    87.2 1921.16   86.91 1937.57   87.02 1947.41   86.57 1960.53   86.94
 1973.65   86.79 1993.34   87.18  2016.3   88.12  2032.7   91.32 2042.55    92.4
 2052.39   92.81 2065.51   90.66 2072.07   90.39 2085.19   88.21 2091.76   86.71
 2111.44   85.98 2131.12   86.03 2137.69   85.73 2177.05   85.94 2232.82    85.8
 2245.95   85.97 2278.75   85.89    2305   86.49 2327.96   86.01 2370.61   86.04
 2383.73   86.33 2396.86   86.23 2426.38   86.68 2442.79    86.1 2478.87   86.49
 2505.12   86.09 2518.24   86.37 2531.36      86 2554.33   86.27 2560.89   86.09
  2610.1   86.18 2619.94   86.44 2646.19   86.13 2669.15   86.58  2711.8   86.81
 2731.48   86.53 2754.45   86.97 2770.85   86.75  2813.5   87.08 2820.06   86.85
 2869.27   87.04 2888.95   86.77 2908.64   87.28 2928.32   86.68 2944.72   86.85
 2974.25   86.63  3000.5   86.97  3033.3   87.05 3049.71    86.8 3069.39   86.98
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 3079.23   86.64 3098.91   86.67 3121.88    87.6    3135   87.48 3154.69   86.03
 3223.58   86.09 3226.86   86.22 3256.39   85.99 3299.03   86.19 3315.44   86.02
 3367.93   86.04 3387.61   86.25 3413.86      86  3423.7   86.22 3436.82   86.05
 3482.75   86.29 3515.56   86.01 3577.89   86.15 3587.73   85.96 3613.98   86.26
  3643.5   86.05 3676.31   86.23 3725.52   86.25 3732.08   86.47 3758.33    86.1
 3768.17   86.24 3787.85   85.94 3817.38   86.08 3850.18   85.46 3886.27   85.23
 3902.67   84.79 3925.64   84.95 3945.32   84.74 3968.29   85.13 3978.13   84.62
 4020.78   85.32  4033.9   88.74  4050.3   89.04 4073.27      86 4086.39   84.62
 4092.95   84.44 4112.63   84.82 4145.44      87 4161.84    87.3 4171.69    86.7
 4181.53   85.18 4194.65   83.94 4204.49   83.62 4234.02   80.47 4250.42   80.26
 4263.55    80.5 4316.04   79.87 4329.16   80.22    4339   79.88 4352.12   80.13
 4371.81   79.99 4378.37   80.55 4394.77   80.87 4407.89   80.53 4427.52   79.52
 4447.14   80.58 4453.68   79.37 4463.49   73.81 4470.03   70.94 4486.38   65.52
 4489.65   65.35 4489.65   57.71 4516.65    57.2 4539.65    55.1 4552.65    54.7
 4564.65    56.5 4595.65    56.1 4618.65    56.6 4640.15    56.5 4662.65    57.5
 4676.05    57.6 4676.05   65.35 4682.59   66.27 4689.13   68.78 4695.67   72.62
 4708.75   79.37 4715.29   81.63  4725.1   86.02 4734.91   86.01 4741.45   86.89
 4747.99    86.7 4764.34   85.52 4780.69   85.54 4813.39   84.68 4829.74   85.24
 4833.01   85.86  4855.9   86.45 4862.44   85.96 4875.52   86.42 4885.33   86.01
 4895.14   85.13 4924.57    85.1 4934.38   84.81 4970.35   84.45  4986.7      84
 5035.75    83.5 5061.93    83.6 5091.45   83.18 5111.13   83.38 5117.69   83.17
 5153.77   83.05 5160.33   83.18  5183.3   82.77 5212.82   82.93  5232.5   82.65
  5265.3   82.55 5294.83   82.69 5324.35   82.59 5344.03   82.78 5399.79   82.59
 5406.35   82.42    5449   82.78 5471.96   82.73 5485.08   82.44 5524.44   82.42
 5560.53   82.02 5600.53   82.19 5620.53   81.76 5660.53   80.61 5680.53   80.19
 5720.53   79.79 5780.53   79.63 5860.53   79.56 6052.56   82.02 6075.53   82.61
 6121.45   83.55 6160.81   83.67  6196.9   83.21  6213.3   83.23 6249.38   82.83
 6288.74   82.64 6351.07   82.58 6370.75    82.3 6393.71   82.35 6406.83   78.05
 6446.83   71.62 6466.83    64.9 6506.83   63.85 6526.83   64.73 6566.83   63.45
 6586.83   63.26 6626.83   63.22 6640.29   64.86 6646.29   82.02 6662.69    82.9
 6672.53   85.57 6679.09   86.63 6688.93   86.94 6702.05   85.31 6721.74   85.33
 6770.94   83.96 6784.06   83.95 6816.86   83.24 6846.39   83.18 6902.15   82.77
 6925.11   82.93 6971.04    82.8  6977.6   83.05 7023.52   82.82 7036.64   82.45
 7176.64   82.35 7216.64   81.56 7236.64   81.86 7276.64   81.76 7284.64   81.59
 7295.78   82.47 7318.74   88.54  7325.3   89.54 7338.42   88.97 7354.83   88.65
 7364.67   88.87 7390.91   88.52 7413.87   88.76 7426.99   88.61 7443.39   88.89
 7479.48   88.67    7509   88.92 7531.96   88.49  7558.2   88.27 7587.73    88.2
 7604.13   88.48 7627.09    88.5 7656.61   88.01 7663.17   88.18 7682.85   87.99
  7725.5   88.24 7738.62      88 7781.26   88.23 7800.94   87.97 7810.78   88.14
  7840.3   88.16 7863.27   87.93 7902.63   88.12 7928.87   87.86 7938.71   88.06
 7961.67   88.02  7991.2   87.76 7997.76   87.52 8043.68   87.47 8102.72   87.11
 8128.97   87.21 8138.81   86.95 8197.85   87.14 8214.25   86.86 8227.38   87.02
 8292.98   86.46  8306.1   86.78 8335.62   86.52 8361.87    87.1 8384.83   86.87
 8424.19    86.9 8460.27   87.17 8466.83   87.44 8502.92   87.37 8525.88      87
 8548.84   87.26 8584.92   87.35 8594.77   87.07 8650.53   86.89 8670.21   86.47
 8680.05   86.86 8703.01   87.23  8722.7   86.97 8752.22   87.19 8768.62   86.91
 8785.02   87.17 8801.42   86.81 8840.79   87.13 8850.63   86.54 8876.87   86.37
 8883.43   86.57 8903.11   86.29 8942.47   86.23 8952.32   85.92 8965.44   86.07
 8975.28   85.71 8998.24   85.78  9021.2   85.56 9063.84   84.36 9073.69   84.32
 9080.25   84.84 9096.65      85 9113.05   83.78 9132.73   83.89 9149.13   83.12
 9178.65   83.46 9218.02   83.75 9224.58   83.98 9273.78   84.61 9368.91   86.14
 9385.31   86.29 9401.71   86.11 9424.67   86.44 9441.08   86.32 9447.64   86.61
  9470.6   86.67 9493.56   86.46 9539.48   86.59 9611.65   86.45 9683.82   86.54
  9736.3   86.37 9755.98   86.41 9805.19   86.23 9847.83   86.21 9874.07   86.03
 9913.44   85.96  9936.4   86.04 9988.88   85.7910051.21   85.7810064.33   85.91
10087.29   85.7710126.65   85.8310159.46   85.6910198.82   85.7310231.62   85.48
10287.39   85.7210333.31    85.710352.99   85.8810415.32   85.8510425.16    85.7
 10467.8    85.810497.32   84.9610507.17   85.2910513.73   85.0210546.53   82.64
10556.37    80.410616.37   80.5310636.37   80.6610696.37    80.810756.37   80.83
10796.37   80.5710816.37   79.9710856.37   80.6310989.37   82.4811018.89   83.25
11032.01   83.4211051.69   84.0411107.46   84.44 11117.3   84.2311163.22   84.19
11205.86   83.94 11215.7   84.0111245.23   83.6611291.15   83.6511317.39   83.33
11396.12   83.3711412.52   83.75 11415.8    84.511428.92   92.2511435.48   92.99
   11465   93.6511468.29   92.9511478.13   87.7211481.41   87.2711524.05   87.27

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2245.95    .085 4161.84     .07 4489.65    .025 4676.05     .07
 4741.45    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4161.84 4741.45          1159.96 1152.38 1315.88             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4161.84    87.3       T
 4741.4511524.05   86.89       T
Left Levee      Station=  115.58      Elevation=  100.79
Right Levee     Station=   11465      Elevation=   93.65

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             95.93    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.074      0.057      0.066
  W.S. Elev (ft)             95.90    Reach Len. (ft)          1159.96    1152.38    1315.88
  Crit W.S. (ft)             82.69    Flow Area (sq ft)       34221.21   13730.30   59614.19
  E.G. Slope (ft/ft)      0.000120    Area (sq ft)            39844.40   13730.30   80406.61
  Q Total (cfs)           125000.00     Flow (cfs)             31263.97   31389.09   62346.94
  Top Width (ft)          11392.94    Top Width (ft)           4030.73     579.61    6782.60
  Vel Total (ft/s)            1.16    Avg. Vel. (ft/s)            0.91       2.29       1.05
  Max Chl Dpth (ft)          41.20    Hydr. Depth (ft)            8.49      23.69       8.79
  Conv. Total (cfs)       11427270.0     Conv. (cfs)            2858093.0  2869532.0  5699640.0
  Length Wtd. (ft)         1246.54    Wetted Per. (ft)         4036.07     603.39    6812.09
  Min Ch El (ft)             54.70    Shear (lb/sq ft)            0.06       0.17       0.07
  Alpha                       1.53    Stream Power (lb/ft s)      0.06       0.39       0.07
  Frctn Loss (ft)             0.15    Cum Volume (acre-ft)    33517.38   24016.14   52711.31
  C & E Loss (ft)             0.00    Cum SA (acres)           7296.92    1199.74    7916.32


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 136.8

INPUT
Description: RGV-02, New Cross-section, End Wall,Updated on left with new
             survey to Station 1045.88. Bathymetric elevations translated from
             IBWC 2008 135 Cross-section
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Station Elevation Data    num=     434
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  100.83      50  100.69      59   98.59   84.99   97.17  110.99   92.36
  155.99   86.65  200.98   87.89  227.98   82.18  288.97   80.28  370.96   80.08
  383.96   82.21  430.95   83.01  465.95   84.46  472.95   87.58  491.95   87.18
  501.94   84.81   900.9   84.78   903.9   69.63   909.9   68.99  930.89   71.42
  935.89      70  942.89   72.94  945.89   84.57  954.89   86.41  957.89    75.6
  970.89   66.68 1000.89   67.06 1012.88    69.8 1025.88   67.37 1045.88   68.07
 1055.94   84.96 1072.34   85.19 1108.41   85.08 1147.76    85.1 1177.28   85.26
 1187.11   85.07 1233.02   85.31 1255.98   85.11 1292.05   85.29 1311.73   85.19
 1360.92   85.27 1396.99   85.42 1436.34   85.29 1456.02   85.47 1472.42   85.32
 1541.28   85.47 1597.03   85.39 1616.71   85.56  1665.9    85.6 1695.41   85.48
 1724.93   85.52 1741.32   85.71 1790.51    85.5 1800.35   85.74 1833.15   85.52
 1918.41   85.69 1941.36   85.84 1964.32   85.76 1993.83   86.22 2039.74   86.06
 2075.82   86.51 2085.65   86.34 2108.61   83.93 2125.01   83.75  2141.4   83.84
 2177.48   83.43 2187.31   83.66 2200.43   83.53  2236.5   83.56 2243.06   83.31
 2282.41   83.63 2341.44   83.45 2351.28   83.66 2374.23    83.5 2380.79   83.79
 2393.91   83.45 2466.05   83.67 2502.12   83.48 2515.24   83.63 2551.31   83.48
 2620.18   83.67 2623.46   83.49 2646.41   83.73 2666.09   83.56 2692.32   83.69
 2715.28   83.54 2721.83    83.7 2777.58   83.61 2784.14   83.88 2797.26   83.54
 2839.89   83.81 2879.24   83.65 2895.64   83.82 2912.03   83.67 2941.55    83.7
 2948.11   84.06 2954.66   83.75 3020.25   83.64 3089.11   83.83 3098.95   83.63
 3112.07   83.79 3135.02    83.7 3144.86   83.87 3161.26   83.72 3223.56   83.93
 3305.55      84  3328.5   83.86 3338.34   84.04 3380.97   84.13 3413.76   83.94
 3469.51   84.18 3538.38   84.03 3554.77   83.93 3594.12   84.31 3607.24    84.1
 3626.92   84.33 3636.75   84.13 3653.15   84.27 3672.83   84.08 3712.18   84.32
 3738.41   84.14 3751.53   84.22  3771.2   84.66 3784.32   88.26 3797.44   88.72
    3804   88.26 3813.83   88.53 3823.67   87.29 3833.51   87.74 3859.74   82.39
 3872.86   76.41 3895.82    66.4 3899.09   65.58 3905.65   63.64 3912.65   60.24
 3922.65   59.64 3942.65   60.14 3962.65   59.84 3972.65   59.24 3982.65   59.14
 3992.65   59.64 4002.65   59.64 4012.65   59.14 4022.65   59.34 4052.65   58.44
 4062.65   58.64    4070   60.64 4076.18   65.32 4079.46   65.41 4086.01   67.58
 4102.41   75.98 4108.97    79.9 4118.81   79.41 4128.65   81.16 4138.48   79.94
 4145.04   80.01  4151.6   81.29 4161.44    81.9 4181.11   81.55 4197.51   82.77
 4217.19   82.69 4227.02   82.37 4243.42    82.5 4253.26   82.88 4266.38   82.94
 4292.61   83.55 4302.45    84.1  4325.4   84.33 4377.87   84.44 4390.99   84.32
 4400.83   84.75 4456.57    85.1 4489.37   84.47 4528.72   84.09 4538.56   84.11
 4584.47   83.52  4610.7   83.47  4627.1    83.2 4666.45   82.87 4676.29   82.91
 4709.08   82.52 4728.76    82.6 4774.67   82.32  4784.5    82.4 4873.05   81.89
 4899.28   81.95 4932.07   81.65 4964.87    81.6 4977.98   81.33 5033.74   81.33
 5053.42   81.56 5115.75   81.96 5122.31   82.24 5145.27   82.17 5151.83   82.38
 5201.04   82.32 5227.29   82.15 5289.62   82.41 5312.58   82.61  5325.7   82.98
  5342.1   82.71 5378.19   82.92 5388.03   83.18 5404.43   83.01 5414.28   83.87
 5424.12   83.83 5437.24    84.3  5443.8   84.03  5460.2   84.04 5470.04    83.7
 5489.73    84.1 5499.57   84.55 5509.41   85.45 5519.25    86.8 5529.09   89.92
 5548.78   90.63 5555.34   89.79 5565.18   86.57 5575.02   84.28 5581.58   83.46
 5604.54   82.02 7031.57   82.02 7038.13   82.27 7041.41   83.42 7051.25   83.96
 7064.37   86.34 7074.21   86.92 7077.49   86.39  7093.9   86.08 7120.14   86.01
  7143.1   86.13 7166.07   85.81 7175.91   85.99 7248.08   86.34  7261.2   86.47
 7290.73    86.4 7326.81   86.74 7336.65   86.63 7372.74   87.17 7428.51   87.17
 7441.63   87.41 7494.12   87.47 7503.96   87.27 7579.41    87.2 7599.09    87.3
  7615.5    87.1 7638.46   87.17  7648.3   87.47 7661.42   86.94 7667.98   87.11
 7710.63    87.3 7730.31   86.85 7756.56   87.23 7772.96    86.8 7792.64   86.87
 7818.89   87.35 7832.01   87.13 7874.66   87.18 7881.22   86.97 7940.27   87.27
 7959.95   87.03 7992.75   87.21 8005.88   87.05 8015.72   87.34 8064.93    87.2
 8081.33   86.79 8101.01   87.45  8137.1   86.83  8153.5      87 8196.15   86.61
 8225.67   86.96 8248.63   86.74 8261.75   86.98 8274.87   86.53 8284.71    86.7
 8307.68   86.38 8324.08   86.37 8350.32   86.86 8360.16   86.78 8389.69   87.34
 8392.97   87.16 8422.49   87.19 8432.33   86.91 8481.54    86.7 8484.82   86.58
  8520.9   86.69 8530.74   86.56 8583.23   87.28 8593.07   87.12 8612.75   87.47
 8632.43   87.16 8638.99    87.7 8655.39   87.71 8661.95   87.39  8671.8   87.67
 8684.92   87.53 8694.76   87.88 8711.16   87.85    8721   87.44  8737.4   87.73
 8773.49   87.54 8789.89   86.92 8806.29   86.81 8832.53   86.98 8848.93   86.89
 8865.33   87.16  8904.7   87.24  8937.5   86.85 8976.87    86.8 8996.55   86.52
 9016.23   85.94 9039.19   86.37 9052.31   86.17  9088.4   86.04 9127.76   86.31
 9170.41   85.61 9180.25    85.8 9206.49   85.56 9232.73   85.55 9249.14   85.82
 9268.82   85.62 9278.66   85.89 9298.34   85.64 9340.99   86.17 9360.67   85.96
 9373.79   85.31 9383.63   85.96 9403.31   85.46 9432.84   85.46 9449.24   85.03
 9459.08   85.24 9491.88   85.06 9498.44   85.28 9514.84   85.12 9524.68   85.39
 9541.09   84.85 9570.61   84.52  9606.7   84.47 9646.06   84.14  9672.3   86.17
 9685.42   86.91 9708.38   87.69 9718.23   86.81 9724.79   86.87 9737.91   86.17
 9790.39   86.09  9823.2   86.36 9859.28   86.23 9882.24   86.3410000.34    86.1
 10023.3   86.0110065.94   86.0510095.47   85.9110138.11    85.910187.32   85.63
10200.44   85.6910226.68   85.4210233.24   85.5510262.76   85.3210282.45   85.45
10305.41   85.1510367.73   84.96 10407.1   84.5610430.06   84.7910462.87    84.4
10535.03   84.0510561.28   83.73 10607.2   83.5410633.44   83.1910672.81   82.98
10699.05   82.4810722.01   82.4810738.41   82.9910754.82   82.4811155.02   82.48
11168.14   83.0911177.98    86.211184.54   87.4211197.66   88.15 11207.5   89.23
11217.35   88.4711223.91   88.5511243.59   87.6111259.99   88.0411309.19   88.15
11335.44   88.3111345.28   87.8511387.92   88.0711430.57   88.0211499.46   88.06
 11509.3   87.9611532.26   88.2311568.34   88.1711578.18    88.511588.02   88.26
11627.39   88.5711640.51   88.2511686.44   88.42 11709.4    89.211768.44   88.15
11778.28   88.4611784.84    88.211807.81   88.1811817.65   88.4711870.13   88.02
11899.66   88.1911935.74   87.8811945.58   87.9311991.51   87.4612011.19   87.48
12024.31    87.112043.99   86.9812073.52   85.46 12093.2   85.4212103.04    86.8
12119.44   87.4712122.72   88.2112132.56      92 12142.4   93.412162.09   94.31
12165.37   93.3512168.65   91.0912175.21   88.0912181.77   87.2712290.02   87.27
12296.58   87.5312303.14   88.9112312.98   94.1612316.26   94.8612342.51   94.64
12352.35   94.9212362.19   94.1512368.75   91.9412385.15   90.04

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .101 3797.44    .066 3895.82    .015 4086.01    .066 4456.57    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      3797.44 4302.45         6010.21 5782.22 1539.14             .1       .3
Left Levee      Station=       0      Elevation=  100.83
Right Levee     Station=12162.09      Elevation=   94.31
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   39.44 3785.92   88.24 4487.8911223.66   84.5711223.6612154.37   88.49

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             95.78    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.101      0.050      0.074
  W.S. Elev (ft)             95.75    Reach Len. (ft)          6010.21    5782.22    1539.14
  Crit W.S. (ft)             87.85    Flow Area (sq ft)       27637.38   11234.98   78592.23
  E.G. Slope (ft/ft)      0.000121    Area (sq ft)            27637.38   11234.98   78592.23
  Q Total (cfs)           125000.00     Flow (cfs)             17103.61   28510.21   79386.19
  Top Width (ft)          12292.47    Top Width (ft)           3704.76     505.01    8082.70
  Vel Total (ft/s)            1.06    Avg. Vel. (ft/s)            0.62       2.54       1.01
```

Max Chl Dpth (ft)	37.31	Hydr. Depth (ft)	7.46	22.25	9.72	
Conv. Total (cfs)	11344150.0	Conv. (cfs)	1552208.0	2587394.0	7204553.0	
Length Wtd. (ft)	3203.14	Wetted Per. (ft)	3705.34	516.06	8095.49	
Min Ch El (ft)	58.44	Shear (lb/sq ft)	0.06	0.17	0.07	
Alpha	1.92	Stream Power (lb/ft s)	0.03	0.42	0.07	
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	32618.90	23685.91	50309.76	
C & E Loss (ft)	0.00	Cum SA (acres)	7193.93	1185.39	7691.79	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 136.2

INPUT
Description: RGV-02, New Cross-section, Begin Wall, Updated on left with new
survey to Station 1755.99. Bathymetric elevations translated from
IBWC 2008 135 Cross-section
Station Elevation Data num= 364

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.6	25	97.22	68	97.23	111	91.63	118	88.29
217	88.29	253	97.81	276	99.97	314	100.3	329	97.48
391	86.2	501.01	85.82	593.01	85.13	824.01	85.67	848.01	85.22
1031.01	85.51	1082.01	86.63	1241.87	88.81	1248.42	86.7	1251.7	84.58
1258.25	83.75	1264.8	84.63	1277.91	83.03	1284.46	80.82	1307.4	65.63
1502	64.41	1525	76.47	1549	72.42	1569	74.58	1579	79.91
1675.99	80.91	1755.99	79.59	1843.99	82.1	2027.98	82.66	2222.93	82.07
2225.08	82.33	2264.44	82.72	2280.83	82.55	2297.23	81.8	2307.07	82.03
2320.19	81.68	2333.3	82.01	2375.94	81.9	2385.78	82.42	2392.34	84.56
2398.89	85.56	2405.45	85.4	2428.41	86.91	2454.65	88.02	2461.21	88.91
2467.76	88.29	2474.32	86.59	2490.72	86.64	2526.8	86.34	2585.83	86.24
2608.78	86.34	2667.81	87.14	2746.52	87.04	2762.92	86.82	2795.71	86.97
2831.79	86.72	2858.03	86.81	2900.66	86.6	2920.34	86.8	2953.13	86.53
2995.76	86.44	3018.72	86.76	3028.56	86.6	3061.35	86.94	3084.31	86.29
3117.11	86.54	3146.62	86.41	3205.65	86.44	3271.24	86.13	3304.04	85.83
3333.55	85.77	3379.47	85.34	3451.62	85.35	3468.01	85.55	3490.97	85.35
3513.93	85.78	3658.22	86.47	3671.34	86.32	3730.37	86.34	3786.12	85.83
3818.92	86.42	3832.04	86.06	3851.71	86.55	3864.83	86.4	3881.23	86.9
3917.31	86	3959.94	86.37	3976.34	86.92	3989.45	88.18	4012.42	86.73
4041.94	86.03	4068.18	86.01	4107.55	85.68	4123.95	85.89	4251.88	85.6
4271.56	85.77	4343.73	85.55	4363.42	85.77	4376.54	85.58	4406.06	85.78
4448.71	85.64	4550.4	85.63	4596.32	85.3	4635.69	85.27	4668.49	85.56
4707.85	86.23	4757.06	86.07	4789.86	86.5	4825.95	86.43	4848.91	86.11
4881.71	86.16	4904.68	85.95	4950.6	86.03	5003.09	86.43	5019.49	86.26
5049.01	86.8	5068.7	87.96	5078.54	87.5	5088.38	85.93	5101.5	82.74
5111.34	81.93	5117.9	82.2	5137.58	81.33	5564.03	81.33	5583.72	82.11
5606.68	82.61	5659.16	83.2	5669	82.98	5711.65	83.12	5754.29	81.33
6436.61	81.33	6462.86	81.79	6479.26	81.74	6495.66	84.11	6518.62	83.85
6538.3	84.27	6564.55	85.48	6577.67	85.78	6646.56	86.7	6676.08	86.72
6738.41	87.02	6761.37	87.25	6771.21	87.84	6777.77	87.47	6800.73	87.7
6840.1	87.61	6846.66	88.04	6856.5	87.54	6876.18	87.7	6889.31	87.43
6922.11	87.74	6961.47	87.45	6981.16	87.74	7017.24	87.38	7046.76	87.82
7086.13	87.21	7112.37	87.26	7155.02	86.93	7161.58	87.06	7276.39	87.22
7279.67	87.4	7368.24	87.53	7407.6	87.87	7463.37	88.11	7483.05	88.04
7535.54	88.18	7578.18	88.01	7620.83	88.14	7627.39	88.73	7653.63	88.32
7663.47	88.76	7679.88	87.85	7693	87.59	7748.76	87.78	7761.89	87.59
7814.37	87.84	7853.74	87.67	7902.94	87.91	8001.35	87.9	8021.03	88.02
8135.85	87.92	8194.89	87.66	8227.7	88.26	8290.02	88.05	8326.11	87.42
8372.03	87.76	8394.99	88.18	8417.95	89.24	8431.07	90.69	8457.32	91.98
8499.96	92.51	8627.89	91.65	8700.06	90.49	8726.3	89.84	8778.78	89.18
8805.03	88.72	8847.67	88.33	8864.07	87.88	8929.68	86.77	8972.32	85.85
8992	85.64	9057.61	85.63	9123.21	86.15	9136.33	85.85	9165.86	85.75
9205.22	86.1	9238.02	85.86	9303.63	85.79	9372.51	85.86	9415.16	86.29
9444.68	86.38	9477.48	86.23	9497.16	86.41	9595.57	86.54	9648.06	87.08
9664.46	87.61	9690.7	87.49	9700.54	87.95	9713.66	87.62	9746.46	87.57
9766.15	88.47	9792.39	87.33	9808.79	87.95	9835.03	87.36	9877.67	88
9917.04	87.76	9943.28	87.86	9966.24	87.5	9992.48	87.6910038.41		87.35
10074.49	87.3110081.05		87.4910117.13		87.210133.54		87.4410163.06		87.04
10192.58	87.1810228.66		87.9310235.22		88.4410284.43		88.5310310.67		86.77
10336.91	86.7210363.16		86.2110376.28		86.61 10438.6		86.0210468.12		85.95
10477.96	86.2110517.33		85.9610523.89		86.510553.41		86.210579.65		85.3
10609.18	85.210619.02		85.5910651.82		85.32 10671.5		85.810681.34		85.46
10727.27	85.2110746.95		85.3110756.79		8510773.19		85.2810815.83		84.68
10832.23	85.0210868.32		84.8510881.44		85.0510901.12		84.7810927.36		85.13
10947.04	84.9510966.73		85.4310992.97		84.6611058.57		84.1611084.82		84.61
11101.22	84.411140.58		84.6611160.26		85.83 11170.1		85.3111183.22		86.05
11206.19	85.1211229.15		85.3311271.79		86.24 11321		86.62 11337.4		87.17
11347.24	86.8811373.48		86.79 11386.6		87.0111429.24		86.8111468.61		87.22
11478.45	87.0311544.05		87.1211560.46		86.86 11668.7		87.0511678.54		87.21
11744.15	87.2311816.32		87.611904.88		87.8911950.81		87.811977.05		88.03
12013.13	87.5112075.46		87.68 12101.7		87.3112167.31		87.6712206.67		87.54
12246.03	87.6612291.96		87.3712314.92		87.4112321.48		87.0612337.88		87.21
12357.56	87.8212377.24		87.4812390.36		87.6312400.21		87.1912423.17		87.41
12439.57	8712498.61		87.1312518.29		86.6312541.26		86.7512570.78		86.45
12619.98	87.0512626.54		87.4912642.95		87.4812652.79		87.9512672.47		89.62
12685.59	91.9712708.55		95.0712738.07		100.0112744.63		100.76 12767.6		102.1
12849.6	105.6	12866	104.9712879.12		104.0212898.81		100.5712921.77		97.25
12948.01	93.9812977.53		91.912997.21		89.4213010.34		88.8713039.86		88.53
13075.94	87.4713089.06		86.5 13115.3		86.3413131.71		85.7613144.83		86.58
13180.91	86.6713203.87		86.2513246.52		86.65 13249.8		87.2413256.36		90.84
13272.76	92.5513292.44		93.1313295.72		92.7913305.56		87.8213308.84		87.27
13430.21	87.2713443.33		88.3813453.17		93.9313456.45		94.2113489.26		93.24
13508.94	90.7413518.78		85.4313525.34		83.18 13531.9		82.9		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.101	1241.87	.066	1307.4	.015	1502	.066	2461.21	.074

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1241.87	2461.21	2472.19	2469.54	881.5	.1 .3

Left Levee Station= 314 Elevation= 100.3
Right Levee Station= 12849.6 Elevation= 105.6
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
276.06	1230.42	88.8	2468.73	12927.32	88.29

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	95.27	Element			
Vel Head (ft)	0.04	Wt. n-Val.	0.101	0.060	0.074
W.S. Elev (ft)	95.23	Reach Len. (ft)	2472.19	2469.54	881.50
Crit W.S. (ft)	85.41	Flow Area (sq ft)	5678.98	20094.38	69840.43
E.G. Slope (ft/ft)	0.000214	Area (sq ft)	5678.98	20094.38	69840.43
Q Total (cfs)	125000.00	Flow (cfs)	4168.45	47116.64	73714.91
Top Width (ft)	12368.16	Top Width (ft)	900.51	1219.34	10248.31
Vel Total (ft/s)	1.31	Avg. Vel. (ft/s)	0.73	2.34	1.06
Max Chl Dpth (ft)	30.82	Hydr. Depth (ft)	6.31	16.48	6.81
Conv. Total (cfs)	8547372.0	Conv. (cfs)	285034.3	3221788.0	5040550.0
Length Wtd. (ft)	1559.16	Wetted Per. (ft)	901.24	1230.87	10249.34
Min Ch El (ft)	64.41	Shear (lb/sq ft)	0.08	0.22	0.09
Alpha	1.61	Stream Power (lb/ft s)	0.06	0.51	0.10
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	30320.48	21606.56	47687.41
C & E Loss (ft)	0.01	Cum SA (acres)	6876.22	1070.94	7367.94

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 136

INPUT
Description: RGV-02, Updated on left with new survey to Station 960.8. New
Cross-section, End Wall, Bathymetric elevations translated from
IBWC 2008 135 Cross-section
Station Elevation Data num= 430

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108.08	31.99	87.52	34.99	86.44	71.98	87.47	113.97	87.8
124.97	90.88	147.97	98.45	153.96	99.41	169.96	98.82	189.96	92.34
209.95	87.57	223.95	86.7	260.94	85.96	280.94	86.76	326.93	86.22
355.92	86.67	377.92	82.31	421.91	81.41	459.9	81.56	495.9	73.25
529.89	64.33	541.32	66.85	547.88	65.46	557.72	64.04	564.72	60.64
574.72	60.04	594.72	60.54	614.72	60.24	624.72	59.64	634.72	59.54
644.72	60.04	654.72	60.04	664.72	59.54	674.72	59.74	704.72	58.84
724.72	59.34	734.72	61.04	744.72	64.08	793.93	64.64	800.5	64.81
819.83	64.33	835.83	69.53	845.82	69.23	856.82	66.05	879.82	69.51
891.81	73.07	913.81	74.7	938.8	78.35	960.8	82.25	974.37	82.24
990.78	82.31	1017.02	82.12	1072.8	83.2	1092.48	84.06	1108.88	84.45
1148.25	84.96	1161.38	84.98	1204.03	85.48	1233.55	85.56	1256.52	85.91
1286.04	85.97	1305.73	86.26	1361.5	86.28	1381.19	86.48	1407.43	86.55
1423.84	86.45	1499.29	86.7	1512.42	86.55	1545.22	86.65	1558.35	86.81
1571.47	86.65	1587.87	86.8	1607.56	86.65	1620.68	86.75	1751.91	86.42
1771.6	86.51	1781.44	86.35	1830.65	86.42	1850.33	86.17	1860.18	86.37
1886.42	86.44	1896.26	86.23	1906.11	86.43	1942.19	86.12	1961.88	86.58
1978.28	86.12	2007.81	86.32	2020.93	86.16	2096.39	86.21	2135.76	85.99
2178.4	85.88	2204.65	86.04	2214.49	85.9	2234.18	86.02	2247.3	85.9
2289.95	85.95	2319.47	85.68	2335.88	85.75	2378.52	85.66	2408.05	85.47
2424.45	85.56	2473.66	85.21	2490.07	85.36	2542.56	85.22	2608.17	85.34
2647.54	85.11	2680.34	85.04	2700.03	84.86	2749.24	85.03	2791.88	85.04
2798.45	85.15	2883.74	85.3	2919.83	84.83	2936.23	85.11	2942.79	85.76
2969.04	84.98	2982.16	85.92	2995.28	88.95	3005.13	90.57	3008.41	90.13
3018.25	86.38	3028.09	85.55	3057.62	85.18	3090.42	85.18	3119.95	85.55
3129.79	85.93	3152.75	86.26	3175.72	87.24	3182.28	87.71	3215.09	91.51
3231.49	92.67	3300.38	93.09	3326.63	93.31	3366	93.11	3372.56	92.96
3425.05	92.72	3457.85	92.85	3464.42	93.31	3474.26	92.48	3487.38	89.06
3493.94	88.23	3500.5	88.07	3507.06	87.05	3513.63	86.64	3546.43	86.08
3585.8	86.41	3625.17	86.21	3644.85	86.29	3664.53	85.93	3697.34	86.03
3739.99	86.56	3746.55	86.78	3753.11	87.6	3769.52	91.75	3785.92	93.29
3808.88	93.21	3831.85	93.35	3841.69	93.09	3848.25	93.51	3874.5	93.85
3920.42	93.68	3936.83	93.33	3972.92	93.3	3979.48	93.19	4028.69	93.28
4048.37	93.1	4077.9	93.21	4084.46	93.59	4097.58	93.62	4110.7	93.32
4127.11	93.33	4182.88	92.83	4192.72	93.24	4215.69	93.4	4225.53	92.99
4248.49	93.04	4300.99	92.93	4360.04	93.07	4369.88	93.25	4399.41	93.25
4465.02	92.95	4471.58	93.09	4543.76	93.24	4556.88	93.19	4573.29	93.61
4602.81	93.12	4625.78	92.91	4638.9	93.69	4668.43	93.94	4691.39	93.74
4760.29	94.2	4789.81	93.56	4816.06	93.54	4884.96	93.31	4944.01	93.24
4996.5	93.47	5062.11	93.83	5071.96	93.47	5088.36	92.35	5104.76	90.31
5134.29	87.51	5157.26	86.52	5170.38	85.66	5180.22	85.35	5203.19	85.52
5255.68	85.37	5262.24	85.48	5301.61	85.01	5308.17	85.35	5321.29	85.27
5340.98	85.64	5354.1	85.33	5377.07	85.54	5386.91	85.33	5406.59	85.6
5459.08	85.55	5482.05	85.65	5495.17	85.48	5527.98	85.72	5554.23	85.56
5580.47	85.61	5593.59	84.91	5610	84.48	5616.56	85.42	5632.96	85.59
5649.37	84.46	5682.17	84.51	5698.58	84.35	5754.35	84.34	5777.31	84.6
5787.16	84.44	5816.68	84.68	5842.93	84.54	5865.9	84.69	5879.02	84.94
5915.11	85.02	5974.16	85.27	6000.41	85.12	6020.09	85.28	6072.58	85.25
6085.7	85.39	6121.79	85.43	6131.63	85.26	6174.28	85.42	6210.37	85.34
6236.62	85.55	6272.71	85.46	6305.51	85.22	6318.64	85.4	6400.65	85.09
6426.9	85.19	6479.39	84.97	6505.64	85.12	6541.73	84.86	6577.81	84.97
6590.94	84.78	6620.46	84.83	6636.87	84.61	6669.67	84.62	6705.76	85.2
6715.6	85.09	6800.9	85.73	6823.87	85.7	6833.71	85.89	6879.64	86.18
6886.2	86.35	6912.45	86.28	6945.26	86.65	6955.1	86.63	7023.99	87.09
7056.8	87.2	7073.21	87	7089.61	87.11	7115.85	86.89	7168.35	86.78
7207.72	86.35	7224.12	86.36	7237.24	86.13	7253.65	86.24	7273.33	86.02
7299.58	85.99	7309.42	85.82	7398	85.37	7466.89	85.2	7502.98	85.2
7519.39	84.99	7562.04	84.96	7585	84.73	7594.84	84.81	7644.05	84.61
7693.26	84.33	7719.51	84.3	7752.32	83.85	7840.9	83.53	7860.58	83.33
7896.67	83.38	7955.72	83	7995.09	83.23	8037.74	83.18	8057.43	83.82
8073.83	84.15	8083.67	83.54	8096.79	83.61	8109.92	84.12	8116.48	83.92
8123.04	84.31	8132.88	83.45	8152.57	82.87	8168.97	83.47	8182.09	83.06
8198.5	82.86	8224.74	83.05	8290.36	82.92	8323.17	83.19	8359.26	83.07
8401.91	83.42	8411.75	84.1	8418.31	83.79	8428.15	83.97	8434.72	83.68
8490.49	84.36	8523.3	84.23	8572.51	84.94	8582.35	84.78	8615.16	85.4
8651.25	85.28	8687.34	85.81	8710.31	85.84	8720.15	86.07	8759.52	86.04
8841.54	86.5	8867.78	86.44	8923.56	86.75	8946.52	86.71	8962.93	87.16
8976.05	86.82	8995.74	87.24	9028.54	87.11	9071.19	87.38	9097.44	87.34
9113.84	87.67	9136.81	87.49	9163.06	87.55	9176.18	87.74	9215.55	87.71
9235.24	87.92	9258.2	87.7	9274.6	87.25	9291.01	87.14	9307.41	87.47
9320.54	87.39	9327.1	87.99	9340.22	87.5	9346.78	87.68	9363.19	87.46
9379.59	89.35	9386.15	89.27	9396	87.69	9412.4	87.02	9438.65	87.51
9484.58	87.82	9537.07	87.43	9563.32	87.61	9592.84	87.36	9612.53	87.5
9625.65	87.38	9681.43	87.31	9707.67	87.16	9730.64	87.24	9753.6	87.04
9792.97	87.08	9838.9	86.81	9874.99	86.88	9881.55	86.72	9911.08	86.91
9934.05	86.74	9966.86	86.79	9983.26	86.6410012.79		86.7710058.72		86.53
10071.84	86.5810134.18		86.4510193.23		86.5810203.08		86.4510239.17		86.5
10262.13	86.36 10285.1		86.510291.66		86.2310314.62		86.9910331.03		86.88
10344.15	86.5510380.24		86.2210393.36		86.5810406.49		86.2410436.02		86.46

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 10455.7   86.2110475.38    85.710498.35    85.610518.04   85.6910531.16    85.5
10554.12   85.5210580.37    85.910600.05   85.4810636.14   85.6410652.55      86
10678.79   86.9610688.64   87.0110705.04    88.610721.45   90.8510737.85   94.16
10750.97   98.5810754.25   99.03 10780.5  106.7510793.62  109.1310823.15  109.95
 10849.4  110.8210859.24  111.29 10865.8  110.7410875.64  109.2710885.49  108.39
10888.77  106.9610898.61  100.7910908.45    95.110924.86   87.5710928.14   87.27
11046.25   87.2711049.53   87.5211059.37   93.5711065.93   94.5611079.05   93.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .101   459.9    .066  529.89    .015  819.83    .066  1361.5    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        459.9   960.8          1496.01 1684.16 1239.16            .1       .3
Left Levee      Station=       0      Elevation=  108.08
Right Levee     Station=10859.24      Elevation=  111.29
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0  153.96   99.41

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             95.02    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.10    Wt. n-Val.                0.101      0.041     0.073
  W.S. Elev (ft)             94.92    Reach Len. (ft)         1496.01    1684.16    1239.16
  Crit W.S. (ft)             78.39    Flow Area (sq ft)       2655.39   14304.21   77707.34
  E.G. Slope (ft/ft)      0.000123    Area (sq ft)            2655.39   14304.21   77707.34
  Q Total (cfs)           125000.00     Flow (cfs)             1945.49   53440.44   69614.07
  Top Width (ft)          10558.11    Top Width (ft)           277.90     500.90    9779.31
  Vel Total (ft/s)            1.32    Avg. Vel. (ft/s)           0.73       3.74       0.90
  Max Chl Dpth (ft)          36.08    Hydr. Depth (ft)           9.56      28.56       7.95
  Conv. Total (cfs)       11262900.0     Conv. (cfs)            175294.6   4815155.0   6272450.0
  Length Wtd. (ft)         1412.93    Wetted Per. (ft)         279.37     507.72    9784.30
  Min Ch El (ft)             58.84    Shear (lb/sq ft)           0.07       0.22       0.06
  Alpha                       3.68    Stream Power (lb/ft s)     0.05       0.81       0.05
  Frctn Loss (ft)             0.18    Cum Volume (acre-ft)    30083.97   20631.48   46194.49
  C & E Loss (ft)             0.00    Cum SA (acres)           6842.78    1022.18    7165.30


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 135.5

INPUT
Description: RGV-02, Updated on left with new survey to Station 1569. New
             Cross-section, Bathymetric elevations translated from IBWC 2008
             135 Cross-section
Station Elevation Data    num=     419
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   85.25   73.99   84.86   89.99    86.7  157.98   87.89  187.97   85.68
  205.97   81.12  257.96   80.62  288.96   81.69  304.96   74.33  330.95   74.42
  369.95    68.6  421.94   67.78  444.94   69.88  465.93   67.78  733.88   67.78
  770.88   75.79  776.88   74.47  790.87   81.66  837.86   82.16  844.86   76.37
  876.86   73.64  904.85    83.6  982.83   83.03 1031.82   80.58 1109.81   81.71
 1233.78   82.61 1357.76   82.58 1459.74   84.25 1531.73   83.36 1569.72   83.84
 1591.05   84.07 1604.17   84.43 1623.86   84.26 1659.94   84.55 1686.18   84.43
 1699.31   84.77 1718.99   84.52 1755.08   84.77  1784.6    84.4 1797.72   84.72
 1856.77    84.8 1866.61   84.54  1919.1   84.76 1932.22   85.13 1945.34   84.51
 1997.83   84.83 2010.95   84.65 2043.76   84.92 2056.88   84.79 2089.69   85.14
 2119.21   84.48 2148.74   93.38 2165.14   98.83 2168.42   99.27 2181.54   99.19
  2188.1   97.73 2201.22   93.44 2217.63    88.5 2230.75   85.74 2247.15   85.11
 2256.99   83.12 2276.67   77.95 2286.52    76.6 2296.36   75.77 2319.32   75.31
 2325.88   75.72 2335.72   75.34 2361.97   75.09 2368.53   75.29 2384.93   74.57
 2411.18   74.65 2430.86   76.25 2447.26   79.63 2463.66   84.68 2470.22   87.13
 2476.78   88.67 2486.63   88.47 2493.19   86.72 2506.31    81.4 2519.43   78.08
 2532.55   76.68 2545.68    75.8 2555.52   75.61 2571.92   76.61 2578.48    77.5
  2591.6   78.31 2608.01   81.91 2614.57   81.26 2621.13   79.42 2634.25    78.8
 2653.93   79.45 2670.33   80.77  2676.9   80.65 2683.46   79.71 2732.66   80.43
 2742.51   81.04 2775.31   80.86 2785.15   81.79 2794.99    81.2  2811.4   82.78
 2837.64   81.99 2854.04   79.84 2877.01   79.46 2886.85   79.59 2899.97   80.59
 2913.09   79.57 2926.21   79.67 2936.05   78.47 2955.74   77.63 2991.82   78.14
 3008.23   78.97 3018.07   78.65 3034.47   79.21 3060.71   79.47 3083.68   80.53
 3103.36   80.55 3116.48   79.41 3126.32   79.86 3142.73   78.91 3152.57   80.19
 3159.13   80.26 3168.97   76.38 3175.53   74.43 3188.65   72.53 3198.49   67.18
 3205.06   64.72 3211.62   64.37 3218.62   61.74 3228.62   61.14 3248.62   61.64
 3268.62   61.34 3278.62   60.74 3288.62   60.64 3298.62   61.14 3308.62   61.14
 3318.62   60.64 3328.62   60.84 3358.62   59.94 3378.62   60.44 3388.62   62.14
  3398.6   64.37 3401.89   64.55 3408.45   67.59 3428.13   74.77 3434.69   78.78
 3447.81   84.86 3454.37   86.04  3467.5   85.89 3474.06   86.31 3493.74   84.67
 3519.98   84.51 3542.95   83.95 3562.63   83.89 3588.87   83.13 3628.24   83.95
 3644.64    85.1 3657.76   87.27 3670.89   87.44 3677.45   86.01 3690.57   85.03
 3697.13   85.06 3703.69    86.9 3713.53   86.04 3756.18   86.08 3779.14   86.26
 3805.39   85.96 3854.59   86.28 3867.72   85.91  3887.4   86.18 3923.48   86.12
 3969.41   86.18 4015.34   85.95 4028.46   85.65 4064.55    85.7 4077.67    85.4
 4103.91   85.49 4117.04   85.26 4136.72   85.49 4202.33   85.73 4212.17   85.18
 4238.42   85.82 4244.98   85.33 4287.63   85.78    4327   85.59 4330.28   86.37
 4340.12    85.4  4343.4   86.48 4353.24   85.35 4372.93   85.58 4402.45   85.11
 4409.01   85.31 4438.54   85.07 4451.66   85.22  4461.5   84.88 4481.19   85.07
 4491.03   84.81 4513.99   84.81  4530.4   84.16 4559.92    84.5 4589.45   84.25
 4612.41   84.53 4632.09   84.37 4658.34   84.46 4668.18   84.27 4697.71    84.3
 4743.64   83.93 4796.12   83.81 4819.09   83.87 4832.21   83.66 4878.14   83.49
 4897.82   83.62 4927.35   83.38 4963.44   83.36 4979.84   83.51 5006.08   83.26
 5025.77   83.36 5061.85   83.05 5094.66   83.22 5124.18   83.05 5134.03   83.16
 5202.92   83.11 5212.76    83.4 5232.44   83.46 5261.97   83.28 5275.09   83.69
  5291.5   83.67 5311.18   84.08 5327.58   83.94 5360.39   84.14  5393.2   84.17
 5432.56      84 5445.69   84.12 5550.67   84.07 5567.07   83.92 5609.72   84.15
 5622.84   83.93 5652.37   84.06  5698.3   83.63 5750.79   83.58 5773.75   83.86
    5800   83.67 5822.96   83.79 5842.64   83.61 5937.78   83.56 5944.34   83.42
 6016.52   83.28 6039.48   83.34  6121.5   83.27 6157.58   83.14 6183.83   83.35
 6219.91   83.08 6242.88   83.21 6347.86   83.07 6367.54   83.32 6400.35   83.48
 6433.15   83.09 6446.28   83.46 6462.68   83.11 6521.73   83.01 6584.06   83.07
 6607.03   82.96 6649.67   83.09 6692.32   82.98 6728.41   83.18 6741.53   83.02
 6810.42    83.2 6869.48   83.74 6879.32   83.47 6912.12   83.34 6974.46   83.43
  7102.4   83.22 7118.81    83.4 7168.02   83.25 7184.42   83.33 7210.66   83.08
    7273   83.17 7299.24   82.96 7351.73   82.91 7377.98   83.06  7407.5   82.88
 7538.73   82.99 7669.95   82.92    7729   83.06 7774.93   82.87 7804.45   82.99
 7824.14    82.9 7866.79   82.99 7883.19   82.85 7902.87   82.99 7929.12   82.87
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 7952.08   83.24 8014.41   83.15 8040.66      83  8050.5   83.13 8125.95   83.23
 8139.08   83.33 8207.97   83.11  8270.3   83.12 8289.98   83.28  8319.5   83.18
 8375.27   83.36 8414.63   83.21 8463.84    83.7 8572.09   83.02 8696.75   82.95
 8765.64   82.85 8814.85      83 8916.55   83.63 8936.23   83.61 8959.19   83.88
 9034.64   84.03 9051.05   83.84 9070.73   83.97  9126.5   83.79 9156.02   83.32
 9175.71   83.43 9195.39   83.26 9211.79   82.51    9261   82.26 9329.89   82.19
 9372.54   82.22 9428.31   82.03 9490.63   82.14 9520.16   82.03 9582.49   82.09
 9648.09   82.03 9667.78   82.25 9723.54   82.19 9759.63    82.3 9772.75   82.17
 9798.99   82.29 9821.96   82.59 9841.64   82.54  9864.6   82.84 9900.69      83
 9946.61   83.48 9989.26   83.5610061.43   84.2910084.39   85.0610087.67   84.86
10107.36   85.3510143.44    85.610182.81   86.3110192.65   86.1510264.82    86.3
10274.66   86.5210310.75   86.3810353.39   86.6910373.08   86.6510392.76   86.87
   10419   86.8510438.69   87.1310455.09   87.0910481.33   87.4210514.14   87.38
10527.26   87.5610576.47   87.3410583.03   87.5910615.84   87.4610681.45    87.5
10704.41   87.2610720.81   87.4810786.42   87.1710825.79   87.3210868.43   87.02
10894.68   87.0510917.64   86.7410976.69   86.8910986.53   86.7111025.89   86.82
 11058.7    86.511124.31   86.5111140.71   86.3411206.32    86.211222.72   86.75
11232.56   86.64 11242.4   85.7711281.76    86.111363.78   85.9811370.34    85.8
11439.23   86.0311478.59   85.8711501.56   86.0111547.48   85.8611580.29   85.94
11616.38   85.7911636.06   85.9111695.11   85.8311721.35   85.9611813.21   85.93
11819.77    85.811875.54   85.9411885.38   85.8511941.15    85.911950.99   86.01
12019.88   85.6812039.56   85.9612046.12   85.6712072.37   85.8812157.66   85.71
 12183.9   85.8712216.71   84.7412236.39   85.9112249.51    85.312256.07   83.45
12262.63    83.4 12269.2   86.3212282.32   88.3112295.44   89.4312315.12   89.82
12321.68   90.3112331.52   92.4512354.49   93.0612357.77    92.812367.61   88.19
12374.17   87.2712502.11   87.2712508.67   88.7112515.23    92.4

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .101 3152.57    .066 3198.49    .015 3408.45    .066 3670.89    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3152.57 3474.06           911.83  679.76  443.07             .1       .3
Left Levee      Station= 2181.54      Elevation=   99.19
Right Levee     Station=12354.49      Elevation=   93.06
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 2192.68 2476.62   88.51 3470.4212454.08    85.9

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             94.83    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                 0.101     0.037      0.074
  W.S. Elev (ft)             94.74    Reach Len. (ft)           911.83    679.76     443.07
  Crit W.S. (ft)             88.08    Flow Area (sq ft)       11740.90   8855.08   78101.35
  E.G. Slope (ft/ft)      0.000137    Area (sq ft)            11740.90   8855.08   78101.35
  Q Total (cfs)           125000.00    Flow (cfs)              10727.52  36866.21   77406.27
  Top Width (ft)          10318.00    Top Width (ft)            955.34    321.49    9041.17
  Vel Total (ft/s)            1.27    Avg. Vel. (ft/s)            0.91      4.16       0.99
  Max Chl Dpth (ft)          34.80    Hydr. Depth (ft)           12.29     27.54       8.64
  Conv. Total (cfs)       10686090.0    Conv. (cfs)             917081.3  3151644.0  6617361.0
  Length Wtd. (ft)          552.71    Wetted Per. (ft)          959.74    329.95    9047.05
  Min Ch El (ft)             59.94    Shear (lb/sq ft)            0.10      0.23       0.07
  Alpha                       3.61    Stream Power (lb/ft s)      0.10      0.95       0.07
  Frctn Loss (ft)             0.07    Cum Volume (acre-ft)    29836.76  20183.78   43978.33
  C & E Loss (ft)             0.00    Cum SA (acres)           6821.60   1006.28    6897.60


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 135

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   86.56    9.83   86.74   22.93   90.19   49.14   98.83   62.25   98.95
   65.52   98.56   85.18   92.06   95.01   89.03  101.56   87.59  111.39   86.61
  124.49   85.79  157.26   79.39  163.81   78.77  183.46   78.69  199.85   79.41
   206.4   79.93  216.23   81.41  229.33   83.81  255.54   84.97  265.37   83.99
  271.92    82.2   275.2   82.33  281.75   84.06   288.3   84.77  294.85   84.93
  304.68   84.42  337.44   84.06  350.55    83.8  363.65   84.81  376.76   87.17
  389.86   87.11  396.42   85.23  406.24   81.28  416.07   78.99   425.9   76.29
  442.28   75.15  458.66   75.27  468.49   76.44   481.6   77.56  491.42   78.87
  497.98   78.61  504.53   77.28  537.29   77.73  556.95   78.38   563.5   78.35
   576.6   78.85  589.71   78.22  606.09   78.74  612.64   79.28  625.75   78.53
  648.68   79.85  655.23   79.31  678.16   78.28  691.27   77.89  710.93   77.81
  720.75   77.07  727.31   77.53  740.41   77.16  756.79      76  766.62   76.36
  779.72   75.76  792.83   77.08  799.38   76.32  805.93   76.12  812.49   76.77
  828.87    77.3   838.7    77.4   851.8   76.93  874.73   78.01  881.29   77.56
  894.39   74.96  910.77   73.28   920.6   71.51  927.15    70.9  936.98   72.22
  940.26   73.26  950.08   77.62  953.36   77.35  963.19   74.34  969.74   73.05
  976.29   70.75  982.85   67.03   989.4   64.43  992.67   62.07  999.67   58.67
 1009.67   58.07 1029.67   58.57 1049.67   58.27 1059.67   57.67 1069.67   57.57
 1079.67   58.07 1089.67   58.07 1099.67   57.57 1109.67   57.77 1139.67   56.87
 1159.67   57.37 1159.76   64.27 1166.31   64.85 1172.86   67.39 1176.14   69.57
 1185.97   73.29 1199.07   76.83  1208.9   82.46 1215.45   85.78 1218.73   86.64
 1225.28   86.88 1238.39   86.54 1254.77   85.77 1267.87   85.72 1280.98   85.18
 1294.08   83.74 1310.46   83.36 1320.29    83.6 1330.12   83.47 1339.95   83.93
 1366.16    83.8 1382.54   83.29 1405.47   83.81 1418.58   83.26 1425.13   83.55
 1434.96   83.15 1451.34      83 1470.99   83.11  1484.1   82.97 1503.76    83.3
 1513.58   82.74 1543.07   82.56 1582.38   83.28 1598.76   84.06 1611.87   84.38
 1618.42   84.88 1651.18    85.6 1664.29   85.36 1687.22   85.52 1693.77   85.22
 1697.05   85.88  1703.6   85.52 1723.26   85.41 1749.47   85.58 1756.02   85.34
 1769.12   85.57 1805.16   85.23 1814.99    85.5 1851.03    85.4 1857.58   85.16
 1873.96   85.32  1896.9   85.28 1913.28   84.96 1926.38   85.16 1936.21   84.97
 1952.59   85.11 1978.81   85.05 2008.33   84.72 2037.85   84.84 2047.69   84.64
  2064.1   84.82 2106.74   84.53 2119.86   84.68 2185.47   84.55 2208.43   84.61
 2221.55   84.33 2228.11   84.52 2260.92   84.53  2280.6   84.22 2300.28   84.48
 2339.65   84.24 2349.49   83.96 2395.41   84.06 2421.66   83.77  2447.9   84.02
 2483.98    83.6 2490.54   83.93 2513.51   83.57 2536.47   83.76 2549.59   83.47
 2565.99   83.69 2575.83   84.11 2644.72   84.36 2677.52    84.2 2730.01   84.17
 2766.09   84.29 2775.94   84.19 2795.62   84.39 2802.18   84.25 2844.82   84.23
 2864.51   83.96 2887.47   84.01 2939.95   83.79 2979.32   83.83 3008.84   83.56
 3081.01   83.43  3133.5   83.42  3166.3    83.5 3176.14   83.37 3202.38   83.55
 3248.31   83.49 3271.27   83.66 3294.23   83.61 3392.64   83.87 3432.01   83.74
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 3448.41   83.86 3510.74   83.67 3559.94   83.63 3576.34   83.77 3599.31    83.6
 3625.55   83.66 3641.95   83.52 3681.32   83.77 3694.44   83.75 3710.84   83.45
 3720.68   83.63 3740.36   83.21 3776.45   83.59 3828.93   83.41  3868.3   83.36
 3910.94   83.54 3927.34   83.35 3953.59   83.42 3983.11   83.25 3996.23   83.31
  4035.6   83.18 4065.12   83.36 4114.32   83.26 4137.29   83.41 4166.81   83.29
 4183.21   83.47 4216.01   83.38 4275.06   83.58 4307.86   83.43 4324.26   83.53
 4353.79   83.38 4366.91   83.57 4412.83   83.41 4442.35   83.52 4494.84    83.3
  4517.8   83.46 4540.76   83.36 4560.44    83.5 4606.37    83.4 4612.93    83.3
 4681.82   83.32 4724.46   83.46 4747.42   83.31 4780.22   83.46 4799.91   83.32
 4816.31   83.62 4839.27   83.19 4868.79   83.11 4954.08   83.18 4977.04   83.06
 5006.56   83.17 5019.68   83.05 5049.21   83.15 5095.13   82.97 5121.37   83.05
 5160.74   82.92 5173.86   83.04 5193.54    82.9 5206.66   83.02 5246.03   82.86
 5265.71   82.96 5308.35   82.89 5370.68   82.94 5406.76   82.81 5419.88   82.96
 5439.56    82.9 5498.61      83 5537.97   82.82 5557.65   82.94  5583.9   82.81
  5616.7   82.95 5698.71   82.92 5731.51   82.83 5757.75   82.88 5813.52   82.69
 5836.48   82.85 5875.84   82.85 5888.96   83.35 5905.36   83.56 5931.61   83.46
 5964.41   83.57 5974.25    83.4 6016.89   83.24 6030.02   83.32 6072.66   82.94
  6082.5   83.09 6118.58   82.99 6125.14   82.81 6216.99   83.14 6230.11   83.35
 6308.84   83.55 6318.68   83.45  6348.2   83.56 6374.45   83.31 6413.81    83.4
 6476.13   83.03 6492.54    83.2  6515.5   84.25 6522.06   83.92 6535.18    82.7
 6551.58    83.6 6561.42    83.1 6604.07   82.81 6617.19   82.94 6630.31   82.78
 6649.99   82.97 6722.16   82.79 6735.28   83.06 6768.08   82.91 6787.76   83.05
 6889.45   83.06 6941.94   82.82 6968.18   83.02 7010.82   83.18 7020.66   83.09
 7109.23   83.39 7132.19   83.35 7155.16   83.14 7171.56   83.42 7184.68   83.35
 7201.08   83.77  7230.6   83.84 7237.16   83.68 7276.53   83.98 7306.05   83.95
 7319.17   84.21 7335.57   84.16 7374.93   84.36  7414.3   84.29 7473.34   84.38
 7502.87   84.79 7515.99   84.65 7525.83   85.03 7555.35   84.57 7565.19   84.67
 7604.56   84.46 7627.52   84.64 7634.08   84.48 7689.84   84.87  7696.4   84.73
 7739.05   85.01 7752.17   84.99 7758.73   84.55 7771.85   85.05 7798.09   86.35
 7837.46   87.59 7840.74    87.4  7847.3   88.11 7873.54   87.41 7922.74   86.99
 7932.58   87.16 7948.99   86.87 7958.83   87.18 7968.67   86.96 7985.07   87.25
 8011.31   87.32 8057.24   87.16 8070.36   87.37 8083.48   87.12 8106.44    87.3
  8129.4    87.3 8149.08   87.04 8155.64   87.22 8178.61   87.24 8188.45   87.08
 8211.41   87.15 8217.97   86.96 8240.93   87.13 8277.01   86.88 8290.14    87.1
  8296.7   86.87 8309.82      87 8332.78   86.67 8381.98   86.94 8418.07   86.49
 8434.47   86.59 8473.83   86.22 8490.23   86.43 8503.35   86.29    8546   86.49
 8552.56   86.23 8572.24   86.35 8582.08    86.1 8614.88   86.21 8624.72   86.05
 8637.84   86.23 8683.77   85.71 8732.97   85.78 8818.26   85.62 8847.78   85.93
 8896.99   85.54 8926.51   85.71 8942.91   85.35 8965.87   85.98 8972.43   85.75
 8982.27   85.99 8988.83   85.47 8998.67   85.36 9008.52   85.62 9031.48    85.6
  9044.6   85.42 9051.16   85.79 9067.56   85.42 9080.68   84.61 9097.08   85.35
 9116.76   85.59 9143.01   85.52 9182.37   85.58 9198.77   85.39 9218.45   85.59
 9225.01   85.39 9257.82   85.62 9274.22   85.52 9320.14   85.66 9346.38   85.39
 9369.35   85.63 9398.87   85.63 9434.95   85.37 9451.35   85.48 9471.03   85.35
 9480.88   85.55 9513.68   85.38 9520.24   85.56  9543.2   85.62 9556.32   85.41
 9582.56   85.65 9598.96   85.47 9641.61   85.58 9658.01   85.38 9664.57   85.53
 9700.65   85.32 9710.49   85.53 9733.46   85.47 9753.14   85.95 9766.26   85.24
 9785.94   84.83 9805.62   87.05  9808.9      87 9818.74   84.62  9825.3   84.42
 9831.86   83.58 9841.71   83.19 9848.27   83.97 9858.11   84.19 9864.67   85.35
 9867.95   86.74 9874.51   91.26 9877.79   92.12 9890.91   92.59 9926.99   92.98
 9933.55    91.1 9936.83   88.62 9940.11   87.34 9943.39   87.2710068.04   87.27
10071.32   87.4410081.17   92.2810084.45   93.5210097.57    93.3

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .101  874.73    .066  982.85    .015 1176.14    .066 1225.28    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        874.73  1208.9           1851.1    1850 1680.42             .1       .3
Left Levee      Station=   62.25      Elevation=   98.95
Right Levee     Station= 9926.99      Elevation=   92.98
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   47.32  385.35    87.1 1257.4610323.38    85.7

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             94.76    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                 0.101      0.041      0.074
  W.S. Elev (ft)             94.67    Reach Len. (ft)          1851.10    1850.00    1680.42
  Crit W.S. (ft)             82.48    Flow Area (sq ft)       10446.61    9783.30   77873.08
  E.G. Slope (ft/ft)      0.000134    Area (sq ft)            10446.61    9783.30   77873.08
  Q Total (cfs)           125000.00     Flow (cfs)              9866.77   38156.10   76977.13
  Top Width (ft)          10020.30    Top Width (ft)            797.46     334.17    8888.67
  Vel Total (ft/s)            1.27    Avg. Vel. (ft/s)            0.94       3.90       0.99
  Max Chl Dpth (ft)          37.80    Hydr. Depth (ft)           13.10      29.28       8.76
  Conv. Total (cfs)       10787780.0    Conv. (cfs)             851523.8   3292956.0   6643297.0
  Length Wtd. (ft)         1747.14    Wetted Per. (ft)          801.04     350.60    8895.86
  Min Ch El (ft)             56.87    Shear (lb/sq ft)            0.11       0.23       0.07
  Alpha                       3.27    Stream Power (lb/ft s)      0.10       0.91       0.07
  Frctn Loss (ft)             0.19    Cum Volume (acre-ft)    29604.54   20038.35   43185.09
  C & E Loss (ft)             0.00    Cum SA (acres)           6803.26    1001.17    6806.42


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 134.65

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   95.58    6.56   97.67   13.12   98.04   22.96   97.97   29.53   96.54
   39.37   93.17   49.21   90.27   68.89    85.2   82.02   82.54   91.86   81.47
  118.11   81.47  141.07    81.7   170.6    81.7  193.56   81.49  200.12   81.63
  259.18   81.51  298.54   81.71  311.67   81.63  344.47   81.78  364.16    81.7
  410.09   82.05  433.05   81.93  472.42   82.32  495.39   82.86  515.07   82.92
  528.19    82.7  547.88   82.68  564.28    82.4  577.41   82.39  587.25    82.1
  593.81   81.56  600.37   79.96  603.65   79.66  616.77   79.66  620.05   79.26
   629.9   74.95  639.74   71.97  649.58   70.19  679.11   70.44  682.39   70.82
  688.95    72.9  698.79   77.37  705.35   81.41  708.63   82.75  711.91   83.05
  734.88   82.68  757.84      83  770.97   83.65  777.53   82.86  790.65    79.9
  800.49   79.13  807.05   79.12   816.9   79.78  826.74   79.62  830.02   78.94
  836.58   75.42  843.14   70.72  846.42    68.9  856.26   64.72  862.83   63.98
  894.14    58.3  906.14   57.91  913.14    57.3  935.14    56.4  955.14    56.7
  964.14    56.1  975.14    56.3  995.14      56 1006.14    56.5 1015.34    56.2
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 1016.78   63.98 1023.32   65.84 1033.14   70.88 1046.24   75.33 1052.78   76.69
 1069.15   81.35 1072.42   81.69 1075.69   80.88 1082.24   77.91 1085.51   77.08
 1092.06   76.67 1095.33   77.05 1101.88    78.9 1105.15   80.41 1121.52   79.43
 1141.16   79.69 1157.52   79.51 1177.16   80.77 1183.71    82.9 1190.25   84.08
 1203.35   84.01 1213.16   84.81 1216.44    84.4 1226.26   84.16 1242.62    84.3
 1268.81   84.27 1298.27   83.98 1308.09   84.09 1350.64   83.66 1357.18   83.78
 1396.46    83.6 1406.28   83.82 1419.37   83.78 1458.65    84.1  1501.2    83.9
 1511.02   83.99 1547.02   83.61 1566.66    83.5 1576.48   83.61 1596.12   83.39
 1641.94   83.24 1664.86      83 1717.23   83.07 1733.59   82.85 1749.96   82.94
 1779.42   82.84 1799.05   82.59 1831.79   82.41 1848.15   82.66 1897.28   82.39
  1910.4   82.44 1933.36   82.24 1939.91   82.32 1989.11   82.18  2038.3   82.16
 2074.38   81.93 2097.33   82.12 2120.29   82.06 2146.53   82.18 2153.09   82.04
 2176.04   82.85 2228.52    82.9 2261.32   83.12 2290.83   83.15 2307.23   83.27
 2323.63   83.15 2333.47   83.27 2385.94   83.39 2399.06   83.34 2454.81   83.52
 2484.33   83.69 2540.09   83.76 2582.72   83.61  2618.8   83.77 2638.48   83.73
 2651.59   83.88 2717.19   84.04 2723.75   84.22 2743.42   84.09 2769.66   84.25
 2815.58   84.26 2835.25   84.15 2871.33   84.35 2884.45   84.25 2920.52   84.27
 2969.72    84.1 3002.52   84.32 3032.03   84.22 3077.95   84.23 3091.07   84.36
 3114.02   84.19 3123.86   84.29 3159.94   83.95 3179.62   84.13 3225.53   83.78
 3264.89    83.7 3271.45   83.49 3284.57   83.75  3310.8   83.79  3376.4   83.55
 3422.31    83.1 3435.43    82.8 3464.95   82.36 3481.34   82.41  3504.3   82.11
 3514.14   81.85 3543.66   81.38  3569.9   81.18 3602.69   80.66 3628.93   80.54
 3651.89   80.03 3661.73   80.11 3694.52   79.89  3714.2   79.95 3737.16   79.77
 3773.23   79.84 3786.35   80.01 3809.31   79.82 3835.55   79.77 3865.06   79.85
 3871.62   79.99  3907.7   79.99 3973.29   80.34 3986.41   80.26 4006.09   80.58
 4032.33   80.81  4084.8   81.13  4117.6   81.46 4163.51   81.62 4176.63   82.47
 4186.47   84.73 4193.03   85.46 4202.86   84.74  4212.7   82.92 4222.54   84.74
 4225.82      85 4248.78   84.59 4255.34   85.11  4261.9   86.14 4288.13   85.07
 4297.97   84.11 4307.81   83.88 4324.21   83.93 4347.16   83.72 4360.28   83.83
 4376.68    83.7 4432.43   83.87 4455.39   84.06 4507.86   83.78 4530.82    83.9
 4586.57   83.86 4596.41   83.98  4678.4   84.02 4701.35   84.14 4714.47   84.03
 4730.87   84.23 4737.43   84.09 4757.11   84.22 4773.51    85.1  4806.3   85.63
 4812.86   85.49 4825.98   84.46  4839.1   84.16 4862.05   84.03 4901.41   84.15
  4950.6   83.96 4989.96   84.04 5045.71    83.8 5071.94   83.89 5147.37   83.75
 5170.33   83.85 5212.96   83.61  5239.2   83.57 5275.28   83.72 5281.84   83.59
 5321.19   83.43 5350.71   83.46 5360.54   83.35 5413.02    83.3 5445.81   83.54
 5498.29   83.64 5521.24   83.48 5531.08   83.65 5547.48   83.62    5577   83.79
 5593.39   83.69 5603.23   83.82 5649.15   83.59 5658.98   83.66  5688.5    83.5
 5708.18   83.57 5724.57   83.45 5773.77   83.46 5819.68   83.57 5855.76   83.51
 5911.51    83.9 5927.91   83.74 5963.98    83.9 6045.97   83.94 6059.09   84.09
 6075.49   83.85    6105   84.09 6144.36   84.03 6200.11    83.5 6209.95   83.56
 6252.58   83.26 6262.42   83.36 6295.22   83.05 6314.89   82.73 6334.57   81.85
 6350.97   82.02  6377.2   81.48 6400.16   80.76 6439.52   79.87 6465.75    79.8
 6488.71   79.43 6888.81   79.43 6895.37   79.62 6918.33   82.28 6944.57   84.44
 6964.24   85.21 6967.52   85.57 6993.76   86.44 7026.56   86.53 7036.39   86.35
 7059.35   86.38 7072.47   85.84 7075.75   86.26 7082.31   85.72 7085.59   86.72
 7095.43   85.98 7108.54   86.22 7128.22   86.26 7138.06   86.06 7157.74   86.18
 7193.81   85.92 7223.33   85.98    7243   85.76  7275.8   85.88 7324.99   85.76
 7364.35   85.51 7393.86    85.6 7416.82   85.35 7446.34   85.28  7452.9   85.52
 7459.46   85.03 7466.01   85.39 7488.97   85.54 7515.21   84.97 7521.77   85.08
 7544.72    84.8 7567.68   84.96 7669.35   84.67 7718.54   84.96 7731.66   86.23
 7748.06   85.56 7757.89   86.04 7764.45   85.27 7771.01   84.98 7800.53   84.61
  7836.6   84.62 7846.44   84.83 7862.84   84.61 7872.68   84.88 7882.52   84.62
 7902.19   84.96 7915.31   84.81 7925.15   85.14 7934.99   84.37 7948.11   85.13
 7957.95   84.92 7971.06   85.47 7977.62   85.13 7990.74   85.11  7997.3   84.67
 8020.26   84.79 8036.66   84.63 8043.21   84.37 8053.05   84.59 8069.45   84.46
 8085.85   83.97 8098.97   84.25 8108.81   83.89 8115.36   84.12 8131.76   84.21
 8154.72   83.97 8187.51   83.94 8249.82    84.3 8256.38   84.17  8269.5   84.53
 8289.17   84.18 8315.41   84.22  8331.8   84.94 8341.64   85.79 8351.48   85.75
 8361.32   84.88 8377.71   84.57 8413.79   84.53  8426.9   84.13 8446.58   84.24
 8456.42   85.11 8466.25   84.23 8472.81   84.26 8482.65   84.81 8492.49   84.83
 8508.89   84.12 8518.72   84.63 8531.84   84.54 8541.68   84.14 8544.96   84.37
 8561.35   84.33 8567.91   84.04 8577.75   84.72 8594.15    84.4 8607.26   84.66
 8623.66   83.97 8643.34   83.74 8659.73   84.06 8669.57   83.89 8679.41   84.23
 8689.25   83.37 8705.64   84.66 8722.04   84.67 8731.88   84.12    8745   84.11
 8754.83   83.81 8767.95   84.05 8787.63   83.97 8794.18   83.73 8830.26   84.37
 8836.82   83.88 8846.65   83.92 8859.77   84.76 8872.89   83.92 8889.28   84.57
 8899.12   84.08 8915.52   83.73 8925.36   83.98 8938.47      84 8964.71   83.59
  8981.1   83.63 8994.22   83.87 9030.29   83.62 9053.25   83.92 9059.81   83.75
 9069.65    84.1  9092.6   83.84 9102.44   84.15    9109   83.98 9118.83   83.23
 9138.51   83.82 9154.91   83.53 9184.42   83.87 9194.26   83.52 9210.66   83.59
 9230.33   84.54 9240.17    85.2 9246.73   84.95 9259.84   83.92 9272.96   83.74
 9289.36   84.25 9309.03   83.83 9318.87   84.06 9338.55   84.26 9348.39   83.49
 9354.94   83.51  9361.5   84.03  9377.9   84.45  9394.3   83.94 9410.69   83.82
 9420.53   83.17 9430.37   83.66 9450.04   82.79 9463.16   83.12 9469.72   84.51
 9482.84   89.91 9486.12   90.75 9495.95   91.77 9502.51   91.52 9532.03    92.4
 9535.31   91.87 9541.86   87.79 9545.14   87.27 9666.48   87.27 9676.32   87.74
 9686.15   93.06 9692.71   93.98 9709.11    93.3 9718.95   91.56

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085    6.56    .066  770.97     .07  843.14    .025 1033.14     .07
 1213.16    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       770.97 1213.16           439.55  1691.6 1780.35             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  770.97   83.65       T
 1213.16 9718.95   84.81       T
Left Levee      Station=   13.12      Elevation=   98.04
Right Levee     Station= 9532.03      Elevation=    92.4

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            94.57    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.10    Wt. n-Val.                 0.066      0.030      0.066
  W.S. Elev (ft)            94.47    Reach Len. (ft)           439.55    1691.60    1780.35
  Crit W.S. (ft)            87.48    Flow Area (sq ft)        7755.52   10435.22   80342.62
  E.G. Slope (ft/ft)      0.000086   Area (sq ft)             9697.89   10435.22   92514.83
  Q Total (cfs)           125000.00   Flow (cfs)               7731.10   42496.54   74772.36
  Top Width (ft)            9683.39   Top Width (ft)            735.41     442.19    8505.79
  Vel Total (ft/s)             1.27   Avg. Vel. (ft/s)            1.00       4.07       0.93
  Max Chl Dpth (ft)           38.47   Hydr. Depth (ft)           10.55      23.60       9.45
  Conv. Total (cfs)       13501440.0   Conv. (cfs)              835048.1   4590114.0   8076273.0
  Length Wtd. (ft)          1603.47   Wetted Per. (ft)          741.54     458.56    8515.81
  Min Ch El (ft)              56.00   Shear (lb/sq ft)            0.06       0.12       0.05
  Alpha                        3.86   Stream Power (lb/ft s)      0.06       0.50       0.05
  Frctn Loss (ft)              0.16   Cum Volume (acre-ft)    29176.52   19609.01   39898.55
  C & E Loss (ft)              0.02   Cum SA (acres)           6770.69     984.68    6470.90
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Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 134.33*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.24	14.8197.15331		17.74	97.87	22.96	98.01	33.34	95.97
40.26	94.89	65.34	92.62	76.59	91.4	85.23	91.16	95.61	90.33
106.85	89.13	149.33	84.98	179.08	82.81	201.37	81.9	229.66	81.86
286.75	81.88	324.8	82.17	336.04	81.92	341.23	81.35	345.56	82.3
367.18	81.49	387.93	80.94	409.56	80.99	424.26	80.8	446.67	80.9
564.37	81.02	577.34	81.07	580.8	81.87	585.99	82.02	638.74	81.96
645.66	82.09	673.34	82.13	695.82	82.05	771.93	82.13	797.88	82.09
815.17	81.96	819.5	81.54	833.34	81.78	865.33	81.89	892.14	81.71
922.43	82.13	943.17	81.73	973.44	81.64	978.63	81.97	985.55	81.7
1013.22	81.82	1020.14	82.07	1057.33	82.29	1070.3	82.52	1091.93	82.35
1118.74	82.8	1128.25	82.66	1141.22	82.8	1170.63	82.48	1212.14	82.31
1217.33	82.66	1228.58	82.78	1264.9	82.55	1303.82	82.51	1323.84	82.28
1338.7	81.81	1353.57	80.46	1361	80.21	1390.73	80.23	1398.16	79.9
1420.58	76.3	1442.77	73.81	1465.07	72.32	1531.98	72.51	1539.41	72.83
1554.28	74.54	1576.57	78.27	1591.43	81.62	1598.87	82.75	1606.3	82.98
1658.96	82.6	1681.41	82.56	1687.45	82.71	1691.77	82.25	1717.6282.62907	
1734.08	83.05	1740.12	83.38	1746.1	82.67	1758.07	80.12	1767.05	79.38
1773.03	79.18	1782.02	79.44	1791	79.07	1793.99	78.43	1799.98	75.34
1805.96	71.25	1814.11	67.4465	1817.93	65.83	1823.92	64.98	1852.49	59.13
1863.44	58.66	1869.82	57.96	1889.89	56.55	1908.14	56.61	1916.35	56.08
1926.39	56.2	1944.63	55.87	1955.22	56.36	1964.07	56.13	1965.46	62.62
1971.75	64.17	1981.2	68.39	1985.7869.75099		1993.81	72.16	2000.11	73.33
2015.86	77.17	2019.01	77.43	2022.16	76.74	2028.46	74.24	2031.61	73.54
2037.91	73.23	2041.06	73.56	2047.36	75.12	2050.51	76.38	2066.26	75.6
2068.88	75.64	2069	76.72	2077.14	77.12	2085.28	78.11	2100.91	78.71
2119.81	80.43	2126.12	82.38	2132.41	83.55	2145.02	83.9	2154.46	84.66
2165.86	84.12	2180.09	84.22	2202.87	84.19	2228.5	83.93	2237.04	84.02
2274.05	83.64	2279.74	83.73	2313.91	83.57	2368	83.95	2405.02	83.76
2413.56	83.83	2444.87	83.5	2470.5	83.49	2487.58	83.29	2527.44	83.14
2547.38	82.93	2592.93	82.97	2607.16	82.78	2621.4	82.84	2647.03	82.74
2664.1	82.53	2692.58	82.38	2706.81	82.59	2749.55	82.37	2760.96	82.41
2829.43	82.2	2872.22	82.19	2903.6	82	2923.56	82.15	2943.54	82.11
2966.36	82.21	2972.07	82.09	2992.03	82.77	3037.68	82.81	3066.21	83
3106.15	83.12	3174.61	83.23	3194.55	83.21	3260.2	83.78	3308.7	83.84
3345.78	83.71	3377.17	83.84	3394.29	83.8	3405.69	83.93	3462.75	84.05
3468.46	84.2	3485.57	84.09	3508.39	84.22	3548.34	84.23	3565.45	84.14
3596.83	84.3	3608.25	84.21	3639.62	84.23	3682.42	84.08	3710.95	84.26
3736.62	84.18	3776.56	84.18	3787.98	84.29	3807.94	84.15	3816.5	84.23
3847.88	83.94	3865	84.09	3904.94	83.79	3939.17	83.72	3944.88	83.55
3956.29	83.76	3979.11	83.8	4036.17	83.59	4076.11	83.21	4113.2	82.59
4127.45	82.63	4181.66	81.77	4204.49	81.6	4233.01	81.16	4255.84	81.06
4275.81	80.63	4284.37	80.7	4312.89	80.51	4330.01	80.56	4349.98	80.41
4381.36	80.47	4392.77	80.61	4412.74	80.45	4435.57	80.4	4466.94	80.58
4498.33	80.58	4555.38	80.87	4566.79	80.8	4583.91	81.06	4606.74	81.25
4652.38	81.51	4680.91	81.79	4720.85	81.92	4732.26	82.62	4740.82	84.51
4746.52	85.11	4755.07	84.51	4763.63	83	4775.05	84.73	4795.02	84.38
4806.43	85.67	4829.25	84.78	4837.81	83.98	4846.37	83.79	4860.63	83.83
4880.59	83.65	4906.27	83.63	4954.77	83.77	4974.74	83.93	5020.38	83.69
5040.35	83.79	5088.85	83.75	5097.41	83.85	5168.73	83.87	5188.69	83.97
5200.1	83.88	5214.37	84.04	5237.19	84.03	5251.46	84.77	5279.98	85.2
5285.69	85.09	5297.1	84.23	5308.51	83.98	5328.48	83.87	5362.71	83.96
5405.5	83.8	5439.74	83.86	5488.23	83.66	5511.05	83.73	5576.66	83.61
5596.64	83.69	5633.72	83.49	5656.54	83.45	5687.93	83.57	5693.63	83.46
5727.86	83.33	5807.74	83.21	5836.26	83.41	5881.91	83.49	5901.88	83.35
5950.38	83.61	5973.2	83.63	6013.14	83.43	6021.69	83.49	6047.37	83.36
6121.54	83.31	6161.48	83.4	6192.86	83.35	6241.36	83.67	6255.62	83.54
6287	83.67	6358.32	83.69	6369.73	83.82	6384	83.61	6409.66	83.81
6443.9	83.76	6492.4	83.31	6500.96	83.36	6538.04	83.11	6546.6	83.19
6575.13	82.93	6592.24	82.66	6609.36	81.93	6623.62	82.07	6646.44	81.61
6666.41	81.01	6700.65	80.27	6723.47	80.21	6743.44	79.9	7091.47	79.86
7097.17	80.02	7117.15	82.24	7139.97	84.03	7157.08	84.67	7159.93	84.97
7182.76	85.7	7211.29	85.77	7219.84	85.62	7239.81	85.64	7251.23	85.19
7254.08	85.54	7259.78	85.09	7262.64	85.92	7271.2	85.3	7282.6	85.5
7299.72	85.54	7308.28	85.37	7325.4	85.47	7356.77	85.25	7382.45	85.29
7399.56	85.11	7428.09	85.21	7470.88	85.1	7505.12	84.89	7530.79	84.96
7550.76	84.75	7576.44	84.69	7582.15	84.89	7587.85	84.48	7593.55	84.78
7613.52	84.91	7636.35	84.43	7642.05	84.52	7662.02	84.28	7681.99	84.42
7770.43	84.16	7813.21	84.4	7824.63	85.46	7838.89	84.9	7847.44	85.3
7858.86	84.41	7884.53	84.1	7915.91	84.11	7924.47	84.28	7938.73	84.1
7947.29	84.32	7955.85	84.11	7972.96	84.39	7984.38	84.26	7992.94	84.54
8001.5	83.89	8012.91	84.52	8021.47	84.35	8032.87	84.81	8038.58	84.52
8049.99	84.5	8055.7	84.14	8075.67	84.24	8095.63	83.88	8104.19	84.07
8118.46	83.96	8132.72	83.55	8144.13	83.78	8152.69	83.48	8172.66	83.74
8192.63	83.54	8221.15	83.51	8275.35	83.81	8281.06	83.7	8292.47	84
8309.58	83.7	8332.41	83.74	8346.66	84.33	8355.22	85.04	8363.78	85.01
8372.34	84.28	8386.6	84.02	8417.98	83.99	8429.39	83.65	8446.5	83.74
8455.06	84.47	8463.62	83.73	8477.88	84.21	8486.44	84.23	8500.71	83.64
8509.26	84.06	8520.67	83.98	8529.23	83.65	8532.08	83.84	8546.34	83.81
8552.04	83.56	8560.6	84.13	8574.87	83.86	8586.27	84.08	8600.54	83.5
8617.66	83.31	8631.92	83.57	8640.47	83.43	8649.03	83.71	8657.59	83
8671.85	84.07	8686.12	84.08	8694.67	83.62	8706.09	83.61	8714.64	83.36
8726.05	83.56	8743.17	83.49	8748.87	83.29	8780.25	83.82	8785.96	83.41
8794.51	83.44	8805.92	84.14	8817.33	83.44	8831.59	83.99	8840.15	83.58
8854.42	83.3	8874.38	83.53	8897.2	83.19	8922.87	83.43	8954.25	83.23
8974.22	83.49	8979.93	83.35	8988.49	83.64	9008.45	83.43	9017.01	83.7
9031.27	82.93	9048.38	83.43	9062.65	83.19	9088.32	83.48	9096.88	83.19
9111.15	83.26	9128.26	84.05	9136.82	84.61	9153.92	83.55	9165.34	83.4
9179.6	83.83	9196.71	83.48	9222.39	83.85	9230.95	83.21	9256.62	84.02
9270.89	83.6	9285.14	83.5	9293.7	82.96	9302.26	83.37	9319.37	82.66
9330.78	82.93	9336.49	84.09	9347.9	88.6	9359.31	90.49	9365.01	90.52
9390.69	92.31	9393.42	91.86	9398.88	88.47	9401.62	88.03	9502.73	88.03
9510.93	88.42	9519.12	92.86	9524.59	93.62	9538.26	93.06	9546.46	91.61

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	14.81	.066	1740.12	.07	1814.11	.025	2077.14	.07
2154.46	.066								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
      1740.12 2154.46           439.55  1691.6 1780.35            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1740.12   83.38       T
 2154.46 9546.46   84.65       T
Left Levee      Station=21.32167      Elevation=98.05334
Right Levee     Station=9390.691      Elevation=92.30666

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 134.02*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    90.9    8.95   92.92   23.0597.13678   25.35   97.87    32.8   97.98
   44.94   95.18   48.98   93.93   54.38   93.19   59.77   91.79   70.55   91.04
   77.29   90.21   92.12   89.58   98.86   89.49   102.9      89  112.34   89.08
  116.38   88.74  129.86    89.5  146.04    89.2  182.44   87.22  229.76   84.76
  248.49   83.95  290.28    82.7  310.89   82.33  354.98   82.26  410.25   82.37
  435.87   82.33  443.95   82.17  466.87   82.53  484.39   82.59  499.22    82.3
  503.27   82.64   515.4   82.42  522.14   81.99  528.88      81  535.62   82.91
  543.71   82.78  554.49    81.8  563.93   81.64  569.32   81.28  574.71   81.68
   580.1   80.83  601.67   80.22  628.63   80.25  635.37   80.41  658.29   80.07
  693.22   80.17  741.87   80.16   756.7   80.27  826.79   80.35  864.54   80.59
  876.67   80.51  883.41   80.91  896.89   80.63  903.63   82.44   992.6   82.28
 1003.38   82.52 1020.91   82.57 1033.04   82.45 1046.52   82.56 1081.57   82.46
 1101.79   82.58 1170.54   82.43 1177.27   82.48 1250.07    82.4 1267.59   82.22
 1271.64   81.47  1295.9   81.81 1314.77   81.74 1324.21   81.93 1345.78   81.92
    1366   81.63 1380.82    81.7 1387.56   81.48 1410.48   81.76 1421.27   82.13
 1434.76   82.21 1438.79   81.99 1452.27   81.98  1467.1   81.46  1498.1   81.28
 1514.28   81.34 1522.37   81.99 1533.15   81.42 1552.02   81.38 1576.28   81.55
 1587.07   82.02 1608.64   82.09 1611.33   82.23 1645.03   82.29 1659.86    82.6
    1672   82.62 1698.95   82.09 1707.04   82.35 1717.83   82.32 1740.74   82.74
 1755.57   82.45 1775.79    82.7 1785.23   82.42 1796.01   82.48 1821.63   82.13
 1875.55   82.02 1886.33   81.92 1894.42   82.64 1911.95   82.89 1945.65   82.81
 1968.57   82.65 2029.23   82.66 2060.23   82.46  2083.6   82.06 2106.77   80.95
 2118.35   80.76 2143.81   80.72 2166.73   80.78 2176.27   80.55 2208.52   77.81
 2240.87   75.89 2250.31   75.46 2285.36   74.41 2331.12   74.51 2337.85   74.44
 2363.42   74.56 2378.22   74.53 2396.43   74.84  2415.9   75.93 2449.54   78.72
 2477.52   81.82 2488.57   82.71 2496.64   82.87 2512.79   82.88 2582.77   82.51
 2596.23   82.55 2617.76   82.29 2627.18   82.56 2633.91   81.61 2644.67   81.84
 2658.13   81.79 2674.2482.09964 2699.85   82.59 2709.27    83.1 2714.68   82.49
  2725.5   80.35 2739.02   79.24 2747.14   79.11 2755.26   78.52 2757.96   77.91
 2763.37   75.26 2771.48   70.35 2778.2967.49015 2806.16   60.89 2810.84   59.96
 2820.73   59.41 2841.92   56.87 2861.14   56.53 2868.56   56.05 2877.63    56.1
 2894.12   55.74  2904.3   56.22 2912.81   56.06 2914.14   61.25 2920.19   62.51
 2929.27   65.89 2938.42 68.2319 2962.57      73 2968.62   72.61 2974.68   70.58
  2977.7      70 2983.76   69.79 2992.84   71.34 2995.87   72.35 3013.52   71.82
 3013.64   73.97 3021.46   74.66 3029.28   76.54  3037.1   77.47  3044.3   77.91
 3062.47   80.09 3068.53   81.86 3074.57   83.01 3095.76   84.52 3105.45   84.07
 3136.93    84.1 3158.72   83.88 3165.98   83.94 3197.46   83.62  3202.3   83.69
 3231.35   83.53 3277.36    83.8 3308.83   83.63 3316.09   83.68 3342.72   83.39
 3364.52   83.36 3379.04   83.19 3412.94   83.05 3429.89   82.87 3468.63   82.86
 3480.73    82.7 3514.63   82.65 3529.15   82.47 3553.37   82.36 3565.47   82.53
 3601.82   82.35 3611.52   82.39 3669.75   82.22 3706.13   82.21 3732.82   82.06
  3749.8   82.19 3786.19   82.23 3791.04   82.14 3808.02   82.68 3846.84   82.72
  3871.1   82.87 3905.06   82.98 3980.24   83.05 4034.25   83.86 4077.31   83.91
 4108.85    83.8 4159.79   83.97 4227.72    84.1 4247.13    84.2  4281.1    84.2
 4295.65   84.12 4322.34   84.25 4395.12   84.07 4419.38   84.21 4441.21   84.13
 4475.18   84.13 4484.88   84.22 4509.14   84.17 4535.83   83.93 4550.38   84.05
 4584.34   83.81 4613.46   83.75 4647.42    83.8 4695.94   83.63  4729.9   83.32
 4761.45   82.82 4773.57   82.85 4819.67   82.16 4839.08   82.02 4863.33   81.67
 4882.74   81.58 4899.73   81.24  4962.8   81.05 4989.48   81.09 4999.19    81.2
 5035.58   81.03 5062.27   81.17 5088.95   81.17 5137.47   81.39 5147.18   81.34
 5161.73   81.55 5219.96    81.9 5244.22   82.11 5278.18   82.21 5287.89   82.78
 5295.16   84.28 5300.02   84.77 5307.29   84.29 5314.57   83.07 5324.27   84.46
 5341.26   84.18 5350.96   85.21 5370.36   84.49 5377.64   83.85 5414.03   83.58
 5435.87   83.56  5477.1   83.67 5494.09   83.79  5532.9   83.59 5549.88   83.67
 5591.12   83.64  5598.4   83.71 5685.73   83.73 5717.27   83.85 5729.41   84.43
 5753.66   84.78 5768.22   83.99 5777.92   83.79  5794.9    83.7 5824.02   83.78
  5860.4   83.64 5889.52   83.69 5930.76   83.52 5950.16   83.57 6005.96   83.47
 6022.94   83.53 6073.88   83.33 6100.57   83.43 6134.53   83.23 6202.46   83.12
 6226.72   83.28 6265.54   83.34 6282.51   83.23 6323.76   83.42 6343.16   83.44
 6406.24   83.21 6469.31   83.17 6503.27   83.24 6529.96   83.19  6571.2   83.44
 6583.33   83.33 6610.01   83.43 6670.66   83.44 6680.37   83.54  6692.5   83.38
 6714.33   83.53 6743.44   83.49 6784.68   83.13  6823.5   82.96 6830.77   83.02
 6869.59   82.59 6884.15      82 6896.28   82.11 6915.68   81.75 6932.66   81.27
 6961.78   80.67 6981.18   80.61 6998.17   80.36 7294.12    80.3 7298.98   80.42
 7315.96   82.19 7335.37   83.63 7352.35   84.38 7371.76   84.95 7396.02   85.01
 7420.28    84.9 7437.26   84.46 7439.69   85.12 7446.96   84.63 7456.66   84.79
  7478.5   84.68 7493.06   84.75 7519.74   84.57 7541.57   84.61 7556.12   84.46
 7580.39   84.53 7616.77   84.44 7645.89   84.27 7667.72   84.33  7684.7   84.16
 7706.54    84.1 7716.24   83.93 7721.09   84.17 7738.07   84.27 7757.48   83.89
 7779.31   83.77 7796.29   83.87  7871.5   83.66 7907.89   83.85 7917.59   84.69
 7929.72   84.24    7937   84.56  7946.7   83.85 7968.54    83.6 7995.22    83.6
  8002.5   83.74 8014.63   83.59 8021.91   83.77 8029.19   83.59 8043.74   83.81
 8053.44   83.71 8060.72   83.93    8068   83.42  8077.7   83.92 8084.98   83.78
 8094.68   84.14 8109.24    83.9 8114.09   83.61 8131.07   83.68 8148.05    83.4
 8167.46   83.45 8179.59   83.12  8189.3   83.31 8196.58   83.07 8213.55   83.28
 8230.54   83.11 8254.79   83.09 8300.88   83.32 8315.44   83.47 8329.99   83.23
  8349.4   83.25 8361.53   83.73  8368.8   84.29 8376.08   84.27 8383.36   83.68
 8395.49   83.47 8422.17   83.44 8431.87   83.17 8446.43   83.24 8453.71   83.82
 8460.98   83.23 8473.11   83.62 8480.39   83.63 8492.52   83.15 8499.79   83.49
 8531.33   83.28 8536.18   83.09 8543.46   83.54 8555.59   83.33 8565.29    83.5
 8577.42   83.03 8591.98   82.88  8604.1   83.09 8611.38   82.97 8618.66    83.2
 8625.94   82.62 8638.06   83.48 8650.19   83.48 8657.47   83.12 8674.45   82.91
 8684.15   83.06 8703.55   82.85 8730.24   83.27  8735.1   82.94 8742.37   82.96
 8752.07   83.52 8761.78   82.96  8773.9   83.41 8793.31   82.86 8810.29   83.05
  8829.7   82.79 8851.53      83 8878.21   82.85 8907.32   83.19  8924.3   83.03
 8931.58   83.24  8943.7   82.64 8958.26   83.04 8970.39   82.86 8992.22    83.1
  8999.5   82.87 9011.63   82.93 9033.46   84.01 9048.01   83.17 9057.72   83.06
 9069.85   83.41  9084.4   83.14 9106.23   83.44 9113.51   82.93 9135.34   83.59
 9147.47   83.26  9159.6   83.19 9166.88   82.76 9174.15   83.09  9188.7   82.52
 9198.41   82.75 9203.26   83.68 9212.97   87.28 9222.67   89.21 9227.52   89.51
 9249.35   92.21 9251.54   91.86 9255.91   89.14 9258.09   88.79 9338.99   88.79
 9345.55   89.11  9352.1   92.65 9356.47   93.27 9367.41   92.81 9373.97   91.65

Manning's n Values        num=       6
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     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085    32.8    .066 2709.27     .07 2778.29    .025 2938.42     .07
 3095.76    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2709.27 3095.76           439.55  1691.6 1780.35             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2709.27    83.1       T
 3095.76 9373.97   84.52       T
Left Levee      Station=    32.8      Elevation=   97.98
Right Levee     Station=9249.354      Elevation=92.21333

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 133.70*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   88.56    3.88   89.61   11.63   91.02    25.2   95.08    31.3  97.276
   32.95   97.87   42.65   97.94   59.13   93.76   64.62    91.9   71.95   90.79
   79.27   88.69    86.6   87.87   93.92   87.66  103.08   86.63   110.4   86.32
  123.22   86.16  132.38   86.36  137.87   85.82  150.69    86.4  156.18   86.09
  163.51   86.56  174.49   87.85  179.98   87.64  183.65      88  196.47   88.07
  245.91    86.5  269.72   85.85  299.01   84.88  335.64   83.86  350.29   83.77
   368.6   83.44   392.4      83  399.73   83.05  425.36   82.73  440.01   82.82
  452.84   82.71  469.31   82.79   480.3   82.65  524.25   82.75  540.73   82.66
  555.38   82.81  573.69   82.64  590.17   82.72  601.16   82.47  632.29   82.97
  656.09   83.03  668.91   82.93  676.24    82.6  681.73   83.11  698.21   82.77
  707.37   82.13  711.03    81.1  716.52   80.64  722.01   82.68  725.68   83.51
  729.34   83.12  736.67   83.32  747.65    82.5  751.32   81.85  760.47   81.46
  764.13   81.61  771.46   81.07  778.79   81.68  786.11    80.4  798.93   80.15
  815.41   79.49  822.73   79.82  828.22   79.56  852.03   79.58  861.19   79.82
  875.84   79.48  892.32   79.35 1005.85   79.44    1026   79.61 1077.27   79.67
 1095.58   79.79 1121.22   79.75 1139.53   79.83 1172.49   80.12 1188.97      80
 1198.13   80.61 1209.12   80.59 1216.44   80.19 1225.59    82.9 1234.75   83.02
  1249.4   82.89 1291.52   82.76 1304.34    82.8 1346.45   82.61  1361.1   82.95
 1384.91   83.01 1401.38   82.82  1419.7   82.99 1467.31   82.86 1487.45   82.89
 1494.78   83.04 1522.25   82.98 1544.22   82.79 1553.38   82.86 1588.17   82.78
 1597.32   82.85 1646.76   82.79 1648.59   82.73 1696.21   82.74 1710.85   82.45
 1720.01   82.48 1725.51   81.36 1729.17   81.22 1740.15   81.62 1758.47   81.84
  1784.1   81.72 1796.92   81.99 1826.22   81.95 1853.68   81.49 1873.83   81.58
 1882.98   81.24 1914.11   81.63 1928.76   82.19  1947.1   82.28 1952.57   81.96
 1970.88   81.95 1991.02   81.19 2007.51   81.06 2022.15   81.12 2033.14   80.95
 2055.11   81.05  2066.1      82 2069.76   81.57 2080.75   81.13 2106.39   81.06
 2139.35   81.27 2141.18   81.53    2154   81.96  2183.3   82.04 2186.96   82.25
 2210.76   82.17 2232.73   82.29 2252.88   82.72 2269.36   82.71 2285.84   82.38
 2305.98   81.82 2316.97   82.19 2331.62    82.1 2362.75   82.67 2382.89   82.23
 2395.72   82.51 2401.21   82.33 2410.36   82.61 2423.18   82.18 2437.83   82.27
 2454.31   82.11 2472.63   81.77 2501.92   81.81 2545.88   81.68 2560.52   81.54
 2571.51   82.61 2595.32   82.99 2637.44   82.85 2666.74   82.84 2697.87   82.71
 2705.19   82.82 2750.97   82.74 2754.63   82.82 2796.75   82.64  2816.9   82.32
 2828.49   82.31 2838.87   81.94 2859.97   81.45 2888.31   81.24 2941.42   81.38
 2954.38   81.19 2979.87   80.04 2998.19   79.08 3031.15   77.98 3054.95   77.31
 3102.56   76.52 3119.03    76.6 3173.87    76.5 3208.61   76.64 3228.71   76.58
 3246.99   76.71  3279.9   77.61  3325.6    79.7  3363.6   82.03 3378.61   82.72
 3389.58   82.84 3411.52   82.83 3440.77   82.68 3524.86   82.46 3550.45   82.18
 3554.11   82.03  3566.9   82.41 3570.56   81.54 3576.05   80.97 3590.67    81.3
 3596.15   81.13 3630.86 81.5599 3665.62   82.12 3678.42   82.82 3683.25    82.3
 3692.92   80.57 3719.51   77.97 3721.93    77.4 3726.77   75.19 3734.02   71.08
3742.4667.79562 3746.11   66.99    3765   61.67 3769.18    60.8 3778.03   60.15
 3796.96   57.03 3814.14   56.44 3820.77   56.03 3828.88      56 3843.61   55.61
 3853.38   56.08 3861.54   55.99 3862.82   59.89 3868.62   60.84 3877.33    63.4
3891.0666.10242 3909.28   68.82 3915.09   68.47  3923.8   66.46 3929.61   66.35
 3938.33   67.57 3941.23   68.32 3955.9467.95394 3958.16      68 3958.28   71.21
 3962.04   71.31 3965.78   72.19 3973.28   74.96 3980.79    76.4  3987.7   77.11
 4005.12   79.74 4010.93   81.33 4016.74   82.48 4029.56   83.87 4037.07   84.37
 4045.05   84.03 4070.99   84.02 4094.93   83.87 4120.87   83.59  4148.8    83.5
 4186.71   83.65 4218.63   83.52 4240.58   83.28 4298.44   82.95 4312.41    82.8
 4344.33   82.76 4414.16   82.33 4424.14   82.46 4510.06   82.24 4540.05   82.24
 4562.04   82.13 4606.02   82.26 4610.02   82.19 4624.01    82.6    4656   82.63
 4703.98   82.83 4765.93    82.9 4810.43   83.96 4845.92   83.99 4871.91    83.9
 4913.89   84.02 4969.87    84.1 4985.86   84.17 5025.85   84.11 5047.84    84.2
 5107.81   84.05 5127.81   84.15  5145.8   84.09 5201.77    84.1 5223.77   83.93
 5235.76   84.01 5263.75   83.82 5315.73   83.81 5355.72   83.67  5383.7   83.43
 5409.69   83.05 5419.68   83.07 5457.67   82.54 5493.66   82.17 5509.65    82.1
 5523.65   81.84 5575.62   81.69 5605.61    81.8 5619.61    81.7 5653.59    81.7
 5719.56   81.92 5727.56   81.87 5755.55   82.14 5807.53   82.44 5835.52   82.51
 5843.51   82.93 5853.51   84.42  5859.5   84.06  5865.5   83.15  5873.5   84.18
 5887.49   83.97 5895.49   84.74 5911.48    84.2 5917.48   83.72 5947.46   83.51
 5999.44   83.57 6013.44   83.66 6045.42    83.5 6059.42   83.56 6171.37   83.58
 6197.36   83.66 6207.35    84.1 6227.34   84.35 6239.34   83.76 6261.33   83.54
 6285.32   83.59  6315.3   83.48  6339.3   83.51 6373.28   83.38 6389.27   83.42
 6435.25   83.33 6449.25   83.37 6491.23   83.21 6513.22   83.28 6541.21   83.12
 6597.18   83.04 6617.17   83.15 6649.16   83.18 6663.15    83.1 6713.13   83.25
 6741.12   83.12 6787.09   83.03 6845.07   83.07 6867.06   83.03 6901.05   83.21
 6983.01    83.2 7001.01   83.14 7018.99   83.26 7042.99   83.22 7076.97   82.94
 7114.95   82.85 7146.94   82.52 7158.93   82.08 7168.93   82.16 7222.91   81.06
 7252.89   80.83 7496.78   80.73 7500.78   80.82 7514.78   82.15 7530.77   83.22
 7544.76   83.78 7560.76   84.21 7580.75   84.25 7600.74   84.16 7614.73   83.83
 7616.73   84.33 7622.73   83.95 7642.72   84.09 7712.69   83.81 7732.68   83.86
 7762.67   83.79 7786.66   83.65 7804.65   83.69 7836.64   83.52 7862.62   83.64
 7878.62   83.34 7896.61   83.25  7910.6   83.33 7972.58   83.15 8002.56   83.29
 8010.56   83.92 8020.56   83.58 8026.55   83.82 8034.55   83.28 8052.54   83.09
 8080.53   83.19 8102.52   83.08 8128.51   83.33  8134.5   82.94  8142.5   83.32
  8148.5   83.21 8156.49   83.48 8172.49   83.07 8186.48   83.13 8200.47   82.91
 8216.47   82.95 8226.46    82.7 8240.46   82.65 8254.45   82.81 8288.43   82.66
 8338.41   82.93  8350.4   82.75  8366.4   82.77 8382.39   83.55 8394.38   83.09
 8404.37   82.93 8426.37    82.9 8434.36   82.69 8446.36   82.75 8452.35   83.18
 8458.35   82.74 8474.34   83.03 8484.34   82.67 8490.33   82.92 8516.32   82.76
 8526.31   82.95  8544.3   82.91  8554.3   82.57 8566.29   82.45 8588.28   82.68
 8594.28   82.25 8604.27   82.89 8614.27   82.89 8620.27   82.61 8634.26   82.45
 8642.25   82.57 8658.24    82.4 8680.24   82.71 8690.23   82.48 8698.22    82.9
 8706.22   82.49 8716.21   82.82 8732.21   82.43  8746.2   82.58 8762.19   82.39
 8780.18   82.56 8802.17   82.46 8826.16   82.73 8840.15   82.62 8846.15   82.79
 8856.14   82.34 8868.14   82.65 8878.13   82.52 8896.12   82.71 8912.12   82.59
 8930.11   83.42  8942.1    82.8 8950.09   82.72 8960.09   82.99 8972.08   82.79
 8990.07   83.03 8996.07   82.65 9014.06   83.16 9034.05   82.87 9040.05   82.55
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 9046.05    82.8 9058.04   82.39 9066.03   82.56 9070.03   83.26 9078.03   85.97
 9086.02   87.93 9090.02   88.51 9108.02   92.12 9114.57   89.55 9175.24   89.55
 9180.16   89.79 9185.08   92.45 9188.36   92.91 9196.55   92.57 9201.47    91.7

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .118 3678.42    .066 3742.46    .015 3955.94    .066 4037.07    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3678.42 4037.07           439.55  1691.6 1780.35             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3678.42   82.82       T
 4037.07 9201.47   84.37       T
Left Levee      Station=   42.65      Elevation=   97.94
Right Levee     Station=9108.016      Elevation=   92.12
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  736.67 3389.58   82.72

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 133.38*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   86.21    4.77   87.49   14.31   89.13   31.02    94.2   39.5597.48146
   45.33   98.06   52.49   97.91   73.32   92.34   80.26   89.86   89.52   88.39
   98.78   85.59  108.03    84.5  117.29   84.29  128.87   83.06  138.12   82.75
  149.69   82.99  154.32   82.75  165.89   83.22  172.84   82.64  189.03   83.72
  195.98   83.43  200.61   84.24  205.24   84.24  212.18   84.99  219.12    86.2
  226.06   86.04   230.7   86.58  246.89   86.94  272.35   86.64  276.98   86.42
  309.38   85.78  323.27   85.61  362.61   84.91   376.5   84.57  411.21   83.92
  422.78   83.78   441.3   83.86  459.81   83.53  478.33   83.59  494.53    83.3
  503.79   83.42  536.18   83.15   554.7   83.27  570.91   83.12  591.73   83.22
  605.62   83.05  626.45   83.24  631.07   83.14  661.16   83.18  681.99   83.06
  700.51   83.25  723.65   83.01  730.59   83.16  744.48   83.11  758.37   82.76
  767.62   82.79  776.88   83.11  797.71   83.41  828.29   83.47  843.99   83.33
  853.26   82.91   860.2   83.59  881.03   83.13   892.6   82.27  897.23    80.9
  904.17   80.29  906.48   80.68  911.11   83.01  915.74   84.11  920.37    83.6
  929.63   83.87  943.51   82.77  948.15   81.89  959.72   81.38  964.34   81.58
   973.6   80.86  982.86   81.67  992.12   79.97 1008.31   79.63 1019.89   78.98
 1029.15   78.77  1038.4    79.2 1045.34   78.87 1075.43   78.91 1087.01   79.24
 1105.52   78.78 1126.35   78.62 1142.55   78.72 1163.38   78.61 1198.09   78.74
 1207.35   78.67 1251.33    78.7 1260.58   78.84 1269.84   78.71  1295.3   78.95
 1302.24   78.89 1330.01   79.06  1360.1   79.03 1383.25    79.2 1415.65   79.15
  1424.9    79.3 1438.79   79.26  1473.5   79.52 1480.44   79.65 1501.27   79.49
 1512.84    80.3 1526.73   80.29 1535.99   79.74 1540.62      81 1545.25   82.94
 1547.56   83.36 1559.14   83.51  1570.7   83.25 1577.65   83.34 1630.88   83.15
 1647.08    83.2 1679.48   83.07 1684.11   82.88  1700.3   82.93 1718.82   83.39
 1744.28   83.32 1748.91   83.45 1769.73    83.2 1792.88   83.42 1853.05   83.27
 1862.31    83.4 1878.51   83.31 1887.77   83.51 1901.65   83.39 1922.48   83.42
 1950.25   83.16 1975.71   83.25  2005.8   83.13 2017.37   83.22 2056.71   83.19
 2082.17   83.06 2142.34   83.08 2160.86    82.7  2167.8   82.96 2172.43   82.74
 2179.37   81.24    2184   81.06 2197.88   81.58 2221.03   81.87 2239.54   81.89
 2253.43   81.69 2269.63   82.05 2306.66   81.98 2341.37   81.35 2357.58   81.27
 2366.83   81.46  2378.4      81 2403.86   81.42 2417.74   81.51 2436.26   82.25
 2459.44   82.36 2466.35   81.93 2489.49   81.93 2501.07   81.59 2514.95   80.91
 2535.78   80.75 2554.29   80.84 2568.17   80.61 2579.75   80.82 2595.95   80.76
 2609.84   82.02 2614.47   81.44 2628.35   80.85 2656.12   80.83 2660.75   80.74
 2681.58   80.96 2690.84   80.85 2702.41   80.99 2704.72   81.34 2720.93    81.9
 2739.44   82.02 2757.95   81.98 2762.58   82.27 2792.67   82.14 2820.44   82.29
  2845.9   82.84 2866.73    82.8 2887.55   82.34 2903.76   81.69 2913.01   81.56
  2926.9   82.03 2945.41   81.89 2954.67   82.13 2984.76   82.61 2998.65   82.13
 3010.22   82.02 3026.42   82.39 3033.36   82.15 3044.93   82.51 3061.14   81.93
 3079.65   82.05 3095.85   81.78 3100.48   81.85 3123.62   81.41 3160.65   81.49
  3216.2   81.34 3234.71   81.16 3239.35   81.36  3248.6   82.59 3278.69   83.09
 3331.92   82.94 3368.95   82.96 3408.29   82.82 3417.55   82.96 3475.41   82.85
 3480.04   82.97 3533.61   82.81 3558.73   82.51 3579.56   82.48 3605.02   82.01
 3648.99   81.77 3655.93   81.87 3676.77   81.77 3686.02   81.91 3706.85   81.81
 3716.11   81.98 3729.99   81.87 3757.77   81.15 3764.71   81.08 3787.85   80.35
 3792.48   80.37 3829.52   79.62 3878.12   78.96 3898.95   78.85 3905.89   78.66
 3940.58   78.72 3952.13   78.61 3982.17    78.6 3998.34    78.7 4009.89   78.56
 4053.79   78.73  4079.2   78.63 4083.83   78.75 4102.31   78.72  4123.1   79.08
 4143.89    79.3 4155.45   79.66 4201.66   80.68 4249.69   82.23 4268.66   82.74
 4310.25   82.77 4347.21   82.61 4365.69   82.67 4386.49   82.49 4453.49   82.37
 4485.84   81.97 4490.46   81.77 4502.01   81.96 4506.63   82.26 4511.25    81.1
 4518.18   80.34 4536.67   80.76 4543.59   80.52 4559.77   80.61 4566.71   80.89
 4587.4781.02998 4605.98   81.36  4610.6   81.29 4631.39   81.65 4647.56   82.55
 4660.34    80.8 4665.51   80.39 4670.99   79.35 4683.77   77.41 4690.16   75.11
 4696.55    71.8 4702.94   69.15 4706.64 68.1666 4723.85   62.45 4728.33   61.51
 4732.82   61.32  4738.3   60.32    4752    57.2 4772.98   56.01 4793.11   55.49
 4802.45   55.94 4810.27   55.92  4811.5   58.53 4817.05   59.18  4825.4   60.91
 4836.53   62.65 4843.6963.45807    4856   64.64 4861.55   64.33  4869.9   62.91
 4875.46   62.91 4886.59   64.29 4902.81   64.18 4902.92   68.46 4903.54  68.479
 4906.51   68.57  4910.1   69.73 4917.29   73.38 4924.47   75.34 4931.09   76.31
 4947.78    79.4  4958.9   81.95 4971.18   83.78 4978.37   84.22 4984.65   83.98
 5005.05   83.93 5044.28   83.57 5066.25   83.46 5096.06   83.51 5121.17   83.37
 5147.85   83.09 5194.93   82.74 5220.03   82.66 5259.26   82.36  5282.8   82.39
 5391.26   82.19    5429   82.24    5440   82.52  5502.9   82.68 5551.62   82.74
 5586.62   84.05 5634.97      84 5712.02    84.1 5756.04   84.09 5773.34   84.15
 5820.51   84.03 5836.24   84.09 5894.41   84.04 5943.16   83.84 5984.04   83.81
 6015.49   83.71  6037.5   83.55 6057.94   83.28  6065.8    83.3 6095.68   82.93
 6147.57   82.45 6188.45   82.33 6212.03   82.39 6249.77   82.31 6301.65   82.44
 6370.84   82.77 6392.85    82.8 6399.14   83.08    6407   84.07 6416.43   83.22
 6422.72   83.91 6433.73   83.77 6440.02   84.28 6457.32   83.59  6480.9   83.44
 6532.79   83.52 6557.94   83.41  6600.4   83.45    6657   83.42 6677.44   83.47
  6685.3   83.76 6701.02   83.93 6710.46   83.53 6727.75   83.37 6746.62    83.4
 6789.08   83.34  6815.8   83.24 6875.55   83.21 6908.57    83.1 6925.87   83.13
 6947.88   83.02  6991.9   82.95 7032.78   83.03 7043.79   82.97 7083.09   83.06
 7141.27   82.89 7204.17   82.87 7230.89   82.98 7342.53   82.95 7369.26   82.75
 7399.13   82.68 7424.29   82.46 7433.72   82.16 7441.58   82.21 7484.04   81.46
 7507.62    81.3 7699.44   81.16 7726.17   82.82 7749.76   83.47  7781.2   83.42
 7792.21    83.2 7814.22   83.36 7869.25   83.16 7908.56   83.13 7966.74   82.93
 7987.17      83 7999.75    82.8 8073.65   82.65 8097.24   82.73 8103.53   83.15
  8116.1   83.08 8122.39   82.72 8136.54   82.59 8158.56   82.64 8175.85   82.56
 8196.29   82.72 8201.01   82.46  8218.3   82.82 8230.88   82.54 8265.47   82.45
 8273.34   82.28 8295.35   82.34 8322.07   82.23 8361.38    82.4 8383.39   82.28
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8395.97	82.8	8413.26	82.38	8446.28	82.25	8451	82.53	8455.71	82.24
8468.29	82.43	8476.15	82.19	8480.87	82.35	8501.3	82.24	8523.31	82.33
8540.61	82.01	8557.91	82.17	8562.62	81.88	8570.48	82.3	8594.06	82
8612.93	81.96	8630.23	82.16	8638.08	82.01	8644.38	82.28	8650.67	82.01
8658.52	82.24	8671.1	81.99	8682.11	82.1	8694.69	82	8708.83	82.12
8726.13	82.08	8760.72	82.33	8768.58	82.04	8778.01	82.26	8800.02	82.33
8812.6	82.26	8826.75	82.83	8836.18	82.42	8850.33	82.57	8859.76	82.45
8873.92	82.62	8878.63	82.38	8892.78	82.73	8917.94	82.52	8927.37	82.25
8933.66	82.38	8936.8	82.85	8944.8	84.95	8966.68	92.03	8971.05	90.32
9011.49	90.32	9014.77	90.47	9018.05	92.25	9025.7	92.33	9028.98	91.75

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.118	4647.56	.066	4706.64	.015	4843.69	.066	4978.37	.067

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4647.56	4978.37	439.55	1691.6 1780.35	.1	.3

Left Levee Station=45.92667 Elevation=98.09334
Right Levee Station=8966.677 Elevation=92.02666
Blocked Obstructions num= 1

Sta L	Sta R	Elev
797.48	4268.5	82.32

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 133.07*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.87	5.67	85.38	17	87.23	36.83	93.31	47.7997.72109	
53.83	98.09	62.33	97.88	65.13	97.38	73.52	94.66	79.12	93.35
87.51	90.92	95.9	87.83	107.1	85.99	118.28	82.49	129.47	81.13
140.66	80.91	154.65	79.48	165.84	79.18	179.83	79.58	185.42	79.33
199.41	80.09	207.8	79.46	227.38	81.04	230.18	80.69	235.78	80.78
241.37	81.85	246.97	81.91	255.36	82.96	263.75	84.55	272.14	84.43
277.74	85.17	297.32	85.81	328.1	85.74	333.69	85.52	356.07	85.33
372.86	85.07	409.23	84.84	437.19	84.54	440	84.63	453.98	84.26
473.56	84.09	495.95	83.77	509.93	83.69	532.32	83.95	554.69	83.69
560.29	83.91	577.08	83.88	596.65	83.6	607.85	83.79	647.01	83.57
669.39	83.72	688.98	83.53	714.15	83.66	730.93	83.44	756.11	83.69
761.71	83.56	798.08	83.6	823.26	83.45	840.04	83.49	845.63	83.69
865.22	83.57	873.61	83.38	882	83.56	893.19	83.36	898.79	83.49
915.57	83.06	926.76	83.08	937.95	83.49	963.13	83.85	985.51	83.79
999.5	83.92	1013.48	83.68	1019.08	83.74	1030.27	83.21	1038.66	84.06
1047.05	83.74	1063.84	83.49	1075.03	82.79	1077.83	82.42	1083.42	80.7
1091.81	79.94	1094.61	80.42	1100.21	83.34	1105.81	84.72	1111.4	84.08
1122.59	84.41	1139.37	83.03	1144.97	81.94	1153.36	81.72	1158.96	81.3
1164.55	81.55	1175.74	80.65	1178.54	81.15	1186.94	81.66	1198.12	79.53
1217.7	79.12	1220.5	78.78	1231.7	78.31	1242.88	78.04	1254.07	78.59
1262.46	78.17	1298.83	78.24	1312.82	78.65	1321.21	78.54	1335.2	78.09
1360.38	77.9	1379.96	78.02	1405.14	77.87	1447.1	78.01	1458.29	77.94
1511.45	77.98	1522.64	78.15	1533.82	77.99	1564.6	78.29	1572.99	78.22
1606.56	78.43	1642.93	78.4	1670.91	78.61	1710.07	78.55	1721.26	78.73
1738.04	78.68	1780.01	79.02	1788.4	79.18	1813.58	78.98	1827.56	80
1844.35	79.98	1852.74	79.21	1855.54	79.3	1861.13	80.88	1866.73	83.29
1869.52	83.83	1883.52	84.01	1897.5	83.68	1905.89	83.79	1928.28	83.64
1936.67	83.73	1970.24	83.55	1989.82	83.6	2028.98	83.43	2034.58	83.19
2042.97	83.36	2054.16	83.25	2076.54	83.82	2107.32	83.73	2112.91	83.9
2124.1	83.66	2138.08	83.57	2166.06	83.85	2202.43	83.8	2216.41	83.67
2238.8	83.68	2261.17	83.86	2269.56	83.72	2280.76	83.97	2297.54	83.82
2322.72	83.85	2356.29	83.52	2387.06	83.63	2392.65	83.52	2423.43	83.47
2437.41	83.58	2448.6	83.45	2457	83.55	2484.97	83.54	2515.74	83.38
2588.48	83.41	2610.86	82.94	2619.25	83.28	2624.85	82.99	2633.24	81.13
2638.84	80.9	2655.62	81.55	2683.59	81.9	2705.97	81.92	2722.76	81.67
2742.34	82.11	2770.32	82.08	2778.71	81.91	2787.1	82.01	2829.06	81.22
2848.65	81.11	2859.84	81.34	2873.82	80.77	2885.01	80.84	2904.6	81.28
2921.38	81.39	2943.76	82.3	2971.77	82.44	2980.13	81.91	3008.1	81.9
3013.69	81.55	3022.09	81.49	3030.48	80.93	3038.87	80.64	3047.27	80.68
3064.06	80.45	3086.43	80.55	3103.21	80.28	3117.21	80.54	3125.6	80.37
3136.78	80.46	3142.38	80.86	3147.97	81.67	3153.57	82.04	3159.17	81.31
3167.56	80.79	3175.95	80.57	3209.52	80.54	3215.12	80.41	3240.3	80.69
3251.48	80.55	3265.47	80.72	3268.27	81.15	3287.85	81.85	3299.04	81.8
3310.23	81.99	3332.61	81.93	3338.21	82.28	3374.57	82.12	3408.14	82.29
3422.13	82.5	3438.91	82.96	3450.1	83.03	3464.09	82.9	3480.88	82.39
3489.27	82.29	3508.85	81.46	3520.04	81.29	3536.82	81.87	3559.21	81.68
3570.39	81.97	3606.76	82.54	3623.55	81.95	3637.54	81.8	3657.13	82.26
3665.52	81.96	3679.5	82.42	3699.09	81.69	3707.48	81.63	3721.46	81.84
3741.05	81.49	3746.64	81.58	3774.62	81.05	3802.6	81.05	3819.38	81.18
3886.53	81.01	3892.12	81.07	3908.9	80.77	3914.5	81.02	3925.69	82.56
3945.27	82.98	3962.06	83.19	4026.41	83.03	4032	83.17	4045.98	83.05
4071.17	83.09	4118.72	82.92	4129.91	83.1	4160.68	83	4199.85	82.97
4205.44	83.12	4241.81	83.08	4300.57	82.7	4306.16	82.82	4325.74	82.77
4334.14	82.54	4345.33	82.64	4356.51	82.44	4378.9	82.48	4409.67	82.29
4418.06	82.43	4443.24	82.3	4454.43	82.48	4471.21	82.48	4479.61	82.35
4490.8	82.57	4499.19	82.41	4507.58	82.51	4541.15	82.08	4549.54	82.11
4577.52	81.63	4583.12	81.73	4611.09	81.46	4619.48	81.5	4627.88	81.25
4655.85	81.19	4664.24	81.03	4678.24	81.08	4686.63	80.9	4711.81	80.92
4720.2	80.73	4731.39	80.91	4736.98	80.73	4762.14	80.84	4776.1	80.7
4781.68	80.83	4792.85	80.69	4812.41	80.68	4831.95	80.8	4845.92	80.62
4898.98	80.81	4929.7	80.68	4935.28	80.83	4957.62	80.74	4982.76	80.98
5007.89	80.98	5021.86	81.25	5077.71	81.67	5086.1	81.86	5127.98	82.29
5158.71	82.75	5167.08	82.59	5175.46	82.77	5186.63	82.67	5208.97	82.72
5220.14	82.62	5253.66	82.54	5276	82.62	5287.17	82.47	5345.82	82.37
5354.2	82.26	5382.13	82.28	5421.22	81.76	5426.81	81.5	5440.77	81.73
5446.35	82.11	5451.94	80.66	5460.32	79.7	5482.66	80.21	5491.04	79.92
5510.59	80.01	5518.97	80.36	5530.14	80.51	5544.0980.50001		5566.44	80.88
5572.03	80.77	5588.79	81.15	5597.17	81.19	5608.34	81.69	5616.71	82.28
5632.24	80.66	5649.87	76.37	5666.1669.76344		5682.69	63.23	5686.57	62.33
5690.46	62.14	5695.2	61.03	5707.05	57.36	5718.9	56.3	5742.6	55.36
5753.08	55.85	5759	55.86	5760.17	57.16	5765.49	57.51	5784.1	59.48
5796.3360.39533		5808.02	60.2	5815.99	59.37	5821.31	59.47	5831.95	60.26
5847.45	60.35	5847.55	65.71	5850.99	65.84	5854.42	67.27	5861.29	71.81
5868.16	74.27	5881.89	77.07	5888.77	78.76	5901.06	81.42	5912.8	83.7
5919.67	84.08	5983.69	83.43	6005.42	83.36	6077.44	82.67	6124.31	82.3
6141.46	82.32	6220.48	82.26	6245.68	82.32	6255.99	82.44	6337.31	82.58
6362.81	84.15	6398.04	84.09	6463.33	84.12	6498.85	84.1	6533.21	84.01
6587.05	83.98	6622.56	83.85	6675.26	83.75	6711.91	83.52	6771.48	83.05
6835.63	82.93	6883.75	82.97	6950.19	83.1	6960.5	83.73	6967.37	83.3

6971.95	83.64	6979.97	83.56	6984.55	83.81	6997.15	83.46	7014.33	83.37
7052.14	83.39	7078.48	83.33	7157.52	83.29	7174.7	83.5	7194.18	83.21
7340.8	82.96	7386.62	82.86	7453.06	82.87	7495.44	82.75	7541.27	82.71
7560.74	82.75	7642.07	82.68	7701.63	82.39	7745.17	81.86	7762.35	81.76
7902.1	81.6	7921.57	82.41	7938.75	82.72	7961.66	82.68	7969.68	82.56
7985.72	82.64	8120.89	82.26	8174.73	82.14	8191.91	82.17	8196.49	82.38
8220.55	82.08	8249.19	82.05	8264.08	82.12	8267.51	81.98	8280.11	82.15
8289.28	82.01	8320.21	81.85	8355.72	81.81	8384.35	81.87	8400.39	81.8
8409.55	82.05	8422.15	81.83	8453.08	81.74	8462.24	81.83	8486.29	81.72
8502.33	81.75	8514.93	81.58	8536.69	81.71	8567.62	81.52	8590.53	81.66
8610	81.56	8650.09	81.69	8675.29	81.88	8713.09	81.93	8723.4	82.24
8730.27	82.05	8771.5	82.3	8796.7	82.12	8803.57	82.43	8809.4	83.5
8825.34	91.93	8827.52	91.08	8847.75	91.08	8851.03	92.04	8856.49	91.79

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.118	5544.09	.066	5666.16	.015	5796.33	.066	5919.67	.067

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5616.71 5919.67 439.55 1691.6 1780.35 .1 .3
Left Levee Station=54.12834 Elevation=98.10667
Right Levee Station=8825.338 Elevation=91.93333
Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
74.58	1881.81	84.05	2558.81	3964.43	83.09	3975.9	3987.38	83.27
4893.86	5622.49	75.33						

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 132.75

INPUT
Description: Cross-Section data supplemented on the right by IBWC cross-section 132.75 from station 6897. 6897=7001-140 feet (the approximate difference at the relative bank stations). Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.53	6.56	83.26	19.68	85.33	42.65	92.43	55.77	97.87
62.33	98.12	72.17	97.85	75.46	97.25	85.3	93.99	91.86	92.42
101.7	89.5	111.54	85.79	124.67	83.59	131.23	81.69	137.79	79.39
144.35	78.38	150.91	77.76	164.03	77.54	180.44	75.9	193.56	75.61
209.96	76.17	216.52	75.92	232.93	76.96	242.77	76.28	246.05	76.82
252.61	77.08	265.73	78.36	269.01	77.97	275.58	78.12	282.14	79.46
288.7	79.59	298.54	80.92	308.38	82.9	318.22	82.82	324.79	83.75
347.75	84.68	364.15	84.69	383.84	84.84	390.4	84.62	416.65	84.55
436.33	84.35	456.01	84.38	478.98	84.33	511.78	84.17	515.07	84.3
531.47	83.95	554.43	83.88	580.68	83.62	587.24	83.8	597.08	83.6
623.33	84.04	649.57	83.85	656.13	84.14	675.82	84.18	698.78	83.9
711.91	84.16	738.15	84.12	757.83	83.99	764.4	84.12	784.08	84.17
807.05	83.94	836.57	84.1	856.25	83.84	885.78	84.13	892.34	83.98
934.99	84.03	964.52	83.85	984.2	83.89	990.76	84.13	1013.73	83.98
1023.57	83.75	1033.41	83.97	1046.53	83.72	1053.1	83.88	1072.78	83.35
1085.9	83.38	1099.02	83.86	1128.55	84.29	1131.83	84.19	1154.8	84.21
1171.2	84.36	1187.6	84.07	1194.16	84.15	1207.29	83.51	1217.13	84.53
1226.97	84.15	1240.09	84.07	1246.66	83.85	1259.78	83.01	1263.06	82.56
1269.62	80.5	1279.46	79.59	1282.74	80.17	1289.3	83.67	1295.87	85.32
1302.43	84.55	1315.55	84.95	1335.23	83.3	1341.8	81.99	1351.64	81.72
1358.2	81.22	1364.76	81.52	1371.32	80.81	1377.88	80.44	1381.16	81.04
1391.01	81.65	1400.85	79.54	1404.13	79.1	1427.09	78.6	1430.37	78.2
1443.5	77.63	1456.62	77.32	1469.74	77.98	1479.58	77.48	1492.71	77.42
1502.55	77.56	1522.23	77.57	1538.64	78.07	1548.48	77.94	1564.88	77.4
1594.41	77.17	1617.37	77.33	1646.9	77.14	1696.11	77.29	1709.23	77.2
1771.57	77.25	1784.69	77.46	1797.81	77.27	1833.9	77.63	1843.74	77.54
1883.11	77.8	1925.76	77.76	1958.57	78.02	2004.5	77.95	2017.62	78.17
2037.3	78.11	2086.51	78.52	2096.35	78.71	2125.88	78.47	2135.72	79.02
2142.28	79.69	2161.97	79.67	2171.81	78.75	2175.09	78.86	2181.65	80.75
2188.21	83.65	2191.49	84.29	2194.77	84.2	2207.9	84.51	2224.3	84.11
2234.14	84.24	2260.39	84.06	2270.23	84.16	2309.6	83.94	2332.56	84
2355.52	83.93	2358.81	83.81	2378.49	83.79	2385.05	83.5	2394.89	83.7
2408.01	83.57	2434.26	84.25	2470.35	84.14	2476.91	84.34	2490.03	84.06
2506.43	83.95	2539.24	84.28	2549.08	84.1	2555.64	84.23	2581.89	84.23
2598.29	84.07	2624.54	84.09	2637.66	84.28	2650.78	84.3	2660.62	84.14
2673.75	84.44	2693.43	84.25	2699.99	84.34	2722.96	84.29	2762.32	83.89
2778.73	84.02	2798.41	84.01	2804.97	83.88	2831.22	83.9	2841.06	83.82
2857.46	83.95	2870.58	83.79	2880.43	83.91	2913.23	83.89	2919.79	83.78
2946.04	83.81	2949.32	83.7	2975.57	83.69	2982.13	83.78	3005.09	83.74
3011.65	83.84	3034.62	83.75	3060.86	83.19	3070.7	83.59	3077.27	83.25
3087.11	81.01	3093.67	80.74	3113.35	81.51	3123.19	81.73	3146.16	81.93
3172.4	81.95	3192.09	81.64	3215.05	82.17	3247.86	82.13	3257.7	81.92
3267.54	82.04	3280.66	81.89	3287.23	81.6	3316.75	81.08	3339.72	80.95
3352.84	81.22	3369.24	80.53	3382.36	80.62	3405.33	81.14	3425.01	81.27
3434.85	81.57	3451.26	82.36	3484.06	82.52	3493.91	81.88	3500.47	82
3513.59	81.82	3526.71	81.88	3533.27	81.46	3543.12	81.38	3552.96	80.72
3562.8	80.37	3572.64	80.42	3592.33	80.14	3605.45	80.11	3618.57	80.27
3638.25	79.94	3641.54	80.14	3654.66	80.26	3664.5	80.06	3677.62	80.17
3684.18	80.65	3690.74	81.61	3697.31	82.06	3703.87	81.18	3713.71	80.55
3723.55	80.29	3746.52	80.2	3762.92	80.24	3769.48	80.09	3799.01	80.41
3812.13	80.24	3828.53	80.44	3831.81	80.96	3854.78	81.79	3867.9	81.73
3881.02	81.95	3907.27	81.88	3913.83	82.3	3936.79	82.2	3953.2	81.98
3956.48	82.09	3995.84	82.29	4012.25	82.54	4031.93	83.08	4045.05	83.16
4061.46	82.99	4081.14	82.37	4090.98	82.25	4113.95	81.24	4127.07	81.03
4146.75	81.71	4173	81.47	4186.12	81.81	4215.65	82.21	4228.77	82.48
4248.46	81.76	4264.86	81.59	4277.98	82.01	4287.83	82.14	4297.67	81.78
4314.07	82.32	4337.04	81.45	4346.88	81.38	4363.28	81.62	4376.41	81.51
4386.25	81.21	4392.81	81.32	4405.93	81.03	4419.06	80.92	4425.62	80.69
4458.43	80.71	4478.11	80.87	4484.67	80.73	4501.08	80.82	4510.92	80.68
4524.04	80.77	4556.85	80.67	4563.41	80.74	4583.09	80.39	4589.66	80.69
4602.78	82.54	4625.74	83.04	4645.43	83.29	4691.36	83.21	4707.76	83.26
4720.89	83.12	4727.45	83.29	4743.85	83.15	4773.38	83.21	4783.22	83.05
4796.34	83.14	4829.15	83.03	4842.27	83.24	4878.36	83.12	4884.92	83.36
4891.48	83.14	4924.29	83.09	4930.85	83.27	4953.82	83.19	4973.5	83.25
4999.75	83.05	5006.31	83.17	5019.43	82.99	5042.4	82.89	5048.96	83.05
5071.92	83.06	5081.77	82.84	5094.89	83.04	5108.01	82.87	5134.26	83.02
5170.35	82.82	5180.19	82.98	5209.72	82.83	5222.84	83.04	5232.68	82.92
5242.52	83.04	5252.37	82.89	5265.49	83.17	5275.33	83	5285.17	83.15
5301.58	83	5311.42	83.13	5324.54	83.01	5334.38	83.15	5344.23	83
5367.19	82.9	5373.75	83.09	5406.56	82.99	5416.4	83.11	5426.25	82.88
5445.93	82.89	5459.05	83.04	5468.89	82.89	5485.3	83.02	5495.14	82.84
5514.83	82.86	5524.67	82.99	5534.51	82.81	5547.63	83.05	5554.19	82.84

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 5567.31   82.96 5573.86   82.81 5583.69   82.96 5600.06   82.79 5606.61   82.95
 5619.71   82.77 5642.64   82.76 5665.56    82.9 5668.84   82.71 5681.94   82.68
 5691.76   82.86 5698.31   82.74 5717.97   82.76 5744.17    82.9 5780.19   82.73
 5786.74   82.91 5812.94   82.75 5826.04   82.89 5842.42   82.88 5871.89   82.66
 5888.27   82.84 5934.12   82.68 5943.95   82.78 5953.77   82.65  5963.6   82.78
 5979.97   82.67 6012.72    82.6 6048.75   82.76 6058.57   82.54  6068.4   82.73
  6081.5   82.59  6107.7   82.66  6120.8   82.55  6160.1   82.47  6186.3   82.58
  6199.4    82.4 6205.95   82.56 6215.78   82.34 6228.88   82.46  6238.7   82.32
 6268.18    82.3 6278.01   82.17 6310.76   82.19 6317.31   81.97 6330.41   81.94
 6356.61   81.55 6363.16   81.24 6379.53   81.51 6386.08   81.96 6392.63   80.22
 6402.46   79.06 6418.83   79.53 6428.66   79.67 6438.48   79.31 6461.41   79.42
 6471.24   79.83 6484.34      80 6500.71   79.97 6526.91   80.39 6533.46   80.26
 6553.11   80.69 6562.94   80.72 6576.04   81.31 6585.86      82 6598.96   80.94
 6608.79   77.33 6618.61   74.47 6628.44   70.49 6634.99   67.06 6641.54   64.01
 6644.81   63.14 6648.09   62.96 6652.09   61.73 6662.09   57.53 6672.09   56.23
 6692.09   55.23 6702.09   55.73 6722.09   55.93 6742.09   56.73 6752.09   56.13
 6762.09   55.83 6772.09   56.23 6782.09   56.23 6792.09   56.53 6792.19   62.96
 6795.47    63.1 6798.74   64.81 6805.29   70.23 6811.84   73.21 6824.94   76.47
  6831.5   78.39 6841.32   80.42 6854.42   83.61 6860.97   83.93    6987   82.24
    7123   82.42    7139   84.24    8538   81.04    8674   82.04    8684   91.84

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .118 6500.71    .066 6634.99    .015 6798.74    .066    6987    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      6585.86 6860.97           755.05    1535 1364.62             .1       .3
Left Levee      Station=   62.33      Elevation=   98.12
Right Levee     Station=    8684      Elevation=   91.84
Blocked Obstructions     num=      3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   39.44 4642.25   83.29 6861.97 8946.48   84.04 8946.48 9211.27   83.99

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             93.32    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                 0.116      0.040     0.067
  W.S. Elev (ft)             93.17    Reach Len. (ft)           755.05    1535.00    1364.62
  Crit W.S. (ft)             86.81    Flow Area (sq ft)       64076.10    7672.54   16608.18
  E.G. Slope (ft/ft)      0.000250    Area (sq ft)            64076.10    7672.54   16608.18
  Q Total (cfs)           125000.00     Flow (cfs)             59577.11   40041.62   25381.28
  Top Width (ft)           8595.28    Top Width (ft)           6497.14     275.11    1823.03
  Vel Total (ft/s)            1.41    Avg. Vel. (ft/s)            0.93       5.22       1.53
  Max Chl Dpth (ft)          37.94    Hydr. Depth (ft)            9.86      27.89       9.11
  Conv. Total (cfs)       7907594.0     Conv. (cfs)             3768892.0   2533063.0   1605639.0
  Length Wtd. (ft)         1160.91    Wetted Per. (ft)         6499.97     290.45    1827.68
  Min Ch El (ft)             55.23    Shear (lb/sq ft)            0.15       0.41       0.14
  Alpha                       4.80    Stream Power (lb/ft s)      0.14       2.15       0.22
  Frctn Loss (ft)             0.27    Cum Volume (acre-ft)    26770.10   17483.47   26251.59
  C & E Loss (ft)             0.01    Cum SA (acres)           6551.63     901.11    5204.45


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 132.46*

INPUT
Description:
Station Elevation Data    num=     490
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   83.65    1.56   85.04   12.19   86.78    30.8   92.44   41.43   96.71
   46.75   96.99   54.87   96.57   57.58   96.04    65.7   93.36   71.12   91.97
   79.24   89.46   87.36   86.36    98.2   84.34  109.03   80.85  119.85   79.29
  130.68   78.87  144.23   77.37  155.05   77.05  168.59   77.41     174   77.22
  187.55   78.02  195.67   77.52  214.62   79.08  217.32   78.78  222.75   78.94
  228.16   79.96  233.57   80.03  241.69   80.98  249.82   82.41  257.94   82.39
  263.36   83.15  282.31   83.87  312.09   83.98  317.51   83.81  339.17   83.76
  355.41   83.62  390.61   83.58  417.68   83.48   420.4   83.58  433.93   83.32
  452.88   83.27  474.55   83.06  488.08   83.04  509.75   83.38   531.4   83.24
  536.82   83.46  553.07   83.49  572.02    83.3  582.85   83.49  620.75   83.34
  642.42   83.48  661.37   83.31  685.74   83.43  701.98   83.24  726.35   83.48
  731.76   83.37  766.96    83.4  791.34   83.25  807.58   83.29  812.99   83.47
  831.95   83.36  840.07   83.19  848.19   83.36  859.02   83.17  864.44   83.29
  880.68   82.89  891.51   82.89  902.34   83.26  926.71   83.59  948.38   83.53
  961.91   83.64  975.45   83.43  980.86    83.5   991.7   83.02  999.82   83.79
 1007.94   83.52 1024.19    83.3 1037.72   82.35 1043.14    80.8 1051.26   80.11
 1053.97   80.54 1059.38   83.16  1064.8   84.39 1070.22   83.81 1081.04   84.11
 1097.29   82.88 1102.71    81.9 1116.24   81.35 1121.66   81.57 1132.49   80.75
 1135.19   81.19 1143.32   81.64 1154.15   79.72  1173.1   79.35 1175.81   79.05
 1186.64   78.62 1197.47   78.39  1208.3   78.88 1216.42   78.51 1251.62   78.58
 1265.16   78.97 1273.28   78.88 1286.82   78.46 1311.19   78.29 1330.14   78.42
 1354.51   78.28 1395.12   78.39 1405.95   78.31  1457.4   78.39 1468.23   78.55
 1479.06    78.4 1508.84   78.66 1516.97    78.6 1549.46   78.79 1584.66   78.76
 1611.74   78.97 1649.64   78.94 1660.47    79.1 1676.71   79.04 1717.33   79.33
 1725.45   79.48 1749.82   79.31 1763.35   80.23  1779.6   80.23 1787.73   79.55
 1790.43   79.63 1795.85   81.05 1801.26   83.23 1803.97   83.71 1817.51   83.86
 1831.05   83.54 1839.17   83.63 1860.83   83.51 1868.95   83.58 1901.44   83.41
 1920.39   83.46  1958.3   83.32 1963.71   83.11 1971.84   83.26 1982.66   83.14
 2004.33   83.64 2034.11   83.56 2039.53   83.72 2063.89   83.45 2090.97    83.7
 2126.17   83.65  2139.7   83.53 2161.37   83.54 2183.02   83.71 2191.15    83.6
 2201.98   83.82 2218.22   83.66  2242.6    83.7 2275.08   83.42 2288.62   83.51
 2340.06   83.36  2353.6   83.48 2399.63   83.45 2405.04   83.36 2426.71   83.39
 2451.08   83.28 2480.85   83.41 2499.81   83.35 2521.47   82.93 2529.59   83.22
 2535.01   82.97 2543.13   81.29 2548.55   81.09 2564.79   81.68 2591.87   82.01
 2613.52   82.01 2629.77   81.79 2648.72   82.19  2675.8   82.15 2683.92   81.99
 2702.87   81.99 2708.29   81.77 2732.66   81.37 2751.61   81.27 2762.44   81.48
 2775.98   80.97 2786.81   81.04 2805.76   81.42 2822.01   81.52 2843.67   82.33
 2870.74   82.46 2878.87      82 2905.94      82 2911.35   81.69 2919.48   81.63
 2935.72   80.87 2943.85    80.9  2960.1   80.68 2981.75   80.77 2997.99   80.53
 3011.54   80.77 3019.66   80.62 3030.49   80.69 3041.31   81.79 3046.74   82.14
 3052.15   81.48 3060.27   81.01 3068.39   80.82 3100.89   80.78  3106.3   80.67
 3130.67   80.92  3141.5   80.81 3155.03   80.97 3157.74   81.36  3176.7      82
 3187.53   81.96 3198.36   82.12 3220.02   81.94 3225.43   82.22 3260.63   82.11
 3293.12   82.25 3306.66   82.45  3322.9   82.86 3333.73   82.93 3347.27   82.81
 3363.52   82.34 3371.64   82.25  3390.6   81.49 3401.42   81.34 3417.67   81.85
 3439.33   81.67 3450.16   81.94 3485.36    82.4 3501.61   81.91 3515.14   81.79
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3534.1	82.2	3542.22	81.91	3555.76	82.32	3574.71	81.67	3582.83	81.62
3596.37	81.8	3615.33	81.5	3620.74	81.59	3647.82	81.12	3674.9	81.13
3691.14	81.25	3756.13	81.13	3761.54	81.18	3777.78	80.91	3783.2	81.13
3794.03	82.51	3812.98	82.9	3829.23	83.09	3866.72	83.01	3896.92	83.08
3910.46	82.96	3934.83	83	3980.86	82.9	3991.69	83.06	4021.47	82.95
4059.38	82.95	4064.79	83.09	4099.99	83.09	4121.66	82.91	4156.85	82.77
4162.27	82.89	4181.22	82.91	4189.35	82.75	4200.18	82.91	4211	82.79
4232.67	82.88	4262.45	82.73	4270.57	82.86	4294.95	82.75	4305.77	82.91
4330.15	82.82	4340.97	83.01	4349.09	82.88	4357.22	83	4370.76	82.9
4397.83	83.02	4424.91	82.85	4430.32	82.99	4457.4	82.89	4465.52	82.99
4473.65	82.82	4489.89	82.84	4500.72	82.98	4508.84	82.87	4522.39	82.95
4530.51	82.81	4554.88	82.92	4563	82.78	4573.83	82.96	4579.24	82.8
4603.78	82.89	4617.1	82.77	4622.5	82.89	4652.24	82.74	4671.16	82.85
4684.67	82.68	4736.03	82.85	4765.76	82.73	4771.17	82.87	4792.79	82.77
4817.12	82.87	4841.44	82.7	4854.96	82.83	4909.02	82.69	4917.13	82.79
4957.67	82.64	4987.41	82.76	4995.51	82.6	5003.62	82.74	5014.44	82.64
5036.06	82.67	5046.87	82.59	5079.31	82.54	5100.93	82.66	5125.26	82.49
5168.51	82.43	5176.62	82.33	5203.65	82.35	5241.49	81.88	5246.89	81.65
5260.4	81.87	5265.81	82.21	5271.21	80.91	5279.33	80.03	5300.95	80.47
5309.06	80.19	5327.98	80.29	5336.09	80.6	5360.41	80.69	5382.04	81.04
5387.44	80.95	5411.77	81.35	5422.59	81.88	5430.69	82.51	5444.13	81.02
5454.22	77.39	5464.3	74.48	5476.41	69.57	5482.5	65.79	5485.55	64.38
5491.18	62.61	5494.55	62.09	5498.65	60.69	5508.91	56.67	5519.17	55.5
5539.69	54.6	5549.87	55.02	5565.21	55.11	5583.1	55.6	5595.26	56.19
5605.26	56.22	5606.92	57.63	5618.1	57.96	5626.47	59.97	5629.27	60.32
5637.71	60.05	5648.33	60.29	5648.43	65.11	5651.92	65.25	5655.39	66.56
5662.34	70.72	5669.29	73.03	5673.95	73.96	5690.71	78.12	5700.58	79.74
5714.48	82.3	5721.43	82.54	5730.85	82.48	5740.27	81.97	5768.52	81.83
5787.36	82.02	5796.77	81.96	5815.61	82.08	5834.44	82.01	5872.12	82
5922.94	81.72	6022.8	81.74	6060.47	81.7	6126.39	81.75	6140.38	81.72
6165.96	83.07	6229.99	82.92	6239.41	83.03	6258.24	83.03	6267.66	83.93
6314.75	83.89	6361.83	83.77	6399.51	83.75	6427.76	83.66	6521.94	83.47
6550.19	83.45	6569.02	83.36	6653.78	83.39	6700.87	83.35	6795.05	83.18
6823.3	82.99	6842.14	82.76	6860.97	82.66	6917.48	82.56	6936.31	82.6
6983.4	82.51	7049.33	82.55	7105.83	82.49	7115.25	82.55	7143.5	82.96
7200.01	82.99	7228.26	82.82	7294.19	82.71	7369.53	82.54	7463.7	82.6
7482.54	82.7	7491.96	80.76	7510.79	80.24	7557.88	80.24	7623.8	80.17
7652.06	80.27	7661.47	80.84	7670.89	80.83	7680.31	82.43	7699.15	82.43
7708.56	82.2	7727.4	82.18	7736.82	81.66	7746.23	81.56	7783.9	81.52
7793.32	81.96	7802.74	81.18	7812.16	81.17	7830.99	80.67	7840.41	80.89
7859.25	80.82	7878.08	80.87	7887.5	81.08	7896.92	80.53	7925.17	80.57
7934.59	80.88	7953.42	80.98	7962.84	80.67	7981.68	80.42	8000.51	80.54
8009.93	80.8	8028.76	81.81	8047.6	81.86	8057.02	80.63	8075.85	80.4
8094.69	80.32	8104.11	80.71	8132.36	80.56	8160.61	80.58	8179.45	80.83
8217.12	80.92	8226.54	81.29	8245.37	81.47	8264.21	81.42	8273.62	82
8283.04	81.99	8320.71	82.31	8339.55	82.26	8348.97	80.4	8358.38	80.63
8386.64	80.59	8396.05	80.39	8414.89	80.74	8433.72	80.63	8443.14	80.78
8461.98	81.74	8471.4	81.77	8480.81	81.53	8490.23	81.59	8518.48	81.49
8527.9	81.25	8537.32	82.14	8565.57	82.2	8574.99	82.38	8612.66	83.33
8620.22	83.91	8627.26	87.71	8636.21	92.05	8643.21	88.24	8648.71	87.79
8658.71	89.63	8668.71	91.77	8678.71	90.57	8698.71	89.87	8708.71	89.66
8778.71	89.58	8798.71	89.5	8848.71	89.43	8858.71	89.35	8888.71	89.37

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.118	5430.69	.066	5476.41	.015	5626.47	.066	5721.43	.067

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
5430.69	5721.43	755.05	1535 1364.62	.1	.3

Left Levee Station= 46.75 Elevation= 96.99
Right Levee Station=8636.205 Elevation= 92.0475
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
74.58	3815.26	83.09	7475.62	8691.91	82.68

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 132.18*

INPUT
Description:
Station Elevation Data num= 490

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.82	18.96	92.45	27.1	95.55	31.17	95.87	39.71	94.83
56.78	89.43	63.18	86.94	71.72	85.09	80.26	82.3	88.8	80.82
97.33	80.19	108.01	78.84	116.55	78.49	127.22	78.64	131.48	78.53
142.16	79.08	148.56	78.75	163.5	79.8	169.91	79.75	174.18	80.47
178.45	80.47	184.85	81.03	191.25	81.92	197.65	81.96	201.93	82.55
216.87	83.06	240.35	83.12	244.61	83	261.69	82.98	293.34	82.83
323.59	82.79	379.09	82.48	396.16	82.71	413.24	82.62	417.5	82.77
430.32	82.8	445.25	82.7	453.8	82.82	483.67	82.69	500.75	82.78
515.7	82.67	534.9	82.76	547.71	82.64	566.92	82.82	583.85	82.83
590.94	82.73	605.1	82.76	630.95	82.68	635.22	82.81	656.57	82.63
662.97	82.75	675.78	82.71	688.59	82.43	697.22	82.41	705.66	82.65
724.87	82.89	752.62	82.92	767.56	82.84	776.1	82.54	782.5	83.06
797.44	82.86	810.25	82.35	816.65	81.11	823.06	80.64	825.19	80.92
829.46	82.65	833.73	83.46	838	83.06	846.54	83.27	859.34	82.46
863.62	81.81	874.29	81.48	878.56	81.62	887.09	81.05	895.63	81.62
904.17	80.35	919.11	80.1	929.79	79.61	938.32	79.46	946.86	79.79
953.26	79.54	981.01	79.6	991.69	79.87	1008.76	79.52	1027.97	79.42
1042.91	79.51	1062.12	79.42	1086.93	79.5	1102.68	79.43	1143.23	79.52
1151.77	79.64	1160.31	79.53	1183.79	79.69	1215.81	79.78	1243.55	79.75
1264.9	79.92	1316.12	79.98	1348.14	80.15	1354.54	80.25	1373.76	80.14
1384.43	80.77	1397.24	80.79	1405.77	80.4	1410.04	81.36	1414.31	82.81
1416.44	83.12	1427.12	83.2	1437.79	82.97	1467.67	83.01	1493.29	82.88
1508.23	82.93	1538.11	82.86	1557.32	82.71	1574.4	83.02	1597.88	82.98
1602.14	83.09	1621.35	82.95	1642.7	83.12	1698.2	82.99	1730.21	83.2
1743.02	83.08	1762.23	83.12	1787.84	82.95	1798.52	83.01	1839.07	82.89
1849.74	83	1907.37	82.97	1923.05	82.87	1950.06	82.98	1965	82.94
1982.08	82.66	1988.48	82.86	1992.75	82.69	1999.15	81.57	2003.42	81.44
2022.63	81.98	2037.57	82.09	2054.65	82.08	2067.46	81.93	2082.4	82.22
2103.74	82.17	2110.14	82.06	2125.08	82.08	2148.56	81.66	2163.51	81.58
2172.04	81.74	2182.71	81.42	2206.2	81.71	2219	81.76	2236.08	82.29
2257.42	82.41	2263.83	82.12	2285.17	82.13	2295.85	81.88	2308.65	81.36
2327.86	81.22	2344.93	81.26	2357.74	81.12	2368.42	81.29	2383.35	81.21
2396.16	82.21	2400.43	81.78	2413.24	81.34	2438.85	81.32	2443.12	81.25
2462.33	81.43	2470.87	81.37	2481.54	81.5	2483.67	81.76	2498.62	82.22
2518.26	82.27	2532.77	82	2553.68	82.19	2564.79	82.14	2589.1	82.21
2613.88	82.65	2633.09	82.63	2652.3	82.26	2667.24	81.75	2675.78	81.64
2688.58	81.98	2705.66	81.88	2714.2	82.07	2741.94	82.33	2754.76	82.06

2765.43	81.99	2780.37	82.25	2786.77	82.05	2797.44	82.32	2812.39	81.89
2829.46	81.99	2844.4	81.79	2848.67	81.85	2870.02	81.55	2891.37	81.55
2904.17	81.64	2955.4	81.58	2972.47	81.42	2976.75	81.56	2985.28	82.48
3013.03	82.9	3042.92	82.81	3053.59	82.9	3102.68	82.71	3132.56	82.77
3141.1	82.87	3164.58	82.79	3194.47	82.81	3198.73	82.9	3226.48	82.93
3243.56	82.76	3271.31	82.65	3305.46	82.79	3331.08	82.74	3354.56	82.65
3360.96	82.73	3380.17	82.67	3388.71	82.79	3407.92	82.75	3416.46	82.85
3439.94	82.8	3461.28	82.9	3474.82	82.78	3486.89	82.89	3521.05	82.75
3531.52	82.76	3542.39	82.93	3565.87	82.78	3600.02	82.87	3634.14	82.75
3638.4	82.84	3661.84	82.72	3676.75	82.79	3678.89	82.69	3710.85	82.72
3727.9	82.8	3751.33	82.73	3755.59	82.83	3772.64	82.79	3781.16	82.88
3811	82.74	3836.2	82.82	3864.27	82.74	3870.66	82.8	3902.62	82.68
3938.85	82.76	3947.37	82.68	3998.51	82.61	4028.34	82.75	4034.74	82.63
4068.83	82.57	4075.23	82.49	4096.53	82.51	4126.36	82.21	4130.63	82.07
4141.28	82.23	4145.54	82.46	4149.8	81.59	4156.2	81	4173.24	81.27
4179.63	81.08	4194.55	81.16	4200.95	81.37	4218.83	81.41	4237.17	81.7
4241.43	81.64	4260.61	81.99	4268.44	82.39	4275.52	83.02	4281.77	82.29
4289.3	81.1	4300.52	77.19	4309.98	74.49	4322.4	69.69	4328.65	65.16
4331.78	63.71	4341	61.22	4352.05	56.76	4355.73	55.81	4366.25	54.77
4387.3	53.97	4392.3	53.97	4400.41	54.45	4408.53	54.54	4416.64	54.37
4435.57	54.94	4448.43	55.64	4457.21	55.89	4459.01	56.28	4460.77	59.16
4469.63	59.53	4472.59	60.03	4481.45	63.74	4484.41	64.41	4493.27	63.88
4504.57	64.05	4504.68	67.27	4508.36	67.4	4512.03	68.31	4516.9	70.18
4519.39	71.21	4526.74	72.85	4531.67	73.62	4540.53	75.85	4548.81	77.66
4559.83	79.06	4567.12	80.18	4574.54	80.98	4581.9	81.14	4594.84	81.1
4607.79	80.18	4620.73	80.05	4633.68	80.16	4646.62	80.12	4659.57	80.31
4672.51	80.66	4685.46	80.62	4711.35	81.02	4737.24	81.04	4763.13	81.26
4789.02	81.34	4814.91	81.25	4827.85	81.3	4858.87	81.19	4892.58	81.22
4944.36	81.19	4970.25	81.14	4996.14	81.17	5047.92	81.05	5138.54	81.09
5157.76	81.03	5192.93	81.9	5229.15	81.76	5255.04	81.78	5280.93	81.68
5293.88	81.92	5319.77	81.96	5332.71	83.77	5397.44	83.75	5449.22	83.66
5462.16	83.59	5513.94	83.6	5552.78	83.46	5630.45	83.3	5656.34	83.31
5682.23	83.21	5721.07	83.21	5746.96	83.06	5785.79	83.16	5876.41	83.22
5928.19	83.23	5967.02	83.17	5979.97	83.2	5992.91	83.09	6005.86	83.14
6057.64	83.01	6083.53	82.69	6096.47	82.68	6122.36	82.26	6148.25	82.08
6225.93	81.95	6251.82	82.05	6290.65	82.02	6316.54	81.94	6368.32	82.07
6407.16	82.12	6484.83	82.08	6497.77	82.22	6510.72	82.56	6523.66	82.76
6536.61	83.09	6601.33	83.23	6614.28	83.23	6653.11	82.91	6679	82.91
6691.95	82.84	6717.84	82.83	6756.68	82.74	6834.35	82.62	6912.02	82.64
6976.74	82.82	6989.69	83.05	7002.63	83.05	7015.58	79.19	7041.47	78.16
7067.36	78.16	7106.19	78.24	7145.03	78.18	7157.97	78.23	7196.81	78.19
7209.75	78.37	7235.64	78.42	7248.59	79.58	7261.54	79.57	7274.48	82.78
7287.43	82.87	7300.37	82.81	7313.32	82.38	7339.21	82.36	7352.15	81.32
7365.1	81.13	7390.99	81.17	7416.88	81.11	7429.82	82	7442.77	80.47
7455.71	80.46	7468.66	80.05	7481.6	79.48	7494.55	79.93	7520.44	79.82
7533.38	80	7546.33	79.96	7559.27	80.37	7572.22	79.29	7585.16	79.28
7598.11	79.42	7611.05	79.41	7624	80.06	7636.94	80.28	7649.89	80.28
7662.83	79.66	7675.78	79.56	7688.72	79.21	7701.67	79.46	7714.61	79.46
7727.56	80.01	7753.45	82.04	7766.39	82.17	7779.34	82.16	7792.29	79.73
7805.23	79.61	7818.17	79.29	7844.07	79.16	7857.01	79.95	7882.9	79.86
7895.85	79.69	7934.68	79.77	7960.57	80.31	7973.52	80.3	7986.46	80.49
8012.35	80.54	8025.3	81.29	8038.24	81.28	8051.19	81.67	8077.08	81.59
8090.02	82.78	8102.97	82.78	8128.86	83.11	8141.8	83.1	8154.75	83.47
8180.64	83.39	8193.58	79.68	8206.53	80.16	8219.47	80.04	8245.36	80.11
8258.31	79.74	8284.2	80.39	8297.14	80.41	8310.09	80.07	8323.04	80.34
8335.98	81.39	8348.92	82.17	8361.87	82.19	8374.82	81.67	8387.76	81.74
8413.65	81.39	8426.6	81.41	8439.54	80.89	8452.49	82.62	8491.32	82.62
8504.27	82.92	8556.05	84.65	8566.43	85.77	8576.11	89.06	8588.41	92.25
8602.41	84.64	8613.41	83.74	8633.41	87.43	8653.41	91.69	8673.41	89.3
8713.41	87.9	8733.41	87.48	8753.41	87.52	8813.41	87.35	8833.41	87.38
8873.41	87.33	8913.41	87.16	9013.41	87.01	9033.41	86.85	9093.41	86.9

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.118	4275.52	.07	4331.78	.015	4516.9	.07	4581.9	.067

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4275.52	4581.9	755.05	1535	1364.62	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	4275.52	83.02	T
4581.9	9093.41	81.14	T

Left Levee Station= 31.17 Elevation= 95.87
Right Levee Station= 8588.41 Elevation= 92.255
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
57.37	3017.79	82.5	7010.9	8548.48	83.15

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 131.89*

INPUT
Description:
Station Elevation Data num= 490

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.69	7.11	92.46	12.76	94.39	15.58	94.74	21.83	93.62
29.64	91.08	39	87.51	45.25	85.84	51.5	83.76	57.74	82.35
71.8	80.3	78.04	79.92	88.97	79.83	96.78	80.13	101.46	79.99
112.39	80.51	117.08	80.57	120.2	80.97	123.32	80.9	132.69	81.44
134.8	81.36	140.5	81.95	151.42	82.25	168.6	82.25	176.26	82.15
191.82	82.19	207.37	82.06	228.09	82.1	270.09	81.93	282.58	82.05
324.74	82.15	346.59	82.03	359.09	82.09	393.44	82.04	419.88	82.24
425.06	82.09	435.42	82.16	444.97	82.06	457.45	82.14	473.07	82.07
487.12	82.12	502.8	81.92	523.03	82.19	554.26	82.19	560.51	82.05
565.19	82.32	579.25	82.21	587.05	81.92	590.17	81.41	594.86	81.16
602.67	82.54	605.79	82.32	612.03	82.43	621.4	82.04	624.53	81.72
635.45	81.67	641.7	81.36	647.95	81.61	654.19	80.97	665.12	80.85
679.17	80.53	685.42	80.69	690.1	80.56	710.4	80.61	718.21	80.77
730.7	80.58	744.75	80.54	787.88	80.62	799.4	80.54	829.07	80.66
863.42	80.72	870.82	80.82	902.45	80.75	918.07	80.87	946.17	80.95
974.48	80.94	983.64	81.02	997.7	80.98	1005.5	81.31	1014.87	81.35
1021.12	81.18	1028.92	82.54	1044.54	82.4	1057.41	82.44	1085.13	82.35
1096.06	82.39	1125.73	82.37	1131.97	82.29	1144.46	82.41	1155.9	82.37
1194.43	82.54	1235.02	82.44	1258.45	82.59	1264.74	82.5	1281.87	82.53
1338.07	82.43	1345.88	82.53	1388.04	82.56	1399.5	82.46	1420.23	82.56
1442.68	82.39	1450.49	82.41	1455.18	81.85	1458.3	81.79	1477.25	82.15
1495.77	82.14	1503.17	82.06	1516.07	82.24	1536.37	82.12	1547.29	82.18
1564.47	81.96	1575.74	81.9	1581.65	82.01	1589.45	81.86	1616	82.01
1628.49	82.26	1644.1	82.35	1648.79	82.23	1664.4	82.25	1681.57	81.86

1701.87	81.73	1717.48	81.7	1726.05	81.8	1736.22	81.73	1745.59	82.29
1748.71	82.08	1758.08	81.87	1779.94	81.83	1808.04	82.03	1820.54	82.43
1834.9	82.43	1850.45	82	1860.81	82.2	1886.72	82.17	1904.85	82.43
1918.9	82.45	1950.13	81.95	1959.5	82.12	1971.99	82.08	1980.03	82.21
1998.53	82.25	2015.71	82.19	2026.64	82.31	2031.32	82.18	2039.13	82.32
2050.06	82.12	2062.55	82.17	2076.6	82.12	2099.24	81.94	2117.2	82.02
2157.8	82.05	2170.29	82	2176.54	82.44	2187.46	82.61	2202.91	82.72
2218.69	82.61	2228.82	82.73	2243.68	82.59	2262.41	82.54	2290.52	82.69
2307.69	82.62	2332.68	82.72	2358.4	82.76	2365.47	82.62	2385.77	82.54
2410.75	82.66	2425.78	82.59	2462.07	82.58	2487.98	82.71	2496.62	82.64
2513.8	82.76	2534.64	82.7	2543.47	82.79	2555.37	82.7	2576.11	82.7
2586.47	82.89	2601.24	82.76	2626.22	82.78	2638.71	82.71	2664.22	82.77
2669.4	82.7	2690.14	82.68	2719.76	82.75	2736.9	82.74	2757.51	82.87
2780.55	82.78	2798.98	82.84	2847.57	82.72	2874.07	82.77	2897.46	82.66
2917.72	82.68	2930.19	82.82	2989.42	82.67	3014.36	82.48	3025.27	82.71
3033.06	81.97	3045.53	82.07	3050.21	81.96	3065.8	82.14	3078.88	82.12
3084.06	82.27	3104.8	82.45	3115.17	82.96	3120.35	83.53	3126.75	82.67
3133.16	81.49	3136.36	80.61	3145.97	77.25	3152.38	75.65	3168.4	69.81
3171.6	67.49	3174.8	64.52	3178	63.05	3181.21	62.61	3187.46	60.35
3198.78	55.64	3202.55	54.94	3207.57	54.36	3213.34	54.04	3234.91	53.33
3242.41	53.33	3250.96	53.87	3259.52	53.92	3268.08	53.64	3278.53	54.04
3288.04	54.27	3310.86	55.7	3312.76	56.33	3314.61	60.68	3317.73	60.71
3323.96	61.36	3327.08	62.1	3336.42	67.5	3339.54	68.5	3342.65	68.49
3348.96	67.7	3360.8	67.81	3360.92	69.42	3364.81	69.54	3368.68	70.06
3376.43	71.69	3380.05	72.27	3386.27	72.78	3389.39	73.28	3398.74	75.64
3404.96	76.93	3414.31	77.86	3426.77	79.27	3434.6	79.67	3442.36	79.74
3458.83	79.73	3475.3	78.38	3491.78	78.23	3508.25	78.44	3524.72	78.42
3541.19	78.73	3557.67	79.31	3574.14	79.29	3590.61	79.71	3607.08	79.96
3623.56	79.94	3640.03	80.07	3672.97	80.47	3705.92	80.68	3738.86	80.62
3755.34	80.74	3821.23	80.65	3837.7	80.7	3903.59	80.63	3936.53	80.56
3969.48	80.59	4018.9	80.42	4035.37	80.4	4134.21	80.41	4150.68	80.44
4175.15	80.33	4219.89	80.72	4233.04	80.72	4265.99	80.54	4298.93	80.59
4315.4	80.43	4331.88	80.45	4348.35	80.82	4364.82	80.89	4381.29	80.88
4397.77	83.61	4430.71	83.63	4480.13	83.62	4546.02	83.51	4562.49	83.4
4595.44	83.45	4628.38	83.44	4677.8	83.25	4710.74	83.22	4727.22	83.15
4760.16	83.12	4776.63	83.06	4809.58	83.08	4842.53	82.95	4875.47	82.92
4891.94	82.96	4924.89	82.76	4957.83	82.83	4974.31	82.92	5040.2	83.01
5073.14	83.1	5089.61	83.07	5155.5	83.1	5171.98	83.05	5204.92	83.04
5221.39	83.09	5237.87	82.94	5254.34	83.01	5287.28	82.95	5320.23	82.85
5353.17	82.37	5369.65	82.37	5386.12	81.97	5402.59	81.75	5435.54	81.49
5517.9	81.35	5534.37	81.35	5567.32	81.51	5583.79	81.46	5616.74	81.48
5633.21	81.38	5649.68	81.38	5682.63	81.49	5699.1	81.49	5715.57	81.6
5764.99	81.69	5814.41	81.68	5830.88	81.65	5863.82	81.67	5880.3	81.89
5896.77	82.4	5913.24	82.72	5929.71	83.21	5946.19	83.2	5962.66	83.3
6012.08	83.46	6028.55	83.46	6061.49	83.13	6077.97	83.01	6110.91	83.02
6127.38	82.92	6193.27	82.88	6209.75	82.8	6275.64	82.71	6292.11	82.64
6308.58	82.66	6325.06	82.58	6341.53	82.67	6374.47	82.74	6407.42	82.74
6423.89	82.87	6440.36	82.87	6489.78	83.03	6506.25	83.4	6522.73	83.39
6539.2	77.61	6555.67	76.91	6572.14	76.08	6605.09	76.09	6621.56	76.17
6654.51	76.23	6670.98	76.18	6703.92	76.17	6720.4	76.24	6769.81	76.21
6786.29	76.48	6802.76	76.47	6819.23	76.57	6835.71	78.31	6852.18	78.31
6868.65	83.13	6885.12	83.27	6901.6	83.19	6918.07	82.55	6951.01	82.54
6967.49	80.99	6983.96	80.71	7016.9	80.78	7033.38	80.65	7049.85	80.7
7066.32	82.05	7082.79	79.75	7099.27	79.75	7115.74	79.13	7132.21	78.3
7148.68	78.98	7165.16	78.83	7181.63	78.83	7198.1	79.09	7214.57	79.04
7231.05	79.67	7247.52	78.05	7263.99	78.05	7280.46	78.26	7296.94	78.26
7313.41	79.23	7329.88	79.58	7346.35	79.57	7362.83	78.66	7379.3	78.51
7395.77	77.99	7412.24	78.38	7428.72	78.38	7445.19	79.21	7461.66	80.7
7478.13	82.28	7494.61	82.48	7511.08	82.47	7527.55	78.82	7544.02	78.65
7560.5	78.18	7576.97	78	7593.44	78	7609.92	79.2	7626.39	79.07
7642.86	79.07	7659.33	78.82	7675.81	78.82	7692.28	78.96	7708.75	78.96
7741.7	79.78	7758.17	79.78	7774.64	80.07	7807.59	80.16	7824.06	81.29
7840.53	81.29	7857	81.88	7873.48	81.9	7889.95	81.77	7906.42	83.56
7922.89	83.56	7955.84	84.07	7972.31	84.07	7988.78	84.62	8005.26	84.62
8021.73	84.52	8038.2	78.96	8054.67	79.69	8071.15	79.52	8087.62	79.51
8104.09	79.64	8120.56	79.08	8137.04	79.63	8153.51	80.03	8169.98	80.04
8186.45	79.52	8202.93	79.89	8219.4	81.46	8235.87	82.59	8252.34	82.6
8268.82	81.8	8285.29	81.89	8318.24	81.32	8334.71	81.33	8351.18	80.53
8367.65	83.1	8384.13	83.04	8417.07	83.03	8433.54	83.47	8499.43	85.97
8512.65	87.64	8524.97	90.41	8532.38	91.25	8540.62	92.46	8550.37	87.29
8561.62	81.05	8578.12	79.69	8608.12	85.22	8638.12	91.62	8668.12	88.03
8728.12	85.94	8758.12	85.3	8788.12	85.37	8818.12	85.25	8878.12	85.1
8908.12	85.15	8938.12	85.05	8968.12	85.07	9028.12	84.83	9058.12	84.83
9088.12	84.75	9178.12	84.6	9208.12	84.35	9268.12	84.45	9298.12	84.43

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	3120.35	.07	3178	.025	3336.42	.07	3442.36	.066

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3120.35	3442.36	755.05	1535 1364.62	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	3120.35	83.53	T
3442.36	9298.12	79.74	T

Left Levee Station= 15.58 Elevation= 94.74
Right Levee Station=8540.615 Elevation=92.46249

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 131.6

INPUT
Description: Cross-Section data supplemented on the right by IBWC cross-section 131.6 from right bank station. 2302.82=3380-1077.18 feet (the approximate difference at the relative bank stations). Bathymetric elevations translated from IBWC 2008 Cross-sections

Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.61	6.56	91.63	16.4	87.41	26.25	84	29.53	83.09
36.09	81.66	42.65	81.09	59.05	81.28	62.33	81.21	65.62	81.51
75.46	80.86	78.74	81.35	88.58	81.48	101.7	81.34	111.55	81.46
121.39	81.3	134.51	81.4	150.92	81.43	157.48	81.36	183.72	81.41
190.28	81.52	206.69	81.38	232.93	81.41	246.06	81.48	255.9	81.65
259.18	81.45	265.74	81.55	272.3	81.46	301.83	81.55	308.39	81.43
324.8	81.51	334.64	81.48	364.16	81.72	374.01	81.57	387.13	81.64
390.41	81.75	400.25	81.6	436.34	81.59	449.46	81.71	452.74	81.64
488.83	81.74	495.39	81.65	518.36	81.82	534.76	81.74	541.33	81.88
547.89	81.76	561.01	81.74	583.97	81.91	606.94	81.77	623.34	81.82
639.75	81.98	656.15	81.77	659.43	81.88	675.84	81.82	702.08	81.94

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  708.64   81.82  721.77   81.77  738.17   81.98  777.54   81.88   784.1   82.02
  790.66   81.89  813.63   82.01  836.59   81.96  843.15   82.07   869.4   82.14
  875.96   82.05  889.08   82.13  912.05   82.13  925.17   82.26  941.58   82.18
  944.86   82.29  964.54   82.18   971.1    82.3  987.51   82.21  994.07   82.31
 1026.88   82.21 1033.44   82.35 1049.84   82.39 1069.53   82.25 1082.65   82.32
 1089.21   82.25 1095.77   82.38 1122.02   82.42 1144.98   82.67 1151.55    82.6
 1161.39   81.91 1167.95   82.21 1184.35   82.14 1204.04   82.27 1233.56   82.25
 1243.41   82.33 1256.53   82.16 1259.81   82.35 1269.65   82.42 1276.21   82.31
 1315.58   82.41 1318.86   82.36 1354.95    82.5 1368.08   82.41 1384.48   82.54
 1394.32   82.41 1400.88   82.57 1407.45   82.42 1423.85   82.36 1436.97   82.52
  1450.1   82.45  1482.9   82.62 1489.47    82.4 1505.87   82.43 1518.99   82.57
 1525.55   82.46 1548.52   82.49 1564.92   82.62  1568.2    82.5 1584.61   82.67
 1594.45   82.61 1597.73   82.72 1607.57   82.59  1620.7   82.64 1627.26   82.87
 1630.54   82.74 1663.35   82.67 1676.47   82.77 1679.75   82.68    1706   82.68
 1725.68   82.75 1735.52   82.87 1755.21    82.8 1761.77   82.87 1797.86   82.74
 1810.98   82.79  1824.1   82.69 1840.51   82.77 1847.07   82.96 1873.32   82.81
    1893   82.85 1906.12   82.97 1922.53   82.83 1929.09   82.93 1938.93   82.84
 1942.21   82.99 1955.34   83.04  1961.9   83.52 1965.18   84.04 1971.74   83.06
  1978.3   81.64 1981.58   80.71 1988.14   78.31 1991.42    77.3 1997.99   75.75
 2007.83   72.14 2014.39   69.93 2017.67   67.35 2020.95   63.89 2024.23   62.38
 2027.51   62.21 2045.51   54.52 2054.51    53.5 2073.51   52.87 2082.51    52.7
 2092.51    52.7 2101.51    53.3 2110.51    53.3 2119.51    52.9 2130.51    53.4
 2140.51    53.6 2158.51    54.8 2164.51   55.51 2166.51   56.39 2168.46   62.21
 2171.74   62.27 2178.29   63.19 2181.57   64.17  2191.4   71.27 2194.68   72.59
 2197.95   72.57 2204.51   71.53 2211.06    71.4 2230.72   71.96 2237.28   72.49
 2243.83   72.49 2247.11   72.94 2256.94   75.43 2263.49   76.65 2266.77   76.99
 2273.32   77.29 2286.43   78.36 2302.82   78.35 2322.82   78.35 2342.82   76.58
 2362.82   76.41 2382.82   76.71 2402.82   76.71 2422.82   77.16 2442.82   77.95
 2462.82   77.95 2482.82   78.54 2502.82    78.9 2522.82    78.9 2542.82    79.1
 2562.82   79.43 2582.82   79.69 2602.82   79.82 2622.82   80.02 2662.82   79.99
 2682.82   80.18 2702.82   80.15 2742.82   80.15 2762.82   80.11 2782.82   80.18
 2822.82   80.11 2862.82   80.08 2902.82   79.98 2942.82   80.01 2982.82   79.88
 3002.82   79.78 3022.82   79.75 3142.82   79.75 3162.82   79.78 3202.82   79.58
 3222.82   79.55 3262.82   79.55 3302.82   79.32 3322.82   79.39 3342.82   79.39
 3362.82   79.19 3382.82   79.22 3402.82   79.71 3422.82   79.81 3442.82   79.81
 3462.82   83.45 3482.82   83.42 3502.82   83.49 3562.82   83.48 3602.82   83.42
 3622.82   83.35 3642.82   83.35 3662.82   83.22 3682.82   83.22 3702.82   83.29
 3742.82   83.29 3802.82   83.05 3842.82   83.02 3862.82   82.92 3902.82   82.89
 3922.82   82.82 3962.82   82.86 4002.82   82.69 4042.82   82.66 4062.82   82.72
 4082.82   82.56 4102.82   82.46 4122.82   82.56 4142.82   82.56 4162.82   82.69
 4202.82   82.75 4222.82   82.82 4242.82   82.82 4282.82   82.95 4302.82   82.92
 4382.82   82.98 4402.82   82.91 4442.82   82.91 4462.82   82.98 4482.82   82.78
 4502.82   82.88 4522.82   82.81 4542.82   82.81 4582.82   82.68 4622.82   82.06
 4642.82   82.06 4662.82   81.53 4682.82   81.24 4722.82   80.91 4742.82   80.91
 4762.82   80.84 4822.82   80.74 4842.82   80.74 4882.82   80.97 4902.82   80.91
 4942.82   80.94 4962.82   80.81 4982.82   80.81 5022.82   80.97 5042.82   80.97
 5062.82   81.13 5122.82   81.26 5182.82   81.26 5202.82   81.23 5242.82   81.26
 5262.82   81.56 5282.82   82.25 5302.82   82.67 5322.82   83.33 5342.82   83.33
 5362.82   83.46 5422.82   83.69 5442.82   83.69 5482.82   83.26 5502.82    83.1
 5542.82   83.13 5562.82      83 5602.82      83 5642.82   82.96 5662.82   82.86
 5702.82   82.83 5722.82   82.76 5742.82   82.76 5762.82   82.67 5782.82    82.7
 5802.82    82.6 5822.82   82.73 5842.82   82.73 5862.82   82.83 5882.82   82.79
 5902.82   82.83 5922.82   83.02 5942.82   83.02 5962.82   83.12 6002.82   83.25
 6022.82   83.74 6042.82   83.74 6062.82   76.03 6082.82   75.11 6102.82      74
 6142.82   74.03 6162.82   74.13 6202.82   74.23 6222.82   74.16 6262.82   74.16
 6282.82   74.26 6302.82   74.23 6342.82   74.23 6362.82   74.59 6382.82   74.59
 6402.82   74.72 6422.82   77.05 6442.82   77.05 6462.82   83.48 6482.82   83.67
 6502.82   83.57 6522.82   82.72 6562.82   82.72 6582.82   80.65 6602.82   80.29
 6622.82   80.39 6642.82   80.39 6662.82   80.22 6682.82   80.29 6702.82   82.09
 6722.82   79.04 6742.82   79.04 6762.82   78.22 6782.82   77.11 6802.82   78.02
 6822.82   77.83 6842.82   77.83 6862.82   78.19 6882.82   78.12 6902.82   78.97
 6922.82   76.81 6942.82   76.81 6962.82    77.1 6982.82    77.1 7002.82   78.41
 7022.82   78.87 7042.82   78.87 7062.82   77.66 7082.82   77.46 7102.82   76.77
 7122.82    77.3 7142.82    77.3 7162.82   78.41 7182.82   80.41 7202.82   82.51
 7222.82   82.78 7242.82   82.78 7262.82   77.92 7282.82   77.69 7302.82   77.07
 7322.82   76.84 7342.82   76.84 7362.82   78.44 7382.82   78.28 7402.82   78.28
 7422.82   77.95 7442.82   77.95 7462.82   78.15 7482.82   78.15 7502.82   78.67
 7522.82   79.26 7542.82   79.26 7562.82   79.65 7602.82   79.78 7622.82   81.29
 7642.82   81.29 7662.82   82.08 7682.82   82.11 7702.82   81.95 7722.82   84.34
 7742.82   84.34 7762.82   84.74 7782.82   85.03 7802.82   85.03 7822.82   85.78
 7842.82   85.78 7862.82   85.65 7882.82   78.24 7902.82   79.22 7922.82   78.99
 7942.82   78.99 7962.82   79.16 7982.82   78.43 8002.82   79.16 8022.82   79.68
 8042.82   79.68 8062.82   78.96 8082.82   79.45 8102.82   81.52 8122.82   83.02
 8142.82   83.02 8162.82   81.94 8182.82   82.04 8202.82   81.61 8222.82   81.25
 8242.82   81.25 8262.82   80.17 8282.82   83.58 8302.82   83.48 8342.82   83.45
 8362.82   84.01 8442.82   87.29 8460.82   89.78 8473.82   91.76 8482.82   92.02
 8492.82   92.67 8505.82   85.78 8520.82   77.45 8542.82   75.64 8582.82   83.02
 8622.82   91.55 8662.82   86.76 8702.82   85.35 8742.82   83.97 8782.82   83.12
 8822.82   83.21 8862.82   83.05 8902.82   82.98 8942.82   82.85 8982.82   82.92
 9022.82   82.79 9062.82   82.82 9142.82   82.49 9182.82   82.49 9222.82   82.39
 9342.82   82.19 9382.82   81.86 9462.82   81.99 9502.82   81.96

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 1965.18     .07 2017.67    .025  2191.4     .07 2286.43    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1971.74 2286.43          1454.61 1509.52 1621.49             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1971.74   83.06       T
 2286.43 9502.82   78.36       T
Left Levee      Station=     .07      Elevation=   93.59
Right Levee     Station= 8492.82      Elevation=   92.67

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             92.45    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.066      0.048     0.066
  W.S. Elev (ft)             92.41    Reach Len. (ft)          1454.61    1509.52    1621.49
  Crit W.S. (ft)             83.35    Flow Area (sq ft)       18270.20    8805.66   69784.63
  E.G. Slope (ft/ft)      0.000106    Area (sq ft)            20041.18    8805.66   71868.71
  Q Total (cfs)           125000.00     Flow (cfs)             18660.40   25316.60   81022.99
  Top Width (ft)           8484.78    Top Width (ft)          1967.75     314.69    6202.34
  Vel Total (ft/s)            1.29    Avg. Vel. (ft/s)           1.02       2.88       1.16
  Max Chl Dpth (ft)          39.71    Hydr. Depth (ft)           9.28      27.98      11.25
  Conv. Total (cfs)       12161020.0     Conv. (cfs)            1815436.0   2463005.0   7882577.0
  Length Wtd. (ft)         1561.12    Wetted Per. (ft)        1969.95     328.98    6209.75
  Min Ch El (ft)             52.70    Shear (lb/sq ft)           0.06       0.18       0.07
  Alpha                       1.62    Stream Power (lb/ft s)     0.06       0.51       0.09
  Frctn Loss (ft)             0.21    Cum Volume (acre-ft)    23833.31   16307.14   20600.86
  C & E Loss (ft)             0.02    Cum SA (acres)           6258.34     858.33    4654.74
```

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 131.35

INPUT
Description: Cross-Section data supplemented on the right by IBWC cross-section
131.35 from station. 2912.94=2950-37.06 feet (the approximate
difference at the relative location). Bathymetric elevations
translated from IBWC 2008 Cross-sections
Station Elevation Data num= 270

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.56	3.28	82.18	9.84	84.65	19.68	89	26.24	91.16
32.8	92.9	36.08	93.59	39.36	93.89	49.2	94.03	52.49	93.56
59.05	92.09	65.61	90.78	68.89	89.68	75.45	85.67	78.73	84.09
85.29	82.36	91.85	81.24	98.41	80.71	104.97	79.9	114.81	79.42
121.37	79.46	124.65	78.83	131.21	76.61	134.49	76.48	662.63	76.48
665.91	76.49	669.19	77	672.47	77.99	675.75	78.36	682.31	77.83
692.15	77.46	705.27	76.73	708.55	76.74	721.67	77.28	734.79	77.2
754.48	77.34	761.04	77.29	767.6	77.38	780.72	77.38	793.84	77.29
800.4	77.36	813.52	77.31	823.36	77.42	846.32	77.29	852.89	77.38
872.57	77.38	879.13	77.47	885.69	77.39	918.49	77.47	934.89	77.4
938.17	77.52	944.73	77.42	967.7	77.48	984.1	77.35	997.22	77.46
1033.3	77.46	1043.14	77.4	1049.71	77.45	1056.27	77.37	1066.11	77.54
1072.67	77.47	1095.63	77.47	1112.03	77.35	1115.31	77.44	1125.15	77.37
1131.71	77.43	1148.12	77.38	1151.4	77.49	1164.52	77.36	1190.76	77.39
1200.6	77.44	1223.56	77.33	1236.68	77.47	1243.25	77.35	1246.53	77.44
1269.49	77.39	1272.77	77.45	1295.73	77.48	1305.57	77.39	1312.13	77.45
1328.53	77.38	1335.1	77.52	1338.38	77.46	1351.5	77.6	1361.34	77.46
1371.18	77.65	1390.86	77.52	1403.98	77.6	1420.38	77.55	1443.35	77.64
1449.91	77.6	1463.03	77.66	1466.31	77.58	1482.71	77.72	1499.11	77.66
1512.23	77.75	1518.79	77.71	1535.2	77.79	1561.44	78.07	1584.4	78.18
1587.68	78.28	1597.52	78.22	1607.36	78.56	1613.92	78.53	1623.77	78.72
1630.33	79.07	1633.61	79.44	1643.45	80.92	1650.01	81.68	1663.13	81.91
1682.81	82.06	1689.37	82.24	1695.93	82.19	1738.58	82.56	1741.86	82.48
1754.98	82.53	1768.1	82.66	1774.66	82.55	1787.78	82.69	1794.34	82.64
1800.9	82.72	1817.31	82.69	1830.43	82.75	1836.99	82.9	1853.39	82.81
1869.79	82.84	1879.63	82.63	1892.75	82.6	1899.31	82.74	1919	82.66
1938.68	82.71	1945.24	82.66	1958.36	82.72	1968.2	82.83	1984.6	82.79
2004.29	82.82	2027.25	81.94	2033.81	81.43	2040.37	81.15	2046.93	81.15
2053.49	81.02	2060.05	80.74	2066.61	80.85	2109.26	81.15	2122.38	81.01
2132.22	81.22	2138.78	81.56	2148.62	81.68	2155.18	80.81	2158.46	80.63
2165.02	81.14	2174.86	81.05	2181.42	81.23	2187.98	81.1	2194.54	80.61
2201.1	80.63	2204.39	80.83	2214.23	80.76	2220.79	80.99	2227.35	80.85
2247.03	80.95	2260.15	80.84	2269.99	80.97	2279.83	80.9	2289.67	80.25
2292.95	80.41	2302.79	80.47	2306.07	80.58	2312.64	80.48	2325.76	79.26
2332.32	78.51	2352	77.18	2355.28	77.11	2361.84	77.77	2374.96	79.3
2381.52	79.74	2384.8	80.12	2391.36	79.82	2397.92	79.33	2401.2	78.78
2411.05	74.84	2414.33	73.81	2420.89	72.51	2424.17	71.63	2430.73	68.93
2434.01	67.21	2437.29	64.94	2440.57	63.25	2447.13	62.24	2450.41	62.02
2458.41	58.54	2468.41	58.34	2478.41	57.84	2488.41	57.54	2498.41	57.84
2508.41	57.84	2518.41	57.44	2528.41	57.04	2538.41	56.84	2548.41	56.84
2558.41	56.54	2568.41	56.04	2578.41	55.84	2588.41	55.54	2598.41	55.74
2608.41	55.44	2618.41	55.24	2628.41	56.74	2630.83	62.21	2634.11	63.59
2637.39	65.64	2640.67	67.03	2647.23	69.03	2650.51	70.29	2657.07	73.84
2660.35	76.45	2663.63	78.48	2666.91	79.15	2670.19	79.12	2683.32	78.09
2689.88	78.01	2706.28	78.46	2712.84	78.47	2735.8	78.81	2742.36	78.64
2752.2	78.55	2758.76	78.59	2775.17	78.48	2785.01	78.65	2798.13	78.6
2824.37	78.58	2837.49	78.82	2847.33	78.91	2853.89	79.11	2867.02	79.07
2876.86	79.32	2886.7	79.44	2893.26	80.18	2899.82	81.44	2906.38	83.46
2909.66	84.22	2912.94	84.59	2918.94	83.04	2939.94	82.64	4093.94	77.74
4109.94	81.94	5856.94	81.74	5862.94	81.64	5881.94	83.14	5891.94	82.34
5962.94	82.34	6062.94	82.74	6108.94	83.34	6115.94	83.94	6151.94	74.84
6162.94	74.44	6175.94	74.04	6262.94	74.04	6362.94	74.64	6462.94	75.14
6516.94	75.44	6556.94	83.94	6576.94	82.94	7866.94	81.44	7876.94	84.64
7896.94	84.64	8504.94	83.64	8548.94	84.64	8575.94	92.64	8583.94	92.64

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.099	2391.36	.066	2437.29	.015	2663.63	.066	2689.88	.088

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2384.8 2666.91 2159.16 2175 2278.61 .1 .3
Left Levee Station= 49.2 Elevation= 94.03
Right Levee Station= 8575.94 Elevation= 92.64
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
33.8	2005.63	82.84	2929.58	8298.59	82.88

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	92.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.	0.099	0.030	0.088
W.S. Elev (ft)	91.95	Reach Len. (ft)	2159.16	2175.00	2278.61
Crit W.S. (ft)	85.86	Flow Area (sq ft)	21923.73	8367.36	53512.16
E.G. Slope (ft/ft)	0.000181	Area (sq ft)	21923.73	8367.36	53512.16
Q Total (cfs)	125000.00	Flow (cfs)	19771.44	52185.61	53042.94
Top Width (ft)	8513.89	Top Width (ft)	2325.07	282.11	5906.71
Vel Total (ft/s)	1.49	Avg. Vel. (ft/s)	0.90	6.24	0.99
Max Chl Dpth (ft)	36.71	Hydr. Depth (ft)	9.43	29.66	9.06
Conv. Total (cfs)	9278634.0	Conv. (cfs)	1467616.0	3873690.0	3937329.0
Length Wtd. (ft)	2215.47	Wetted Per. (ft)	2327.60	294.11	5909.26
Min Ch El (ft)	55.24	Shear (lb/sq ft)	0.11	0.32	0.10
Alpha	7.54	Stream Power (lb/ft s)	0.10	2.01	0.10
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	23132.64	16009.58	18267.25
C & E Loss (ft)	0.06	Cum SA (acres)	6186.67	847.99	4429.36

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 130.93

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INPUT
Description: Cross-Section data supplemented on the right by IBWC cross-section
             131.93 from right bank station. 2655.70=3740-1084.3 feet (the
             approximate difference at the relative bank stations). Bathymetric
             elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     458
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   93.31    6.56   93.13    9.84   92.66   16.39    91.2   19.67   90.69
   22.95   89.94   29.51   86.35   32.78   84.78   36.06   83.52   42.62   82.13
   49.18   81.43   52.46   81.39   55.73   81.12   65.57   78.99   72.13   78.12
   75.41    77.8   78.68   77.75  957.32   77.75  967.16   78.19     977   78.17
  990.11   78.23  999.95   78.17 1009.78   78.46 1029.45   78.22 1039.29   78.32
 1049.12   78.31 1058.96   77.91 1072.07    77.8 1095.02   77.75 1262.23   77.75
  1265.5   77.88 1268.78   78.34 1275.34   79.83 1278.62   80.28  1281.9   80.24
 1291.73   79.88 1301.57   79.26  1311.4   79.26 1324.52   79.13 1337.63    79.1
 1350.74   79.14 1360.58   79.22 1376.97   79.22 1390.09   79.26 1399.92   79.34
 1416.31   79.29 1422.87    79.4 1435.99   79.41 1442.54   79.47 1458.94   79.45
    1495   79.58 1501.56   79.56 1524.51   79.62 1527.78   79.69 1557.29   79.74
 1563.85   79.71 1580.24   79.83  1586.8    79.8 1603.19    79.9 1619.58   79.87
  1632.7      80 1645.81   80.05 1649.09      80 1668.76   80.09 1675.32   80.04
 1691.71   80.15 1704.82   80.13 1714.66   80.22 1724.49   80.17 1734.33   80.27
 1744.17   80.23    1754   80.33 1770.39   80.31 1790.06   80.43 1796.62    80.4
 1809.73    80.5 1819.57   80.46 1842.52   80.59 1852.36   80.55 1868.75   80.67
 1878.58   80.64 1885.14   80.71 1908.09   80.76 1960.55   81.07 1973.66   81.03
 1996.61   81.28 2026.12   81.37 2035.95   81.56 2045.79   81.53 2062.18   81.71
 2072.02   82.16 2078.57   82.88 2081.85   83.02 2085.13   82.77 2098.24   80.52
  2104.8   79.49 2108.08   79.12 2111.36   79.02 2117.91   79.04 2124.47   78.78
 2127.75   78.75 2137.59   78.92 2190.04   78.83  2196.6   78.88 2203.16   78.73
 2212.99   78.81 2219.55   78.78 2226.11   78.89 2232.66   78.87 2245.78   78.71
 2258.89   78.79 2262.17   78.86 2278.56   78.64 2285.12    78.7 2308.07   79.22
 2311.35   79.11 2321.18   78.44 2324.46   78.51 2331.02    78.9  2334.3   78.99
 2340.85   78.03 2344.13   77.75 2347.41   77.09 2353.97   75.35 2360.53   74.29
  2363.8   74.13 2367.08   74.23 2373.64   72.61 2376.92   73.57  2380.2   75.26
 2383.48   76.75 2386.76   77.27 2390.04   76.88 2393.32   75.36 2399.88   71.03
 2403.16   69.03 2406.44   67.74    2413   66.63 2416.28    65.9 2419.56   64.73
 2422.84   63.22 2426.12   62.18 2462.56   57.57 2477.56    57.2 2477.56   57.21
 2482.56   56.68 2487.56    56.3 2489.56   56.34 2496.56   56.46 2498.56    56.5
 2502.56   56.43 2508.56   56.31 2509.56    56.3 2515.56   56.41 2520.56    56.5
 2522.56   56.52 2529.56   56.57 2532.56    56.6 2536.56   56.43 2543.56    56.1
 2543.56   56.13 2549.56    56.1 2555.56    56.1 2556.56   56.13 2563.56   56.25
 2567.56    56.3 2570.56   56.14 2577.56   55.84 2578.56    55.8 2584.56   55.85
 2590.56    55.9 2591.56   55.91 2598.56   55.97 2602.56      56 2605.56   56.03
 2612.56   56.09 2613.56    56.1 2614.56   56.39 2615.56    56.7 2616.06   56.76
 2616.35   57.18 2616.35   62.17 2619.62   62.57  2622.9   64.47 2626.18   67.63
 2629.46   70.25 2632.74    72.1 2636.02   73.49  2639.3   74.26 2645.86   75.43
 2649.14   76.27  2655.7    79.5  2675.7   83.53  2695.7    81.5  2715.7   81.36
  2755.7   81.36  2775.7    81.1  2795.7   81.03  2815.7      81  2835.7      81
  2855.7   80.77  2875.7   80.51  2895.7   80.54  2915.7   80.47  2935.7   80.47
  2955.7   80.31  2975.7   80.34  2995.7   80.44  3015.7   80.28  3035.7   80.28
  3055.7   80.37  3075.7   80.21  3095.7   80.18  3115.7   80.05  3135.7   80.05
  3155.7   79.85  3175.7   79.78  3195.7   79.81  3215.7   79.52  3235.7   79.52
  3255.7   79.45  3275.7   79.32  3295.7   79.12  3315.7   79.06  3335.7   79.06
  3355.7   79.35  3375.7   79.12  3395.7   79.02  3415.7   78.93  3435.7   78.93
  3455.7   78.66  3475.7    78.7  3495.7   78.56  3515.7    78.2  3535.7    78.2
  3555.7    78.3  3575.7   78.23  3595.7      78  3615.7   77.84  3635.7   77.84
  3655.7   77.25  3675.7   77.05  3695.7   77.41  3715.7   77.12  3735.7   77.12
  3755.7   76.72  3775.7   76.89  3795.7   76.72  3815.7   76.66  3835.7   76.66
  3855.7   76.26  3875.7   76.59  3935.7   76.59  3955.7   76.62  3975.7   76.59
  3995.7   76.36  4015.7   76.78  4035.7   76.78  4055.7   77.05  4075.7   76.72
  4135.7   76.72  4155.7   76.68  4175.7   76.68  4195.7   76.72  4215.7   76.81
  4235.7   76.81  4255.7   77.11  4275.7   76.95  4295.7   77.21  4315.7   81.64
  4335.7   80.98  4355.7   79.83  4375.7   80.91  4395.7   81.86  4415.7   82.52
  4435.7   82.52  4455.7   83.01  4475.7   83.47  4495.7   83.24  4515.7   82.85
  4535.7   82.85  4555.7   82.49  4575.7   82.35  4595.7   82.16  4615.7   82.03
  4655.7   82.03  4675.7   82.02  4695.7   81.93  4715.7   81.89  4735.7   81.89
  4755.7   82.02  4775.7   82.22  4795.7   82.22  4815.7   82.65  4835.7   82.65
  4855.7   82.68  4875.7   82.68  4895.7   82.61  4915.7   82.64  4935.7   82.64
  4955.7   82.61  4975.7   82.45  4995.7   82.31  5015.7   82.28  5035.7   82.28
  5055.7   82.25  5075.7   82.15  5095.7   82.15  5115.7   82.05  5135.7   82.05
  5155.7   82.02  5175.7   81.89  5195.7   81.85  5215.7   81.69  5235.7   81.69
  5255.7   81.59  5275.7   81.59  5295.7   81.46  5315.7   81.36  5335.7   81.36
  5355.7   81.33  5375.7   81.19  5395.7   81.13  5415.7      81  5435.7      81
  5455.7   81.03  5475.7   80.86  5495.7   80.73  5515.7   80.67  5535.7   80.67
  5555.7   80.73  5575.7    80.7  5595.7   80.37  5615.7   81.88  5635.7   81.88
  5655.7   83.52  5675.7   84.17  5695.7   84.27  5715.7   84.11  5735.7   84.11
  5755.7   84.07  5775.7   84.24  5795.7   84.11  5815.7   84.27  5835.7   84.27
  5855.7   84.24  5875.7   84.24  5895.7   83.94  5915.7   83.58  5955.7   83.58
  5975.7   83.45  5995.7   84.24  6035.7   84.24  6055.7    84.3  6075.7   84.37
  6095.7   84.46  6115.7   84.43  6135.7   84.43  6155.7   84.56  6235.7   84.56
  6255.7   84.49  6275.7   84.53  6295.7   84.56  6315.7   84.53  6335.7   84.53
  6355.7   84.36  6375.7    84.3  6395.7   84.33  6415.7   84.23  6435.7   84.23
  6455.7   84.13  6475.7   84.33  6495.7   84.43  6515.7   84.39  6535.7   84.39
  6555.7   84.49  6575.7   84.46  6595.7   84.36  6615.7   84.32  6635.7   84.32
  6655.7   84.26  6675.7   84.32  6695.7   84.26  6715.7   84.19  6775.7   84.19
  6795.7   84.32  6835.7   84.32  6855.7   84.42  6875.7   84.26  6895.7   84.26
  6915.7   84.42  6935.7   84.42  6955.7   84.45  6975.7   84.42  6995.7   84.15
  7015.7   84.12  7035.7   84.12  7055.7   84.02  7075.7   83.92  7095.7   83.76
  7115.7   83.63  7135.7   83.63  7155.7   83.23  7175.7   83.23  7195.7    83.2
  7215.7   83.13  7235.7   83.13  7255.7    83.1  7275.7    83.1  7295.7   82.94
  7315.7   83.49  7335.7   83.49  7355.7   83.53  7424.7   79.88  7446.7   87.21
  7461.7   91.41  7475.7   91.67  7484.7   91.79  7495.7   84.68  7513.7   74.92
  7575.7   79.98  7595.7   90.67  7615.7      89  7635.7      89  7655.7   82.37
  7675.7   82.08  7695.7   82.99  7735.7   80.93  7755.7    80.7  7775.7   80.83
  7795.7   81.12  7815.7   81.09  7835.7   81.09  7855.7   81.05  7915.7   81.05
  7935.7   81.02  7955.7   80.95  7975.7   80.99  8015.7   80.85  8055.7   80.82
  8075.7   80.89  8095.7   81.21  8115.7   81.21  8135.7   81.77  8155.7   81.31
  8175.7   81.31  8215.7   75.93  8235.7    73.6  8255.7   79.11  8275.7   80.06
  8295.7   82.03  8315.7   82.03  8335.7   80.59  8355.7   79.67  8435.7   79.73
  8455.7   79.79  8475.7   79.76  8495.7    79.7

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2331.02     .07 2419.56    .025 2616.35     .07  2655.7    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2340.85  2655.7          2220.46 2174.42  1705.8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2340.85   78.03       T
  2655.7  8495.7    79.5       T
Left Levee      Station=       0      Elevation=   93.31
```

Right Levee Station= 7484.7 Elevation= 91.79

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	91.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.066	0.045	0.066
W.S. Elev (ft)	91.76	Reach Len. (ft)	2220.46	2174.42	1705.80
Crit W.S. (ft)	82.62	Flow Area (sq ft)	29579.87	9042.97	46843.52
E.G. Slope (ft/ft)	0.000126	Area (sq ft)	29884.88	9042.97	48950.73
Q Total (cfs)	125000.00	Flow (cfs)	40686.83	30455.38	53857.79
Top Width (ft)	7468.63	Top Width (ft)	2326.98	314.85	4826.81
Vel Total (ft/s)	1.46	Avg. Vel. (ft/s)	1.38	3.37	1.15
Max Chl Dpth (ft)	35.96	Hydr. Depth (ft)	12.71	28.72	9.70
Conv. Total (cfs)	11131690.0	Conv. (cfs)	3623305.0	2712159.0	4796226.0
Length Wtd. (ft)	2003.02	Wetted Per. (ft)	2329.95	329.94	4830.05
Min Ch El (ft)	55.80	Shear (lb/sq ft)	0.10	0.22	0.08
Alpha	1.85	Stream Power (lb/ft s)	0.14	0.73	0.09
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	21848.63	15574.93	15587.35
C & E Loss (ft)	0.02	Cum SA (acres)	6071.37	833.09	4148.63

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 130.51

INPUT
Description: Cross-Section data supplemented on the right by IBWC cross-section
131.51 from station. 3443.55=3685-241.45 feet (the approximate
difference at the relative location). Bathymetric elevations
translated from IBWC 2008 Cross-sections
Station Elevation Data num= 308

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.48	3.28	91.15	6.56	91.48	16.4	91.84	22.96	91.59
26.24	91.09	29.52	90.2	42.64	85.66	52.47	81.85	55.75	81.18
62.31	80.34	65.59	80.16	72.15	80.28	78.71	80.16	101.67	80.41
114.79	80.16	127.91	80.2	137.74	80.35	147.58	80.22	154.14	80.32
160.7	80.22	173.82	80.3	180.38	80.19	190.22	80.32	206.62	80.37
219.73	80.22	242.69	80.4	259.09	80.24	291.89	80.23	314.84	80.19
331.24	80.27	344.36	80.21	364.04	80.26	383.72	80.23	400.11	80.32
406.67	80.22	423.07	80.18	432.91	80.28	449.31	80.29	459.15	80.2
465.71	80.26	488.66	80.11	498.5	80.2	505.06	80.04	511.62	80.18
521.46	80.12	534.58	80.18	557.54	80.09	570.65	80.21	580.49	80.08
603.45	80.18	610.01	80.09	632.97	80.18	649.36	80.05	675.6	80.2
685.44	80.11	695.28	80.2	714.96	80.07	734.63	80.17	741.19	80.09
757.59	80.13	764.15	80.31	770.71	80.17	780.55	80.29	793.67	80.24
800.23	80.32	806.79	80.18	816.62	80.25	823.18	80.11	839.58	80.19
849.42	80.12	855.98	80.19	872.38	80.05	892.06	80.06	898.61	80.14
911.73	80.01	918.29	80.1	928.13	80.05	944.53	80.11	954.37	80
967.49	80.14	977.33	80.06	997	80.04	1003.56	80.21	1019.96	80
1023.24	80.13	1036.36	80.04	1042.92	80.11	1052.76	80	1069.15	80.03
1082.27	80.14	1085.55	80.05	1101.95	79.99	1115.07	80.08	1121.63	80.01
1131.47	80.11	1141.31	79.93	1160.98	79.91	1164.26	79.99	1187.22	80.09
1193.78	79.98	1200.34	80.07	1213.46	80.01	1249.53	80.18	1269.21	80.58
1275.77	80.61	1285.61	80.12	1302.01	80.15	1311.84	80	1324.96	79.96
1347.92	80.11	1374.16	80.04	1393.83	80.14	1400.39	80.04	1406.95	80.11
1420.07	80.01	1423.35	80.11	1439.75	80.06	1449.59	80.14	1456.15	80.06
1492.22	80.09	1515.18	80.06	1528.3	80.11	1554.54	80.06	1564.37	80.16
1570.93	80.09	1613.57	80.19	1620.13	80.11	1646.36	80.23	1656.2	80.12
1679.16	80.29	1685.72	80.18	1702.12	80.24	1705.4	80.32	1718.52	80.18
1738.19	80.29	1741.47	80.16	1754.59	80.31	1761.15	80.17	1787.39	80.25
1793.95	80.32	1810.34	80.29	1816.9	80.35	1830.02	80.25	1836.58	80.38
1856.26	80.2	1862.82	80.29	1879.22	80.21	1889.05	80.37	1892.33	80.19
1912.01	80.34	1921.85	80.19	1928.41	80.38	1941.53	80.27	1948.09	80.39
1964.48	80.28	1967.76	80.38	1974.32	80.24	1994	80.4	2000.56	80.27
2007.12	80.38	2013.68	80.26	2020.24	80.38	2030.08	80.29	2043.2	80.44
2046.48	80.32	2066.15	80.51	2079.27	80.35	2102.23	80.48	2112.07	80.28
2128.47	80.4	2148.15	80.32	2154.71	80.45	2167.82	80.42	2177.66	80.51
2180.94	80.39	2187.5	80.6	2200.62	80.43	2207.18	80.54	2223.58	80.42
2230.14	80.54	2243.26	80.42	2249.82	80.54	2256.38	80.41	2276.05	80.47
2285.89	80.34	2289.17	80.54	2305.57	80.35	2308.85	80.45	2328.53	80.4
2331.81	80.5	2351.49	80.53	2364.61	80.43	2381	80.45	2397.4	80.58
2407.24	80.45	2423.64	80.6	2449.88	80.56	2459.72	80.65	2466.28	80.55
2479.4	80.68	2489.23	80.54	2508.91	80.6	2525.31	80.59	2535.15	80.74
2554.83	80.6	2564.67	80.73	2567.95	80.66	2607.3	80.72	2613.86	80.64
2630.26	80.63	2636.82	80.76	2643.38	80.68	2649.94	80.77	2666.34	80.68
2679.46	80.92	2689.3	80.7	2702.42	80.76	2718.81	80.95	2728.65	81.21
2741.77	81.28	2745.05	81.72	2751.61	83.14	2754.89	83.33	2761.45	82.97
2768.01	83.59	2771.29	83.21	2777.84	81.72	2784.4	81.26	2790.96	81.44
2800.8	80.93	2813.92	80.77	2820.48	80.98	2830.31	80.98	2843.43	81.14
2849.99	80.93	2856.55	81.06	2863.11	80.81	2866.39	80.88	2872.94	80.49
2879.5	80.55	2905.74	80.3	2912.3	80.36	2931.97	80.19	2954.93	80.52
2964.77	80.4	3007.4	80.18	3013.96	80.24	3020.51	80.85	3033.63	81.15
3043.47	82.14	3050.03	82.12	3053.31	81.73	3056.59	80.19	3063.15	75.83
3066.43	73.85	3069.71	72.3	3076.26	68.73	3082.82	64.51	3086.1	62.69
3089.38	62.17	3093.38	61.85	3103.38	58.35	3113.38	57.85	3123.38	57.55
3133.38	57.35	3143.38	57.25	3153.38	57.75	3163.38	57.85	3173.38	58.15
3193.38	58.35	3203.38	59.05	3213.38	58.85	3223.38	58.85	3233.38	58.95
3253.38	59.55	3263.38	60.35	3273.38	60.85	3295.98	62.17	3299.26	62.24
3305.82	64.16	3309.1	66.18	3312.38	67.63	3315.66	68.74	3322.21	70.46
3328.77	71.19	3335.33	72.63	3341.89	74.65	3348.45	77.62	3351.73	78.68
3355.01	78.85	3368.12	77.95	3374.68	77.38	3394.36	77.68	3414.04	77.33
3417.32	77.15	3430.43	75.94	3436.99	75.57	3443.55	75.39	3482.55	76.53
3996.55	78.75	4158.55	76.74	4589.55	77.24	5039.55	74.54	5134.55	84.24
5439.55	82.44	5440.55	92.74	7263.55	92.74				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.074	3050.03	.066	3082.82	.015	3305.82	.066	3355.01	.067

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
3050.03 3355.01 1031.28 2400.25 3908.06 .1 .3
Left Levee Station= 16.4 Elevation= 91.84
Right Levee Station= 7263.55 Elevation= 92.74
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
18.03	2767.32	83.58	3997.75	5304.79	78.71

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	91.47	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.26	Wt. n-Val.	0.074	0.034	0.067	
W.S. Elev (ft)	91.21	Reach Len. (ft)	1031.28	2400.25	3908.06	
Crit W.S. (ft)	82.62	Flow Area (sq ft)	23775.96	8621.78	25287.89	
E.G. Slope (ft/ft)	0.000226	Area (sq ft)	23775.96	8621.78	25287.89	
Q Total (cfs)	125000.00	Flow (cfs)	28354.57	52279.29	44366.14	
Top Width (ft)	5414.95	Top Width (ft)	3024.58	304.98	2085.39	
Vel Total (ft/s)	2.17	Avg. Vel. (ft/s)	1.19	6.06	1.75	
Max Chl Dpth (ft)	33.96	Hydr. Depth (ft)	7.86	28.27	12.13	
Conv. Total (cfs)	8317837.0	Conv. (cfs)	1886790.0	3478805.0	2952243.0	
Length Wtd. (ft)	2594.54	Wetted Per. (ft)	3026.25	313.86	2093.80	
Min Ch El (ft)	57.25	Shear (lb/sq ft)	0.11	0.39	0.17	
Alpha	3.58	Stream Power (lb/ft s)	0.13	2.35	0.30	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	20480.96	15134.03	14133.77	
C & E Loss (ft)	0.08	Cum SA (acres)	5934.98	817.62	4013.29	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.3

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85.91	6.56	88.46	9.84	89.47	16.39	90.89	19.67	91.17
32.79	91.6	36.07	91.48	39.35	91.06	42.62	90.37	45.9	89.42
55.74	86.27	59.02	84.98	65.58	82.22	68.85	81.29	72.13	80.64
78.69	79.89	85.25	79.92	95.08	79.53	104.92	79.55	111.48	79.39
127.87	79.26	134.43	79.29	147.55	79.23	154.1	79.32	163.94	79.17
183.61	79.16	190.17	79.08	200.01	79.14	213.12	79.12	219.68	79.04
239.35	79.21	259.02	79.12	278.7	79.14	285.25	79	295.09	78.98
301.65	79.08	318.04	79.01	321.32	78.95	334.44	78.95	340.99	79.03
350.83	78.93	357.39	78.93	363.94	79.02	377.06	78.99	383.62	79.08
396.73	78.95	413.13	79.01	422.96	78.93	429.52	78.96	442.64	78.91
465.59	78.96	475.42	78.92	491.82	79.09	501.65	78.97	508.21	79.03
521.33	78.92	534.44	78.96	541	78.91	547.56	78.96	560.67	78.86
567.23	78.98	573.79	78.9	586.9	78.92	593.46	78.98	613.13	78.94
619.69	78.97	639.36	78.9	645.92	78.95	659.04	78.96	665.59	78.87
672.15	78.96	675.43	78.89	681.99	78.96	688.54	78.86	701.66	78.88
711.5	78.82	724.61	78.89	731.17	78.82	750.84	78.92	763.96	78.79
783.63	78.87	803.3	78.91	826.25	78.81	836.09	78.85	842.65	78.96
849.21	78.87	862.32	78.83	868.88	78.9	878.71	78.9	885.27	78.77
888.55	78.87	895.11	78.82	901.67	78.86	908.22	78.8	914.78	78.85
921.34	78.77	934.45	78.82	941.01	78.77	950.85	78.86	957.41	78.74
967.24	78.84	973.8	78.79	980.36	78.89	993.47	78.81	1000.03	78.72
1009.87	78.71	1019.7	78.9	1026.26	78.82	1049.21	78.73	1052.49	78.76
1065.6	78.68	1075.44	78.78	1082	78.66	1098.39	78.7	1108.23	78.65
1114.79	78.74	1121.34	78.68	1131.18	78.74	1134.46	78.68	1141.02	78.74
1147.57	78.69	1170.53	78.67	1180.36	78.58	1186.92	78.59	1203.31	78.81
1213.15	78.76	1216.43	78.83	1229.54	78.72	1232.82	78.77	1239.38	78.67
1245.94	78.73	1252.5	78.68	1262.33	78.77	1265.61	78.71	1272.17	79.01
1278.73	79.22	1282	79.23	1298.4	79.63	1304.96	79.47	1311.51	79.47
1318.07	79.56	1321.35	79.47	1337.74	79.41	1344.3	79.51	1350.86	79.38
1360.7	79.48	1363.97	79.36	1370.53	79.42	1380.37	79.33	1386.93	79.52
1400.04	79.36	1409.88	79.39	1413.16	79.32	1419.71	79.45	1436.11	79.41
1445.94	79.48	1452.5	79.39	1462.34	79.4	1482.01	79.52	1495.1	79.43
1511.46	79.49	1518.01	79.43	1537.64	79.43	1547.45	79.31	1550.73	79.4
1560.54	79.48	1563.81	79.43	1576.9	79.5	1586.72	79.44	1589.99	79.48
1603.08	79.45	1609.62	79.53	1622.71	79.59	1635.8	79.49	1645.61	79.62
1652.15	79.59	1668.51	79.68	1675.06	79.57	1684.87	79.66	1688.15	79.61
1704.5	79.56	1707.78	79.63	1724.14	79.49	1750.31	79.63	1756.85	79.53
1769.94	79.53	1773.21	79.6	1779.76	79.48	1786.3	79.62	1805.93	79.52
1822.29	79.56	1832.11	79.63	1838.65	79.58	1851.74	79.62	1864.83	79.49
1877.91	79.56	1891	79.53	1900.82	79.65	1920.45	79.61	1930.26	79.71
1933.54	79.63	1946.62	79.63	1962.98	79.52	1966.25	79.63	1976.07	79.59
1985.89	79.71	1998.97	79.62	2015.33	79.67	2018.6	79.74	2025.15	79.62
2044.78	79.5	2048.05	79.55	2067.68	79.53	2077.5	79.6	2087.31	79.48
2097.13	79.53	2113.49	79.74	2120.03	79.64	2126.58	79.8	2129.85	80.13
2139.66	81.63	2142.94	82.02	2149.48	82.31	2156.02	82.21	2159.3	82.25
2162.57	82.06	2169.11	81.14	2178.93	80.68	2188.74	80.49	2201.83	80.35
2224.73	80.24	2234.55	80.55	2244.36	80.28	2260.72	80.36	2267.27	80.2
2277.08	80.17	2280.36	80.07	2286.9	80.3	2290.17	80.29	2296.72	80.07
2306.53	79.97	2309.8	80.11	2322.89	81.58	2329.43	81.82	2335.98	82.19
2339.25	82.11	2342.52	81.53	2345.79	80.64	2349.07	79.39	2355.61	77.67
2362.15	76.62	2365.43	76.27	2371.97	75.98	2375.24	75.33	2378.51	74.41
2381.78	72.97	2391.6	67.73	2398.14	63.26	2405.42	60.29	2415.42	56.79
2425.42	56.29	2435.42	55.99	2445.42	55.79	2455.42	55.69	2465.42	56.19
2475.42	56.29	2485.42	56.59	2505.42	56.79	2515.42	57.49	2525.42	57.29
2535.42	57.29	2545.42	57.39	2565.42	57.99	2575.42	58.79	2585.42	59.29
2595.42	61.93	2601.13	62.1	2604.4	62.5	2607.68	63.97	2614.23	67.64
2617.51	69.21	2624.06	71.84	2630.62	73.29	2637.17	74.29	2650.28	75.99
2656.83	76.49	2669.94	77.77	2673.22	78.48	2676.49	79.56	2679.77	80.38
2683.05	80.79	2689.6	80.56	2699.43	80.35	2702.71	80.12	2709.26	80.07
2715.81	80.14	2725.64	80.01	2738.75	79.94	2758.41	80.04	2774.79	79.74
2784.62	79.81	2794.46	79.5	2801.01	79.5	2807.56	79.67	2814.12	79.98
2823.95	79.67	2830.5	79.76	2840.33	79.74	2846.88	79.86	2856.71	79.59
2866.54	79.21	2879.65	79.12	2905.86	79.04	2909.14	79.13	2925.53	78.91
2928.8	78.96	2938.63	78.87	2964.85	78.85	2971.4	79.03	2974.68	79.01
2977.95	79.22	2984.51	79.45	2994.34	79.68	3004.17	80.3	3010.72	80.87
3014	81.45	3020.55	81.74	3023.83	81.76	3027.1	81.59	3033.66	81.56
3050.04	81.31	3063.15	81.44	3079.53	81.34	3092.64	81.42	3095.92	81.36
3105.75	81.43	3118.85	81.43	3141.79	81.19	3154.9	81.36	3164.73	81.27
3174.56	81.27	3181.11	81.33	3187.66	81.23	3194.22	81.24	3210.6	81.12
3217.15	81.18	3220.43	81.09	3230.26	81.15	3246.64	81.04	3253.2	81.12
3259.75	81.04	3289.24	81.09	3292.52	81.01	3299.07	81.05	3305.63	80.97
3312.18	80.77	3318.73	80.83	3331.84	80.74	3344.95	80.79	3351.5	80.53
3367.88	80.35	3374.44	80.41	3380.99	80.26	3387.54	79.76	3397.37	79.93
3403.93	79.55	3407.21	79.52	3420.31	79.73	3426.87	80.36	3430.14	80.39
3436.7	79.5	3439.97	79.46	3446.53	80.22	3449.8	80.37	3453.08	80.22
3456.36	79.88	3466.19	79.55	3472.74	79.64	3482.57	79.92	3489.12	79.99
3495.68	80.29	3502.23	79.97	3512.06	79.7	3521.89	79.86	3535	79.92
3538.27	79.99	3548.11	79.77	3551.38	79.89	3564.49	79.67	3571.04	79.14
3577.6	79.61	3580.87	79.73	3593.98	78.41	3597.26	78.38	3603.81	78.54
3616.92	78.37	3623.47	78.41	3630.02	78.31	3636.58	78.32	3643.13	78.48

3652.96	78.53	3659.51	78.46	3666.07	78.52	3675.9	78.48	3682.45	78.52		
3692.28	78.47	3698.83	78.51	3705.39	78.42	3718.5	78.4	3725.05	78.31		
3731.6	78.4	3741.43	78.27	3747.99	78.29	3757.82	78.41	3764.37	78.32		
3770.92	78.41	3777.48	78.34	3787.21	78.44	3793.7	78.37	3800.19	78.46		
3809.93	78.39	3826.15	78.54	3835.89	78.33	3842.38	78.3	3845.62	78.43		
3852.11	78.45	3858.6	78.6	3868.34	78.54	3874.83	78.33	3878.07	78.12		
3884.56	78.57	3887.81	78.99	3891.05	80	3894.3	80.65	3904.04	81.17		
3917.02	81.66	3930	83.51	3936.49	84.78	3939.73	85.74	3942.98	86.99		
3949.47	89.85	3952.71	90.46	3962.45	90.78	3975.43	90.57	3978.67	90.35		
3981.92	89.85	3985.16	88.87	3991.65	86.34	3994.9	85.51	4007.88	82.92		
4011.12	82.55	4014.37	82.95	4020.86	84.36	4024.1	84.88	4027.35	84.84		
4030.59	84.2	4037.08	82.4	4040.33	81.79	4046.82	81.24	4050.06	80.78		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.068	2306.53	.068	2335.98	.066	2398.14	.025	2607.68	.066
2683.05	.06								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2335.98	2683.05	1060.66	1050 1065.26	.1	.3

Left Levee Station= 32.79 Elevation= 91.6
Right Levee Station= 3962.45 Elevation= 90.78
Blocked Obstructions num= 1

Sta L	Sta R	Elev
2.82	2152.11	82.35

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	91.14	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.01	Wt. n-Val.	0.068	0.044	0.060	
W.S. Elev (ft)	91.14	Reach Len. (ft)	1060.66	1050.00	1065.26	
Crit W.S. (ft)	64.28	Flow Area (sq ft)	20369.12	9244.92	14643.40	
E.G. Slope (ft/ft)	0.000010	Area (sq ft)	20369.12	9244.92	14643.40	
Q Total (cfs)	20000.00	Flow (cfs)	5958.32	8570.56	5471.12	
Top Width (ft)	4011.31	Top Width (ft)	2297.23	347.07	1367.01	
Vel Total (ft/s)	0.45	Avg. Vel. (ft/s)	0.29	0.93	0.37	
Max Chl Dpth (ft)	35.45	Hydr. Depth (ft)	8.87	26.64	10.71	
Conv. Total (cfs)	6397802.0	Conv. (cfs)	1906009.0	2741637.0	1750156.0	
Length Wtd. (ft)	1056.44	Wetted Per. (ft)	2298.99	355.59	1381.20	
Min Ch El (ft)	55.69	Shear (lb/sq ft)	0.01	0.02	0.01	
Alpha	2.12	Stream Power (lb/ft s)	0.00	0.01	0.00	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19958.39	14641.79	12342.52	
C & E Loss (ft)	0.00	Cum SA (acres)	5871.98	799.65	3858.42	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.27

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.91	3.26	90.28	9.78	88.6	13.04	87.45	16.3	86.38
19.56	85.23	26.07	82.77	29.33	81.82	32.59	81.11	35.85	80.54
39.11	80.03	42.37	79.62	45.63	79.48	52.15	79.36	61.92	78.9
78.22	78.88	88	78.8	101.03	78.86	114.07	78.78	120.59	78.8
123.85	78.75	130.37	78.8	136.88	78.72	146.66	78.73	153.18	78.68
159.7	78.75	162.96	78.74	172.74	78.79	182.51	78.75	189.03	78.8
195.55	78.78	205.33	78.7	211.85	78.82	218.36	78.73	221.62	78.79
224.88	78.78	228.14	78.66	231.4	78.65	237.92	78.75	244.44	78.68
254.21	78.73	267.25	78.57	270.51	78.6	273.77	78.57	277.03	78.64
283.55	78.67	286.81	78.63	293.32	78.63	296.58	78.67	303.1	78.57
306.36	78.61	312.88	78.59	316.14	78.54	329.18	78.58	335.69	78.64
342.21	78.58	345.47	78.59	358.51	78.55	365.03	78.64	368.29	78.6
374.8	78.62	378.06	78.66	384.58	78.54	387.84	78.64	391.1	78.55
397.62	78.6	400.88	78.55	404.14	78.59	407.4	78.54	413.91	78.61
417.17	78.56	423.69	78.6	426.95	78.51	433.47	78.59	436.73	78.53
443.25	78.51	446.51	78.47	453.02	78.6	459.54	78.59	466.06	78.5
472.58	78.58	479.1	78.5	485.62	78.54	492.16	78.48	498.7	78.45
501.97	78.48	505.25	78.41	511.79	78.48	515.06	78.43	521.61	78.54
524.88	78.43	528.15	78.4	531.42	78.47	541.24	78.47	547.78	78.35
557.6	78.26	567.41	78.39	570.68	78.39	577.23	78.32	580.5	78.35
587.04	78.25	590.32	78.25	593.59	78.31	596.86	78.25	603.4	78.22
613.22	78.38	616.49	78.36	619.76	78.25	629.58	78.26	632.85	78.23
642.67	78.24	649.21	78.23	652.48	78.26	659.03	78.27	662.3	78.31
668.84	78.27	675.39	78.26	685.2	78.31	688.47	78.23	695.02	78.22
698.29	78.19	704.83	78.27	711.38	78.3	721.19	78.17	731.01	78.15
734.28	78.18	740.82	78.14	747.37	78.17	753.91	78.14	757.18	78.22
760.45	78.22	767	78.08	773.54	78.14	776.81	78.11	786.63	78.13
789.9	78.1	796.45	78.16	799.72	78.1	809.53	78.12	812.81	78.18
816.08	78.16	822.62	78.22	829.16	78.13	832.44	78.11	842.25	78.11
848.8	78.15	855.34	78.12	858.61	78.15	861.88	78.1	881.52	78.05
888.06	77.98	904.42	78.07	910.96	78.03	917.51	77.95	924.05	77.95
933.87	78	940.41	77.94	943.68	78	946.95	77.96	953.5	77.96
956.77	78.01	963.31	78.02	966.58	77.99	969.86	78.02	973.13	77.97
976.4	77.98	982.94	78.07	989.49	78	996.03	78.1	999.3	77.97
1002.58	77.92	1005.85	77.94	1012.39	77.91	1018.94	77.97	1022.21	78.06
1025.48	77.93	1028.75	77.88	1035.3	77.89	1038.57	77.83	1045.11	77.86
1051.65	77.74	1054.93	77.88	1058.2	77.8	1068.01	77.85	1071.29	77.83
1074.56	77.69	1077.83	77.78	1081.1	77.74	1087.65	77.86	1100.73	78.18
1107.28	78.43	1117.09	78.69	1123.64	78.81	1126.91	78.96	1130.18	79.34
1133.45	79.86	1140	82.07	1143.27	82.38	1146.54	82.43	1149.81	82.57
1156.36	82.59	1159.63	82.38	1162.9	81.85	1169.44	80.56	1172.71	80.05
1175.99	79.77	1182.53	79.3	1185.8	79.14	1192.35	78.63	1198.89	78.02
1202.16	77.79	1205.43	77.77	1215.25	77.6	1218.52	77.59	1225.07	77.76
1228.34	77.73	1234.88	77.42	1241.42	77.31	1247.97	77.45	1251.24	77.45
1254.51	77.52	1261.06	77.56	1267.6	77.5	1270.87	77.44	1277.42	77.42
1283.96	77.49	1287.23	77.66	1293.78	77.57	1297.05	77.36	1300.32	77.28
1306.86	77.33	1310.14	77.43	1316.68	77.51	1323.22	77.52	1329.77	77.69
1333.04	77.55	1339.58	77.5	1342.85	77.4	1346.13	77.19	1352.67	77.16
1375.57	77.83	1378.85	77.87	1382.12	77.81	1385.39	77.86	1388.66	78.16
1391.93	78.31	1395.2	78.33	1398.48	78.16	1401.75	78.12	1408.29	78.32
1411.56	78.35	1418.11	78.56	1421.38	78.55	1427.92	78.65	1437.74	79.21
1441.01	79.37	1444.28	79.44	1450.83	79.23	1454.1	79.24	1457.37	79.34
1463.91	79.46	1470.46	79.74	1473.73	79.91	1477	79.99	1480.27	80.01

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 1483.55   79.37 1486.82   78.49 1490.09   77.45 1493.36   76.03 1499.91   72.27
 1503.18   70.31 1506.45   69.01 1509.72   68.18 1512.99   67.61 1516.26   67.13
 1519.54   66.45 1522.81   64.75 1526.08   62.77 1529.35   55.65 1531.07    55.7
 1542.07   55.41 1547.07    55.3 1560.07    55.2 1572.07      55 1584.07    55.3
 1597.07    55.7 1609.07      56 1621.07    55.4 1624.07    55.6 1631.07   56.01
 1632.07    56.1 1638.07   56.24 1643.07    56.4 1651.07   56.53 1654.07    56.6
 1657.07   56.83 1663.07   57.37 1664.07    57.5 1674.07    57.7 1683.07    57.7
 1693.23   61.85 1696.51   62.01 1699.79   63.27 1703.07   64.97 1706.35   66.87
 1709.63   68.48 1716.19      71 1719.47   72.38 1722.75   73.93 1726.03   74.72
 1732.59   75.91 1735.87   76.53 1739.15   76.91 1742.44   77.04    1749   76.95
 1755.56   76.99 1758.84   76.93 1762.12   77.04 1771.96   77.97 1775.24    78.3
 1778.52   78.56  1781.8   78.94 1788.36   81.33 1791.64   82.07 1794.92   82.13
 1801.49   81.23 1804.77   81.03 1808.05    81.1 1811.33   81.08 1814.61   80.82
 1817.89   80.49 1821.17    80.3 1824.45   80.28 1827.73   80.31 1831.01   80.23
 1840.85    80.2 1844.13   80.25 1850.69   80.19 1853.98   80.24 1863.82   80.17
 1870.38   80.21 1876.94    80.2 1880.22   80.13 1886.78   80.11 1890.06   80.15
 1896.62   80.17  1899.9   80.09 1906.47   80.09 1913.03   80.02 1916.31   80.03
 1919.59   79.98 1929.43   79.97 1932.71   80.05 1935.99   80.05 1939.27   79.96
 1942.55   79.97 1949.11   79.88 1952.39   79.86 1958.95   79.96 1972.08      80
 1975.36   79.93  1985.2   79.85 1988.48   79.87 1995.04   79.86  2001.6   79.79
 2008.16   79.83 2014.72   79.84 2021.29   79.78 2027.85   79.76 2034.41    79.7
 2040.97   79.73 2044.25    79.7 2047.53    79.6 2054.09   79.66 2057.37   79.62
 2060.65    79.7 2063.93   79.73  2070.5   79.63 2077.06   79.59 2083.62   79.71
  2086.9   79.64 2090.18    79.7 2093.46    79.7 2100.02   79.61  2103.3   79.59
 2109.86   79.65 2113.14   79.74 2116.43   79.74 2122.99   79.64 2132.83   79.64
 2136.11   79.66 2139.39   79.74 2142.67   79.72 2145.95   79.63 2152.51   79.63
 2159.07   79.71 2168.92   79.66  2172.2   79.73 2178.76   79.62 2185.32    79.7
 2191.88   79.65 2195.16   79.68 2208.28    79.6 2218.13    79.7 2227.97   79.63
 2234.53   79.63 2241.09   79.69 2247.65   79.71 2250.93   79.66  2257.5   79.71
 2260.78   79.67 2267.34    79.7  2273.9    79.7 2280.46   79.67 2287.02   79.74
 2293.58   79.75 2300.14   79.72 2303.43   79.79 2309.99   79.69 2313.27   79.72
 2319.83    79.7 2323.11   79.64 2329.67   79.68 2332.95   79.61 2339.51   79.67
 2346.07   79.61 2355.92   79.65 2362.48   79.75 2369.04   79.64 2378.88   79.82
 2382.16   79.81 2388.72   79.92 2395.28   79.95 2398.56   80.03 2401.85   80.03
 2408.41   79.88 2411.69   79.92 2414.97   80.02 2418.25   80.23 2421.53   80.54
 2424.81   80.76 2431.37   81.32 2434.65   81.55 2437.93    81.9 2441.21   82.42
 2444.49   83.11 2447.78   83.93 2451.06   84.93 2454.34   85.99 2457.62    87.1
  2460.9   88.36 2464.18   89.36 2467.46   89.84 2470.74      90 2474.02    90.4
  2477.3   90.62 2483.86   90.72 2487.14   90.73 2490.42   90.68

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085    3.26    .066 1156.36     .07    1477     .07 1493.36    .025
 1709.63     .07 1791.64    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1480.27 1791.64           704.22    1050 1152.61             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1480.27   80.01       T
 1791.64 2490.42   82.07       T
Left Levee      Station=       0      Elevation=   90.91
Right Levee     Station= 2487.14      Elevation=   90.73

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             91.13    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                0.067      0.041     0.066
  W.S. Elev (ft)             91.11    Reach Len. (ft)          704.22    1050.00    1152.61
  Crit W.S. (ft)             63.97    Flow Area (sq ft)      16161.90    8359.52    6020.14
  E.G. Slope (ft/ft)      0.000016    Area (sq ft)           18526.88    8359.52    7412.52
  Q Total (cfs)           20000.00    Flow (cfs)              7111.94   10601.22    2286.84
  Top Width (ft)           2490.42    Top Width (ft)          1480.27     311.37     698.78
  Vel Total (ft/s)            0.65    Avg. Vel. (ft/s)           0.44       1.27       0.38
  Max Chl Dpth (ft)          36.11    Hydr. Depth (ft)          10.92      26.85       8.62
  Conv. Total (cfs)       4972895.0    Conv. (cfs)             1768348.0  2635938.0   568609.9
  Length Wtd. (ft)          994.39    Wetted Per. (ft)        1483.07     324.03     700.60
  Min Ch El (ft)             55.00    Shear (lb/sq ft)           0.01       0.03       0.01
  Alpha                       2.19    Stream Power (lb/ft s)     0.00       0.03       0.00
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)    19484.84   14429.61   12072.83
  C & E Loss (ft)             0.01    Cum SA (acres)           5825.99     791.72    3833.16


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 129.23

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      34
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.64    3275   91.64    3307   91.64    3308   81.64    3320   74.54
    3327   73.84    3332   66.34    3336   64.82    3345   61.39    3349   59.74
    3359   56.24    3369   55.74    3379   55.44    3389   55.24    3399   55.14
    3409   55.64    3419   55.74    3429   56.04    3439   56.14    3449   56.24
    3459   56.94    3469   56.74    3479   56.74    3489   56.84    3509   57.44
    3519   58.24    3529   58.74    3539   61.38    3541   63.54    3553   64.86
    3571   66.84    3615   76.74    3616   91.64    7505   91.64

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .144    3275    .144    3308    .066    3336    .025    3553    .066
    3615     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         3308    3615           57.04      70   79.73             .1       .3
Left Levee      Station=       0      Elevation=   91.64
Right Levee     Station=    7505      Elevation=   91.64

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             91.10    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                0.144      0.040     0.060
  W.S. Elev (ft)             91.02    Reach Len. (ft)           57.04      70.00     79.73
```

Crit W.S. (ft)	63.74	Flow Area (sq ft)	4.40	9055.54	6.85
E.G. Slope (ft/ft)	0.000040	Area (sq ft)	4.40	9055.54	6.85
Q Total (cfs)	20000.00	Flow (cfs)	0.17	19999.17	0.66
Top Width (ft)	308.90	Top Width (ft)	0.94	307.00	0.96
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)	0.04	2.21	0.10
Max Chl Dpth (ft)	35.88	Hydr. Depth (ft)	4.69	29.50	7.14
Conv. Total (cfs)	3154816.0	Conv. (cfs)	27.3	3154685.0	103.7
Length Wtd. (ft)	70.00	Wetted Per. (ft)	9.43	317.51	14.31
Min Ch El (ft)	55.14	Shear (lb/sq ft)	0.00	0.07	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00	0.16	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	19335.05	14219.72	11974.67
C & E Loss (ft)	0.00	Cum SA (acres)	5814.02	784.27	3823.90

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.22

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.64	3275	91.64	3307	91.64	3308	81.64	3320	74.54
3327	73.84	3332	66.34	3336	64.82	3345	61.39	3349	59.74
3359	56.24	3369	55.74	3379	55.44	3389	55.24	3399	55.14
3409	55.64	3419	55.74	3429	56.04	3439	56.14	3449	56.24
3459	56.94	3469	56.74	3479	56.74	3489	56.84	3509	57.44
3519	58.24	3529	58.74	3539	61.38	3541	63.54	3553	64.86
3571	66.84	3615	76.74	3616	91.64	7505	91.64		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.144	3275	.144	3308	.066	3336	.025	3553	.066
3615	.06								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3308	3615	79.88	70	67.66	.1	.3

Left Levee Station= 0 Elevation= 91.64
Right Levee Station= 7505 Elevation= 91.64

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	91.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.144	0.040	0.060
W.S. Elev (ft)	91.02	Reach Len. (ft)	79.88	70.00	67.66
Crit W.S. (ft)	63.74	Flow Area (sq ft)	4.40	9054.67	6.84
E.G. Slope (ft/ft)	0.000040	Area (sq ft)	4.40	9054.67	6.84
Q Total (cfs)	20000.00	Flow (cfs)	0.17	19999.17	0.66
Top Width (ft)	308.90	Top Width (ft)	0.94	307.00	0.96
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)	0.04	2.21	0.10
Max Chl Dpth (ft)	35.88	Hydr. Depth (ft)	4.69	29.49	7.14
Conv. Total (cfs)	3154310.0	Conv. (cfs)	27.3	3154179.0	103.6
Length Wtd. (ft)	70.03	Wetted Per. (ft)	9.43	317.51	14.31
Min Ch El (ft)	55.14	Shear (lb/sq ft)	0.00	0.07	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00	0.16	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	19335.04	14205.17	11974.66
C & E Loss (ft)	0.07	Cum SA (acres)	5814.01	783.77	3823.90

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.216

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.64	100	91.64	100	55.64	140	55.64	140	91.64
145	91.64	145	55.64	227	55.64	227	91.64	232	91.64
232	55.64	272	55.64	272	91.64	372	91.64		

Manning's n Values num= 1

Sta	n Val
0	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
145	227	15.43	20	21.58	.2	.5

Left Levee Station= 0 Elevation= 91.64
Right Levee Station= 372 Elevation= 91.64
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
100	140	87.64	232	272	87.64

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	91.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.015	0.015	0.015
W.S. Elev (ft)	90.30	Reach Len. (ft)	15.43	20.00	21.58
Crit W.S. (ft)	67.92	Flow Area (sq ft)	106.31	2841.93	106.31
E.G. Slope (ft/ft)	0.000097	Area (sq ft)	106.31	2841.93	106.31
Q Total (cfs)	20000.00	Flow (cfs)	183.52	19632.97	183.52
Top Width (ft)	162.00	Top Width (ft)	40.00	82.00	40.00
Vel Total (ft/s)	6.55	Avg. Vel. (ft/s)	1.73	6.91	1.73
Max Chl Dpth (ft)	34.66	Hydr. Depth (ft)	2.66	34.66	2.66
Conv. Total (cfs)	2026357.0	Conv. (cfs)	18593.4	1989170.0	18593.4
Length Wtd. (ft)	20.00	Wetted Per. (ft)	45.32	151.32	45.32
Min Ch El (ft)	55.64	Shear (lb/sq ft)	0.01	0.11	0.01
Alpha	1.09	Stream Power (lb/ft s)	0.02	0.79	0.02

Frctn Loss (ft)	Cum Volume (acre-ft)	19334.94	14195.61	11974.57
C & E Loss (ft)	Cum SA (acres)	5813.98	783.46	3823.87

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

INLINE STRUCTURE

RIVER: Rio Grande
REACH: Lower Reach RS: 129.215

INPUT
Description: Retamal Dam
Distance from Upstream XS = 5
Deck/Roadway Width = 5
Weir Coefficient = 3.58
Weir Embankment Coordinates num = 2

Sta	Elev	Sta	Elev
0	91.64	372	91.64

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Weir crest shape = Ogee

INLINE STRUCTURE GATE Gate #1
Height = 13.75
Width = 82
Invert = 58.64
Gate Type = Radial Radial Coefficient= .6
Trunion Exponent = .16
Opening Exponent = .72
Head Exponent = .62
Trunion Height = 24
Weir Coefficient = 3.58
Weir crest shape = Ogee
Number of Gate Openings = 1

Sta
186

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.214

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.64	100	91.64	100	55.64	140	55.64	140	91.64
145	91.64	145	55.64	227	55.64	227	91.64	232	91.64
232	55.64	272	55.64	272	91.64	372	91.64		

Manning's n Values num= 1

Sta	n Val
0	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
145 227 25.03 25.01 25.62 .2 .5
Left Levee Station= 0 Elevation= 91.64
Right Levee Station= 372 Elevation= 91.64
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
100	140	87.64	232	272	87.64

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	84.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.22	Wt. n-Val.		0.015	
W.S. Elev (ft)	83.18	Reach Len. (ft)	25.03	25.01	25.62
Crit W.S. (ft)	67.92	Flow Area (sq ft)		2257.98	
E.G. Slope (ft/ft)	0.000191	Area (sq ft)		2257.98	
Q Total (cfs)	20000.00	Flow (cfs)		20000.00	
Top Width (ft)	82.00	Top Width (ft)		82.00	
Vel Total (ft/s)	8.86	Avg. Vel. (ft/s)		8.86	
Max Chl Dpth (ft)	27.54	Hydr. Depth (ft)		27.54	
Conv. Total (cfs)	1448121.0	Conv. (cfs)		1448121.0	
Length Wtd. (ft)	25.01	Wetted Per. (ft)		137.07	
Min Ch El (ft)	55.64	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		1.74	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19334.94	14194.76	11974.57
C & E Loss (ft)	0.23	Cum SA (acres)	5813.97	783.42	3823.86

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.213

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.64	100	91.64	100	55.64	140	55.64	140	91.64
145	91.64	145	55.64	160.5	55.64	160.5	91.64	170.5	91.64
170.5	55.64	201.5	55.64	201.5	91.64	211.5	91.64	211.5	55.64
227	55.64	227	91.64	232	91.64	232	55.64	272	55.64
272	91.64	372	91.64						

Manning's n Values num= 1

Sta	n Val

```
      0    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          145     227           25.03   25.01   25.62            .2       .5
Left Levee      Station=       0      Elevation=   91.64
Right Levee     Station=     372      Elevation=   91.64
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     100     140   87.64     232     272   87.64

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             84.16    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               2.36    Wt. n-Val.                           0.015
  W.S. Elev (ft)             81.79    Reach Len. (ft)           25.03      25.01      25.62
  Crit W.S. (ft)             70.42    Flow Area (sq ft)                  1621.44
  E.G. Slope (ft/ft)      0.001074    Area (sq ft)                       1621.44
  Q Total (cfs)           20000.00    Flow (cfs)                        20000.00
  Top Width (ft)             62.00    Top Width (ft)                       62.00
  Vel Total (ft/s)           12.33    Avg. Vel. (ft/s)                     12.33
  Max Chl Dpth (ft)          26.15    Hydr. Depth (ft)                     26.15
  Conv. Total (cfs)       610318.9    Conv. (cfs)                       610318.9
  Length Wtd. (ft)           25.01    Wetted Per. (ft)                    218.91
  Min Ch El (ft)             55.64    Shear (lb/sq ft)                      0.50
  Alpha                       1.00    Stream Power (lb/ft s)                6.12
  Frctn Loss (ft)             0.03    Cum Volume (acre-ft)    19334.94   14193.65   11974.57
  C & E Loss (ft)             0.00    Cum SA (acres)           5813.97     783.38    3823.86


Warning: Divided flow computed for this cross-section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 129.212

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.64     100   91.64     100   55.64     140   55.64     140   91.64
     145   91.64     145   55.64   160.5   55.64   160.5   91.64   170.5   91.64
   170.5   55.64   201.5   55.64   201.5   91.64   211.5   91.64   211.5   55.64
     227   55.64     227   91.64     232   91.64     232   55.64     272   55.64
     272   91.64     372   91.64

Manning's n Values        num=       1
     Sta   n Val
       0    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          145     227           10.01   10.01   10.25            .2       .5
Left Levee      Station=       0      Elevation=   91.64
Right Levee     Station=     372      Elevation=   91.64
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     100     140   87.64     232     272   87.64

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             84.13    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               2.37    Wt. n-Val.                           0.015
  W.S. Elev (ft)             81.76    Reach Len. (ft)           10.01      10.01      10.25
  Crit W.S. (ft)             70.42    Flow Area (sq ft)                  1619.31
  E.G. Slope (ft/ft)      0.001077    Area (sq ft)                       1619.31
  Q Total (cfs)           20000.00    Flow (cfs)                        20000.00
  Top Width (ft)             62.00    Top Width (ft)                       62.00
  Vel Total (ft/s)           12.35    Avg. Vel. (ft/s)                     12.35
  Max Chl Dpth (ft)          26.12    Hydr. Depth (ft)                     26.12
  Conv. Total (cfs)       609365.4    Conv. (cfs)                       609365.4
  Length Wtd. (ft)           10.01    Wetted Per. (ft)                    218.71
  Min Ch El (ft)             55.64    Shear (lb/sq ft)                      0.50
  Alpha                       1.00    Stream Power (lb/ft s)                6.15
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)    19334.94   14192.71   11974.57
  C & E Loss (ft)             1.11    Cum SA (acres)           5813.97     783.34    3823.86


Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 129.211

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      28   87.14     100   55.64     272   55.64     344   87.14

Manning's n Values        num=       1
     Sta   n Val
      28    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           28     344          112.99     100    95.7            .2       .5
Left Levee      Station=      28      Elevation=   87.14
Right Levee     Station=     344      Elevation=   87.14

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             83.02    Element                  Left OB    Channel   Right OB
```

Vel Head (ft)	0.15	Wt. n-Val.		0.015		
W.S. Elev (ft)	82.87	Reach Len. (ft)	112.99	100.00	95.70	
Crit W.S. (ft)	62.88	Flow Area (sq ft)		6377.17		
E.G. Slope (ft/ft)	0.000018	Area (sq ft)		6377.17		
Q Total (cfs)	20000.00	Flow (cfs)		20000.00		
Top Width (ft)	296.46	Top Width (ft)		296.46		
Vel Total (ft/s)	3.14	Avg. Vel. (ft/s)		3.14		
Max Chl Dpth (ft)	27.23	Hydr. Depth (ft)		21.51		
Conv. Total (cfs)	4764930.0	Conv. (cfs)		4764930.0		
Length Wtd. (ft)	100.00	Wetted Per. (ft)		307.85		
Min Ch El (ft)	55.64	Shear (lb/sq ft)		0.02		
Alpha	1.00	Stream Power (lb/ft s)		0.07		
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	19334.94	14191.80	11974.57	
C & E Loss (ft)	0.02	Cum SA (acres)	5813.97	783.30	3823.86	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.21

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
14	87.14	86	55.64	286	55.64	358	87.14

Manning's n Values num= 1

Sta	n Val
14	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
14	358	472.44	400	409.67	.2	.5

Left Levee Station= 14 Elevation= 87.14
Right Levee Station= 358 Elevation= 87.14

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	83.00	Element		Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.			0.015	
W.S. Elev (ft)	82.88	Reach Len. (ft)		472.44	400.00	409.67
Crit W.S. (ft)	62.24	Flow Area (sq ft)			7144.03	
E.G. Slope (ft/ft)	0.000014	Area (sq ft)			7144.03	
Q Total (cfs)	20000.00	Flow (cfs)			20000.00	
Top Width (ft)	324.53	Top Width (ft)			324.53	
Vel Total (ft/s)	2.80	Avg. Vel. (ft/s)			2.80	
Max Chl Dpth (ft)	27.24	Hydr. Depth (ft)			22.01	
Conv. Total (cfs)	5432308.0	Conv. (cfs)			5432308.0	
Length Wtd. (ft)	408.14	Wetted Per. (ft)			335.92	
Min Ch El (ft)	55.64	Shear (lb/sq ft)			0.02	
Alpha	1.00	Stream Power (lb/ft s)			0.05	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		19334.94	14176.28	11974.57
C & E Loss (ft)	0.04	Cum SA (acres)		5813.97	782.59	3823.86

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.2

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.75	13.06	84.01	32.66	89.48	52.25	90.03	55.52	89.08
58.78	83.98	62.05	82.1	78.37	81.94	101.33	79.88	111.17	80.94
143.97	81.42	150.53	80.55	157.09	81.2	170.21	81.05	216.13	81
225.97	80.8	235.81	81.43	252.21	81.18	278.45	81.21	321.09	81.66
334.21	82.38	350.61	82.65	373.57	81.73	380.13	82.24	399.81	81.81
426.05	82.31	471.96	82.02	494.92	82.23	534.28	81.88	540.84	82.12
586.76	81.94	599.88	82.07	681.88	82.09	734.36	81.96	750.76	82.2
826.19	81.96	852.43	81.73	868.83	81.99	924.59	82.05	954.11	81.84
970.51	82.08	996.75	81.59	1006.59	81.96	1065.63	81.86	1088.59	82.01
1098.43	81.69	1114.83	81.99	1137.79	81.7	1150.91	82.02	1209.94	81.78
1232.9	81.98	1272.26	81.93	1278.82	81.66	1295.22	81.94	1324.74	81.83
1357.54	82.07	1367.38	81.87	1403.46	81.98	1423.14	81.73	1442.82	82.01
1449.38	81.22	1459.22	81.72	1475.62	81.85	1485.46	81.33	1495.3	77.37
1501.86	75.81	1514.98	75.77	1521.54	78.16	1528.09	79.39	1541.21	79.15
1567.45	77.67	1590.41	78.16	1626.49	78.03	1682.25	78.22	1711.77	78.04
1744.57	78.13	1810.17	78.08	1856.08	78.2	1875.76	78.05	1928.24	78.26
1938.08	78.18	2003.68	78.43	2059.44	78.23	2072.56	78.47	2111.92	78.51
2151.28	78.36	2157.84	78.65	2210.32	78.8	2223.43	79.02	2243.11	80.05
2252.95	80.94	2275.91	80.7	2289.03	81.17	2308.71	81.29	2351.35	81.15
2367.75	81.36	2436.63	81.22	2443.19	81.48	2472.71	81.22	2538.31	81.43
2557.99	81.23	2590.79	81.46	2623.59	81.29	2672.78	81.41	2735.1	81.32
2754.78	81.49	2781.02	81.3	2833.5	81.26	2876.14	81.59	2899.1	81.17
2912.22	80.36	2935.18	77.75	2945.02	78.24	2964.7	77.89	2981.1	78.3
3013.9	78.37	3043.42	78.22	3168.05	78.29	3213.97	78.21	3266.45	78.27
3279.57	78.48	3332.05	78.45	3341.89	78.29	3417.33	78.45	3450.13	78.25
3473.08	78.39	3502.6	78.3	3525.56	78.46	3597.72	78.28	3722.36	78.74
3725.64	78.15	3742.04	78.75	3794.52	79.18	3810.92	79.18	3830.6	78.67
3850.28	78.86	3896.19	78.52	3984.75	78.73	4033.95	78.61	4073.31	78.64
4079.87	78.83	4155.31	78.6	4188.11	78.85	4240.59	78.64	4286.51	78.87
4312.75	78.73	4358.67	78.88	4371.79	78.67	4414.43	78.76	4434.11	78.56
4473.47	79	4506.27	78.71	4555.47	78.93	4578.43	78.78	4607.94	79.02
4627.62	79.45	4647.3	78.79	4670.26	78.69	4693.22	78.86	4719.46	78.7
4729.3	78.88	4758.82	78.47	4781.78	78.71	4808.02	78.59	4827.7	78.95
4863.78	78.61	4886.74	78.94	4922.82	78.71	4935.94	78.96	4972.02	78.91
5011.38	78.48	5037.62	78.64	5050.74	79.05	5083.54	78.17	5119.62	78.15
5145.86	78.71	5155.7	78.34	5168.82	76.43	5172.1	77.3	5185.22	78.24
5198.34	78.39	5211.46	77.74	5221.3	78.09	5244.26	77.56	5267.22	78.05
5293.46	78.11	5316.42	77.82	5362.34	78.01	5372.18	77.83	5398.42	78.38
5404.98	78.03	5431.22	78.03	5447.62	78.27	5467.3	78	5506.66	78.24
5526.34	78.2	5536.18	78.57	5559.14	78.08	5585.38	78.55	5598.5	78.13

```
  5614.9   78.34 5654.25   78.12 5660.81   78.36 5687.05   78.38 5703.45   78.05
 5778.89   78.25 5792.01   78.63 5811.69   78.38 5837.93    78.5 5844.49   78.88
 5857.61   78.39 5870.73   78.79 5887.13   78.52 5929.77    78.9 5939.61   78.61
 5965.85    78.8 5992.09   78.23 6015.05   78.53 6051.13   78.61 6077.37   78.43
 6093.77   78.82 6106.89   78.37 6169.21   78.71 6182.33   78.58 6270.89   78.86
 6290.57   78.52 6306.97   78.72 6320.09   78.51 6359.45   78.87 6375.85    78.5
 6392.25   78.95 6421.77   79.08 6434.89   78.75 6451.29   79.26 6470.97   78.88
 6480.81   79.34 6500.49   79.16 6513.61   78.72 6552.97   79.17 6575.93   78.87
 6592.33   79.66 6605.45   79.47 6621.85   80.26 6654.64   80.47 6667.76    80.3
 6687.44    80.5 6697.28   80.17 6723.52   80.12 6739.92   80.33 6753.04   80.04
 6815.36   80.13 6903.92   79.89 6930.16   80.33 6943.28   79.94 6959.68   80.14
 6982.64   79.86 6999.04   80.38  7005.6    79.9 7028.56   80.07 7044.96   79.72
 7107.28   79.76 7143.36   79.95 7182.72   79.75  7218.8   80.13 7231.92   79.73
  7251.6   80.07 7264.72   79.83  7300.8   80.01 7320.48   79.82 7340.16   79.97
 7343.44   79.69  7366.4   79.92 7392.64   79.79 7438.56   79.84  7448.4   80.19
 7454.96   79.77 7527.12   79.66 7553.36   79.24 7589.44    79.6 7628.79   79.79
 7648.47   79.53 7681.27   79.54 7723.91   79.77 7815.75   79.71 7851.83   79.39
 7874.79   79.37 7904.31   81.97 7927.27   81.27 7946.95   79.11 7963.35   79.12
 7983.03   80.16 8009.26   80.29 8012.54    79.7 8038.76   72.43 8048.59   69.06
 8071.53    66.1 8081.37   65.74 8117.42   66.71 8127.25   67.32 8137.08   68.66
 8143.64   70.38 8150.19   73.16 8160.02   76.12 8166.58   76.86 8176.41   76.11
 8189.52   79.38 8196.08   80.42 8219.02   80.58 8232.13   78.55 8238.69   76.45
 8255.07   64.26 8261.63   61.74 8270.63   60.74 8275.63   58.08 8283.63   55.64
 8303.63   55.04 8313.63   55.64 8333.63   55.24 8363.63   55.24 8373.63   55.04
 8403.63   56.04 8433.63   56.04 8453.63   57.34 8458.63   58.08 8464.03   61.16
 8530.24   61.71 8536.79   62.32 8540.06   63.68 8546.61   68.32 8553.15   70.44
 8562.97   78.33 8579.34   80.67 8598.98    81.4 8628.44   81.15 8661.17   81.37
 8667.72   82.39 8677.54   85.42 8684.08   85.09 8697.18   81.95 8720.09   81.33
 8736.45   82.05 8749.55   81.92 8769.19   80.41 8782.28   81.97  8792.1   85.16
 8798.65   86.41 8808.46   85.43 8815.01   85.59 8824.83   87.01 8834.65   81.77
 8837.92   80.79 8844.47   81.89 8854.29   80.45 8864.11   80.24  8926.3   80.09
 9014.68   80.13 9027.77   79.97 9080.14   80.03 9086.69   79.88 9135.79   79.89
 9148.91   80.07 9171.85    79.8 9221.03   79.73 9266.92   79.83 9289.87    80.1
 9322.66   80.09    9362   80.33  9391.5   80.13 9407.89   80.25 9463.62   80.12
 9473.46   80.29 9499.69   80.09 9519.36   80.24 9529.19   79.84 9539.03   80.15
 9545.58      81 9555.42    84.2  9558.7   84.58 9568.53   83.09 9575.09   84.62
 9578.37   84.08  9588.2   79.59 9598.04   79.27 9627.54   79.86 9673.44   79.48
 9706.22   79.54 9758.67   79.27 9811.13   79.27 9827.52   79.01 9857.02   79.12
 9873.41   78.88 9889.81   79.03  9906.2   78.71 9938.98    78.9 9991.43   78.43
10040.61   78.4110053.72   78.1610089.78   78.2510125.84   78.7410175.02   80.03
10188.13   80.74 10207.8   82.4810240.59   82.3810260.26   81.6410273.37   80.58
10306.15   80.9610325.82   80.7910378.28   80.8410424.17    80.610493.02   80.94
10502.85    81.210512.69   80.7210538.91   81.2310552.03   82.3310574.97   82.11
10591.37   81.5510607.76   81.6410640.54   80.4710656.93   80.67 10676.6   80.39
10706.11    80.810715.94   80.3910755.28    80.110774.95   80.5710801.18   80.21
10817.57   80.4710847.08   80.0910896.25   80.4510912.64   80.1710965.09   80.23
10974.93   80.6910991.32    80.111017.55   80.4511047.05   80.0411089.67   79.83
11161.79   80.1811174.91   80.5711210.97    80.511256.87   81.0311299.48   80.86
11319.15   81.5211325.71   81.2711335.54   82.6511345.38   81.5211371.61   80.74
11384.72   81.0911424.06   81.4611450.29   81.5311469.96   81.31 11538.8   81.32
11574.86   81.1711617.48   81.2611666.66    81.211715.83   80.5311725.67   80.77
11742.06   80.1211755.17   80.0811784.67   77.8811791.23   77.9911817.46   80.54

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .168 8219.02    .066 8275.63    .025 8458.63    .066 8579.34    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8219.02 8579.34          1099.85 1148.64 1145.18             .1       .3
Left Levee      Station=   52.25      Elevation=   90.03
Right Levee     Station= 8824.83      Elevation=   87.01
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 8018.03  8193.8   80.29

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             82.95    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.168      0.048      0.067
  W.S. Elev (ft)             82.91    Reach Len. (ft)          1099.85    1148.64    1145.18
  Crit W.S. (ft)             63.09    Flow Area (sq ft)       26991.19    7785.52     266.77
  E.G. Slope (ft/ft)      0.000072    Area (sq ft)            26991.19    7785.52     266.77
  Q Total (cfs)           20000.00    Flow (cfs)               4484.48   15450.64      64.87
  Top Width (ft)           8700.72    Top Width (ft)           8158.37     360.32     182.03
  Vel Total (ft/s)            0.57    Avg. Vel. (ft/s)            0.17       1.98       0.24
  Max Chl Dpth (ft)          27.87    Hydr. Depth (ft)            3.31      21.61       1.47
  Conv. Total (cfs)       2362743.0    Conv. (cfs)              529784.1   1825295.0     7663.8
  Length Wtd. (ft)         1143.07    Wetted Per. (ft)         8164.62     372.41     182.64
  Min Ch El (ft)             55.04    Shear (lb/sq ft)            0.01       0.09       0.01
  Alpha                       9.36    Stream Power (lb/ft s)      0.00       0.19       0.00
  Frctn Loss (ft)             0.15    Cum Volume (acre-ft)    19188.57   14107.73   11973.31
  C & E Loss (ft)             0.01    Cum SA (acres)           5769.73     779.45    3823.01


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 129.03

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.83   13.12   84.14   26.24   88.13   32.81   89.57   52.49      90
   55.77   89.25   62.33   82.97   65.61   82.22   82.02   81.76   98.42   80.01
  111.54   80.95  124.66   81.19  160.75   81.03  213.24   81.07  226.36   81.37
  232.92   82.03  242.76   81.13  249.33   81.75  282.13   82.52  308.38    81.8
  347.74   81.69  373.99    81.8  413.36   81.74  429.76   81.87  465.85   81.64
  475.69   81.79  511.77   81.64  560.98   81.65  580.67   81.85  590.51   81.67
  656.12   81.75  679.09   81.62  757.82    81.8  839.84   81.66  928.41   81.91
  954.66    81.7  971.06   81.86 1039.95   81.53 1072.76   81.79 1092.44   81.64
 1102.29   81.86 1154.77   81.66 1174.46   81.87 1187.58   81.51 1217.11   81.45
 1220.39   81.19 1236.79    81.9 1246.63    81.8 1253.19   80.67 1259.75   77.35
 1263.03   76.52 1272.88   76.07 1279.44   76.45    1286   78.66 1312.24   77.84
 1335.21   78.08 1384.42   78.12  1404.1   77.93 1499.24   78.08 1518.92      78
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 1545.17   78.18 1614.06   78.01 1643.59   78.23 1673.11   78.09 1682.95   78.23
 1745.28   78.15 1787.93   78.42  1827.3   78.99 1846.98   79.97 1856.82   81.08
 1876.51   80.76 1886.35   81.19 1915.88   81.49 1935.56   81.32 1951.96   81.56
 2020.86   81.36 2043.82   81.42 2109.43   81.35 2155.36   81.48 2168.48   81.28
 2224.25   81.31 2234.09   81.22  2283.3   81.31 2289.86   81.53 2316.11   81.25
 2345.63   81.18 2355.47   81.36  2401.4    81.5 2430.93   81.13 2444.05   79.66
 2457.17   78.87 2463.73   77.75 2470.29   78.29 2476.86   77.89 2483.42   78.33
 2493.26   78.02 2571.99   78.24  2621.2   78.16 2650.73   78.34 2690.09   78.36
  2755.7   78.15 2814.75   78.31  2857.4   78.23 2890.21    78.4 2932.85   78.19
 2988.62   78.24 3018.15   78.55 3031.27    78.4 3044.39   78.68 3087.04    78.3
 3100.16   77.29 3116.57   76.45 3159.21   75.71 3198.58   75.54 3267.47   75.74
 3283.87   75.51 3365.89   75.58 3395.41   75.53 3428.22   76.93 3438.06   78.18
 3454.46   77.63 3470.87   78.18 3490.55   78.26 3503.67   78.69 3539.76    78.2
 3585.69   77.88 3595.53   78.03 3628.34   77.89 3644.74   78.08 3710.35   77.82
 3789.08   78.12 3844.85   77.91 3861.26   78.08 3946.55   77.98 3966.23   78.07
 4035.13   78.04 4041.69   77.86 4074.49   78.09  4090.9   77.91 4120.42   78.14
 4176.19   77.92 4254.93    78.1 4271.33   77.89 4297.58   78.13 4366.47    77.9
 4376.31   78.09 4438.64   77.82 4464.89   78.06 4494.42   77.81 4504.26   78.06
 4537.06   77.79 4563.31   77.75 4573.15   77.95  4615.8   77.79 4655.17   77.99
 4691.25   77.73  4733.9   78.05 4743.74   77.77 4756.87   78.07 4773.27   77.94
 4789.67   78.18 4796.23   78.65 4806.08    75.2 4812.64   77.45 4852.01   77.26
 4888.09   77.26 4911.06   77.49 4963.55   77.53 4999.63   77.43 5078.37   77.82
 5098.05   77.66 5137.42   77.69 5193.19   77.92 5219.44    77.7 5245.68   77.93
 5258.81   77.75 5281.77   77.98 5304.73   77.87 5347.38    78.1 5363.79   77.88
 5426.12   78.08 5442.52   77.94  5531.1   78.04 5577.03   78.23 5586.87   78.11
 5639.36   78.21 5678.73   78.56 5695.13    78.2 5701.69   78.46 5741.06   78.55
 5767.31   79.12 5790.27   78.79 5816.51   78.83 5823.08   78.63 5865.72   78.86
 5878.85   78.74 5905.09   79.28 5911.65   78.91 5931.34   79.17 5944.46    78.9
 5960.86   79.28 5987.11   78.84 5996.95   79.22 6029.76   79.01  6039.6   78.78
 6059.28   79.31 6078.97   78.94 6088.81   79.14 6121.61   78.98 6134.74   79.55
 6144.58   79.01 6190.51   79.42 6213.47   80.41 6220.03   80.27 6233.16   81.19
 6256.12   80.77 6282.37    80.7 6315.17   80.14 6328.29   80.54 6338.14   80.25
 6354.54   80.56 6367.66   80.22 6374.22   80.54 6400.47   80.14 6410.31   80.56
 6423.43   80.32  6446.4   80.82 6469.36   80.08 6489.05   80.53 6512.01    80.2
 6567.78   80.02 6597.31   80.06 6616.99   80.41 6626.83   80.08 6679.32   80.24
 6699.01      80 6741.66   80.07 6748.22   80.29 6764.62   79.85 6797.43   80.08
 6833.51    79.8 6856.48    79.9 6872.88   80.27 6889.28   80.01 6912.25   80.34
 6922.09   79.89  6954.9   80.04 6964.74   79.85 6981.14   80.11 6997.55   79.66
 7027.07   79.95 7043.48   79.88 7053.32   79.53 7092.69    79.5 7099.25   79.73
 7171.42   79.39 7181.26   79.72 7200.95   79.43 7240.31   79.66 7269.84   79.65
 7279.67   79.86 7312.41   79.96 7325.51   79.66 7358.25   79.94  7364.8   79.66
 7417.18   79.62 7446.65   79.23 7456.47   79.41 7479.38    79.1  7502.3   79.57
 7508.85   79.08 7531.77   79.46 7538.31   80.21 7567.78   82.16  7577.6   79.48
  7590.7   77.22 7610.34   77.85 7620.16   74.03 7629.98   68.26 7639.81   66.47
 7646.35   64.68 7662.72   61.92 7669.27   61.71 7671.21   58.78 7678.71   58.28
 7696.42   57.98 7716.42   57.38 7736.42   57.08 7746.42   56.18 7756.42   54.78
 7776.42   55.08 7796.42   56.78 7806.42   56.78 7816.42   58.18 7826.42   61.71
 7832.97   62.86 7842.79   65.91 7849.34    66.6 7862.43   70.61 7868.98   73.87
 7885.35   75.39  7891.9   76.54 7901.72   77.28 7924.64   77.51 7934.46   77.29
 7960.65   77.52 7977.02   78.08 7986.84   79.25 7993.39   82.17 7996.66   82.75
 8003.21   81.72 8006.49   82.76 8013.03   82.29 8026.13   80.31  8029.4   80.97
 8045.77   80.43 8078.52   80.56  8098.2   80.48 8206.47   80.39 8255.67   80.23
 8295.04   80.27 8340.96   80.09 8347.52   80.22 8377.04   79.99 8413.12   80.14
 8426.25   79.99 8511.53   80.21 8544.34   80.03 8573.86   80.23 8593.54   79.97
  8616.5   80.21 8629.62   80.03 8659.15   80.13 8691.95   80.01 8728.03   79.71
 8744.43   79.86 8846.12   79.41 8852.68   79.64 8885.49   79.37 8934.69   79.69
 8944.53   79.52  9033.1   79.12 9059.34   79.33 9069.18   79.16 9118.39   79.28
 9151.19   79.21 9167.59   79.42 9180.71   78.99 9197.11   79.89 9203.67   83.81
 9210.23   84.65 9216.79   83.02 9229.92   84.54 9239.76   80.65 9256.16   79.79
 9272.56   80.04 9311.92   80.06 9325.04   79.84 9344.72   79.94 9403.77   79.72
 9485.78   80.05 9508.74   79.98 9521.86   80.17 9544.82   79.95 9551.38   80.66
 9557.94   80.17 9580.91   79.92 9607.15   80.02 9620.27   79.67 9633.39   79.91
 9656.35   79.52 9676.03   79.59 9692.43   79.33  9715.4   79.31 9751.48   78.91
 9771.16   78.86 9807.24    78.5 9817.09   78.66 9840.05   78.39 9863.01    78.4
 9885.97   78.09 9971.26   77.9110007.34   77.9210069.67   78.7510095.91    79.5
10118.87   79.8610125.43   80.2810158.23   80.76 10197.6   81.6610204.16   80.97
10227.12   84.1310236.96    82.110243.52   83.4910250.08   82.6610273.04   83.17
10282.89   82.3110289.45   82.3110299.29   81.4810318.97   81.8410335.37    81.6
10355.05   82.1710381.29   81.6110417.38   81.4310450.18   81.4510456.74   81.27
10505.94   81.4110525.63    81.210545.31    81.510571.55   81.1910587.95   81.32
10660.12   80.9810669.96   81.35 10679.8    80.910778.21   80.3310788.05   80.45
10817.57   80.1810833.97   80.2810876.62   79.6910899.58   79.7510925.82    79.4
10938.94   79.6310958.62   79.5410965.18   79.8110981.59   79.3110994.71   79.75
11050.47    79.711093.12   80.4411106.24   80.39 11145.6   80.9711188.24    81.2
11234.17   81.3211240.73   81.5311276.81   81.0411293.21   81.1411299.77   81.63
11309.61   83.8411316.17   82.3811326.01   83.1611335.86   81.4111348.98   80.82
11450.67   81.3211493.31   81.2311503.15   80.5511516.27   81.1311552.35    81.2
11572.04   81.08 11627.8   81.2211647.48   81.0611670.44   81.2211709.81   81.07
11742.61   81.1511821.34   80.6111834.46    80.711867.26   79.8811883.66    77.6
11900.06   77.2211913.19   77.5111942.62    79.711958.91   84.3611994.75      84

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .14 7531.77    .066 7662.72    .025 7832.97    .066 8026.13    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7567.78 7996.66          3555.05    2827 2507.63            .1       .3
Left Levee      Station=   52.49      Elevation=       90
Right Levee     Station=11958.91      Elevation=   84.36
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    33.8 6226.78   84.96 6226.78 7564.12   82.15 8004.51 8619.72    82.7
 8619.7311952.68   84.58

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             82.79    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                 0.136      0.052      0.066
  W.S. Elev (ft)             82.64    Reach Len. (ft)          3555.05    2827.00    2507.63
  Crit W.S. (ft)             65.09    Flow Area (sq ft)         662.79    6435.62       3.68
  E.G. Slope (ft/ft)      0.000324    Area (sq ft)              662.79    6435.62       3.68
  Q Total (cfs)           20000.00    Flow (cfs)                 81.53   19917.58       0.89
  Top Width (ft)           1776.70    Top Width (ft)           1341.00     428.28       7.42
  Vel Total (ft/s)            2.82    Avg. Vel. (ft/s)            0.12       3.09       0.24
  Max Chl Dpth (ft)          27.86    Hydr. Depth (ft)            0.49      15.03       0.50
  Conv. Total (cfs)       1111859.0    Conv. (cfs)               4532.7   1107277.0       49.4
  Length Wtd. (ft)           2831.86    Wetted Per. (ft)         1341.73     437.20      13.10
  Min Ch El (ft)               54.78    Shear (lb/sq ft)            0.01       0.30       0.01
  Alpha                         1.20    Stream Power (lb/ft s)      0.00       0.92       0.00
  Frctn Loss (ft)              0.57    Cum Volume (acre-ft)     18839.45   13920.23   11969.76
  C & E Loss (ft)              0.03    Cum SA (acres)            5649.80     769.05    3820.51
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Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 128.5

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.03	16.4	89.07	19.68	86.23	22.96	81.65	26.24	80.54
39.36	80.21	49.2	78.44	55.77	77.9	62.33	78.18	75.45	77.86
85.29	78.62	108.25	79.3	127.93	79.18	137.77	78.76	144.33	79.38
170.58	79.54	209.94	79.34	219.78	79.57	252.59	79.31	268.99	79.49
291.95	79.28	328.03	79.47	347.72	79.18	357.56	79.43	370.68	79.28
455.97	79.3	462.53	79.49	482.21	79.25	508.45	79.43	528.13	79.24
547.82	79.51	564.22	79.26	600.3	79.45	619.98	79.19	626.54	79.55
659.35	79.35	685.59	79.5	698.71	80.3	701.99	79.74	711.83	75.23
718.39	72.87	724.95	71.6	734.79	70.98	744.64	71.01	757.76	71.57
767.6	73.21	784	72.7	790.56	72.08	823.36	71.93	846.33	72.14
859.45	72	888.97	72.21	905.37	72	964.42	72.25	990.66	72
1033.3	72.39	1062.83	72.08	1102.19	72.27	1115.31	72.47	1134.99	72.12
1151.4	72.33	1177.64	72.23	1200.6	72.44	1220.28	73.26	1233.4	73.3
1246.52	74.17	1266.21	74.56	1276.05	75.68	1285.89	75.42	1295.73	75.7
1312.13	75.58	1328.53	75.77	1344.93	75.65	1387.58	75.84	1426.94	75.84
1443.34	75.7	1531.91	75.98	1545.03	75.88	1581.12	76.05	1650	76.08
1672.97	76.24	1689.37	76.11	1741.85	76.34	1771.38	76.21	1814.02	76.46
1866.5	76.57	1896.03	76.45	1935.39	76.63	1941.95	76.54	1991.16	76.61
2040.36	77.12	2069.88	78	2073.17	78.86	2096.13	79.56	2122.37	79.05
2132.21	78.59	2161.74	78.03	2210.94	78.25	2250.31	78.22	2319.19	78.47
2352	78.51	2374.96	78.41	2456.97	78.63	2479.93	78.55	2525.86	78.84
2538.98	78.67	2575.06	78.95	2581.62	78.84	2630.83	79.09	2637.39	78.95
2660.35	79.13	2699.72	79.17	2732.52	79.37	2739.08	79.23	2817.81	79.45
2883.42	79.51	2958.87	79.88	2988.39	79.85	2998.23	80.04	3024.47	79.93
3050.72	80.11	3099.93	80.07	3126.17	80.32	3172.09	80.23	3195.06	80.38
3227.86	80.22	3244.26	80.5	3267.22	80.1	3296.75	80.17	3309.87	80.37
3349.23	80.28	3421.4	79.97	3434.52	80.15	3487.01	79.93	3500.13	80.11
3513.25	79.93	3529.65	80.08	3552.62	79.8	3569.02	80.02	3585.42	79.69
3595.26	79.95	3624.79	79.72	3634.63	79.94	3660.87	79.83	3667.43	80
3693.67	79.77	3700.23	80.03	3726.48	79.78	3742.88	79.97	3785.52	80.01
3798.65	79.75	3811.77	79.91	3831.45	79.76	3854.41	80.05	3870.81	79.74
3887.22	79.93	3897.06	79.74	3926.58	79.83	3939.7	79.64	3956.1	79.89
3972.5	79.63	4011.87	79.59	4031.55	79.8	4044.67	79.5	4061.08	79.82
4074.2	79.64	4110.28	79.93	4136.52	80.72	4175.89	81.11	4192.29	81.42
4202.13	80.15	4218.53	79.93	4225.09	79.58	4248.06	79.67	4261.18	79.92
4290.7	79.8	4297.26	80.23	4316.94	80.1	4323.5	80.34	4346.47	79.88
4359.59	80.23	4369.43	79.78	4392.39	79.98	4425.19	79.76	4435.03	80
4487.52	79.82	4517.04	80.07	4526.88	80.45	4543.28	81.99	4549.84	80.76
4556.41	76.76	4562.97	69.38	4566.25	68.26	4579.37	62	4582.65	55.89
4600.65	55.35	4604.65	55.05	4622.65	55.85	4649.65	56.45	4662.65	57.15
4670.65	57.25	4688.65	57.25	4703.65	57.35	4713.65	57.75	4753.23	61.55
4769.63	61.58	4779.47	63.6	4786.03	65.97	4795.87	66.61	4799.15	67.55
4808.99	72.08	4815.55	74.26	4825.39	76.44	4835.23	77.36	4845.08	77.16
4868.04	77.32	4874.6	77.13	4923.8	77.42	4933.64	79.7	4946.76	79.89
4950.04	80.32	4956.6	79.12	4963.17	80.19	4969.73	79.45	4982.85	78.84
5015.65	79.08	5058.3	78.71	5084.54	78.82	5094.38	78.67	5127.18	78.85
5166.55	78.5	5189.51	78.65	5228.87	78.35	5238.71	78.5	5274.79	78.45
5281.35	78.27	5310.87	78.67	5346.95	78.69	5409.28	78.59	5438.8	78.74
5497.84	78.8	5520.8	78.63	5537.2	78.97	5622.49	78.79	5678.25	78.97
5711.05	78.77	5717.61	79.03	5776.65	79.04	5806.17	78.81	5858.66	78.96
5881.62	78.81	5898.02	79.04	5904.58	78.81	5937.38	79.06	5950.5	78.39
6035.78	78.7	6107.95	78.71	6137.47	78.88	6170.27	78.82	6199.79	79.12
6209.63	79.02	6265.39	79.06	6291.63	79.22	6353.96	78.85	6373.64	79.03
6393.32	78.93	6403.16	79.23	6432.68	78.91	6458.92	79.09	6488.44	78.93
6498.28	79.15	6580.29	78.9	6599.97	79.4	6622.93	79.12	6645.89	79.08
6681.97	79.59	6708.21	79.33	6754.13	79.2	6806.62	79.53	6829.58	80.12
6888.62	80.46	6895.18	81.68	6898.46	83.96	6901.74	84.55	6908.3	81.64
6914.86	83.56	6921.42	81.78	6944.38	81.26	6993.59	81.24	7006.71	81.37
7059.19	81.41	7085.43	81.22	7141.19	81.5	7190.39	81.33	7210.07	81.47
7272.4	81.27	7285.52	81.12	7311.76	81.16	7347.84	80.92	7390.48	80.87
7436.4	80.64	7462.65	80.66	7495.45	80.45	7515.13	80.54	7547.93	80.26
7567.61	80.34	7593.85	80.02	7639.77	79.94	7652.89	79.72	7679.14	79.78
7744.74	79.35	7800.5	79.07	7898.9	78.22	7941.55	78.09	7987.47	77.67
7997.31	77.76	8023.55	77.53	8076.03	77.68	8135.07	77.41	8220.36	77.47
8253.16	77.75	8266.28	77.7	8289.25	78.11	8322.05	78.51	8328.61	78.77
8394.21	80.06	8410.62	80.71	8443.42	81.46	8476.22	81.69	8486.06	81.92
8502.46	81.63	8525.42	81.75	8604.15	81.72	8630.39	81.55	8643.51	81.73
8696	81.21	8712.4	81.13	8738.64	81.26	8755.04	80.38	8761.6	80.65
8787.85	80.89	8837.05	81.01	8846.89	81.18	8856.73	80.71	8860.01	81.12
8892.82	80.56	8909.22	80.54	8919.06	80.24	8942.02	80.58	8958.42	80.45
8964.98	80.94	8971.54	79.62	8981.38	79.32	8987.94	78.23	8994.5	78.42
9001.06	77.02	9010.91	72.47	9020.75	69.76	9037.15	68.21	9046.99	68.28
9063.39	67.63	9092.91	65.78	9099.47	65.15	9119.15	64.68	9132.28	64.82
9142.12	64.25	9151.96	64.4	9174.92	63.88	9188.04	63.94	9197.88	65.08
9211	64.34	9230.68	64.79	9237.24	64.66	9253.65	65.13	9263.49	65.68
9286.45	65.54	9299.57	66.1	9309.41	66.96	9315.97	66.25	9342.21	66.16
9368.46	66.79	9391.42	66.61	9404.54	67.01	9420.94	66.81	9427.5	67.07
9450.46	67.2	9466.86	67.55	9476.7	67.26	9489.83	67.92	9502.95	67.48
9519.35	67.91	9525.91	67.65	9555.43	67.89	9581.67	67.5	9591.51	68.37
9604.63	67.92	9630.88	68	9650.56	67.69	9660.4	67.87	9686.64	67.4
9706.32	67.62	9719.44	67.32	9732.57	67.34	9748.97	66.96	9801.45	66.72
9827.69	66.51	9847.38	66.04	9873.62	65.82	9896.58	65.27	9932.66	64.87
9985.15	63.7510008.11		64.0110047.47		63.8110099.96		64.0110122.92		63.85
10145.88	64.0910155.72		63.6510178.68		64.310201.64		63.7410211.49		63.86
10247.57	66.4310260.69		67.7310267.25		68.0310277.09		69.2810296.77		71.3
10319.73	76.410332.86		77.1310365.66		76.6610401.74		76.77 10424.7		76.53
10437.82	76.1810457.51		76.2110493.59		77.0510503.43		76.9510519.83		77.33
10539.51	76.0510549.35		75.8410605.12		75.39 10641.2		75.8610654.32		75.78
10680.56	76.210733.05		76.5610739.61		76.510775.69		77.1410821.62		77.77
10844.58	77.8610877.38		77.6710887.22		78.0510893.78		77.3110900.34		75.54
10906.9	75.5910913.46		76.66 10923.3		80.2810933.15		82.4810936.43		83.75
10942.96	84.7410962.48		84.7510972.25		82.0410982.01		80.47		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

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       0    .066 2096.13    .085 4549.84     .07 4562.97    .025 4799.15     .07
 4950.04    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4549.84 4950.04          1964.77    1391  1506.6             .1       .3
Ineffective Flow     num=       2
   Sta L    Sta R    Elev  Permanent
       0 4549.84   80.76       T
 4950.0410982.01   80.32       T
Left Levee      Station=    16.4      Elevation=   89.07
Right Levee     Station=10962.48      Elevation=   84.75
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  8923.611303.13   77.13

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             82.20    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                 0.075      0.046     0.066
  W.S. Elev (ft)             82.14    Reach Len. (ft)          1964.77    1391.00    1506.60
  Crit W.S. (ft)             64.68    Flow Area (sq ft)        6200.96    6328.77    9812.00
  E.G. Slope (ft/ft)      0.000136    Area (sq ft)            18402.81    6328.77   20065.48
  Q Total (cfs)           20000.00    Flow (cfs)               1767.11   14628.17    3604.72
  Top Width (ft)          10887.56    Top Width (ft)           4527.23    400.20    5960.13
  Vel Total (ft/s)            0.90    Avg. Vel. (ft/s)            0.28      2.31       0.37
  Max Chl Dpth (ft)          27.09    Hydr. Depth (ft)            1.37     15.81       1.65
  Conv. Total (cfs)       1713427.0    Conv. (cfs)              151390.7   1253215.0   308821.0
  Length Wtd. (ft)           1469.42  Wetted Per. (ft)         4530.50     412.84    5962.35
  Min Ch El (ft)             55.05    Shear (lb/sq ft)            0.01       0.13       0.01
  Alpha                       4.92    Stream Power (lb/ft s)      0.00       0.30       0.01
  Frctn Loss (ft)             0.08    Cum Volume (acre-ft)    18061.45   13506.03   11392.10
  C & E Loss (ft)             0.00    Cum SA (acres)           5410.34     742.16    3648.75


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 128.23*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   86.59   13.43   88.56   24.94   88.66    28.6   85.92   32.26   81.46
   35.91   80.42   50.54   80.13   61.52   78.89   68.84   78.46   76.16   78.54
   90.79   78.04  101.76   78.49  127.36   79.01  146.21   78.91  160.28   77.94
   167.6   78.23  189.71   78.54  219.62   78.28  227.78   78.47  241.37   78.23
  252.24   78.97  273.99   79.04  284.87   78.85   306.6   79.08  322.93   79.01
  344.69   79.21  355.57   79.07  372.44   79.24  399.06   79.08  405.37   79.21
  426.25   79.08  439.85   79.33   461.6   79.17  488.78   79.05  522.42   79.22
  540.45   79.08  554.04   79.22  581.23   79.12  617.53   79.35  635.82   79.16
  676.05   79.38  697.99   79.15  705.31   79.41  733.49   79.29  771.16    79.4
  785.79   79.98  789.44   79.62  800.42   76.63  807.73   75.01  815.05   74.19
  826.02   73.83  851.63   74.27   862.6   75.36  880.89   75.08  888.21   74.69
  931.96   74.53   950.4   74.64  980.91   74.59  997.94   74.72 1016.23   74.64
 1035.28    74.8 1059.75   74.71 1070.63   74.84 1111.34    74.7 1171.23   74.91
 1190.26   74.66 1231.05   74.84  1252.8   75.47 1272.28   75.19 1301.74   75.23
 1345.24   75.08  1353.4   75.54 1369.71   75.53 1382.02   74.97 1394.18   74.79
 1418.61    75.1 1429.58   75.78 1440.55   75.61  1488.1   75.71 1506.39    75.6
 1553.95   75.83 1592.67   75.88 1616.12   75.72 1649.76   75.85 1676.95   75.84
  1698.7   76.02 1729.52   75.89 1823.77    75.9 1846.57   75.85 1864.55   75.99
 1890.47   75.88 1940.68   76.03 1992.34    75.9 2011.37      76 2084.77   76.12
 2150.03   75.83 2160.91   75.71    2227   75.83 2245.19   76.09 2264.22    76.1
 2296.85   76.36 2314.78   77.22 2318.45   77.95 2340.47 78.4313 2364.82   78.09
 2384.28   77.61 2417.21   77.21 2451.82   77.46 2481.73   77.39 2517.08   77.43
 2530.67   77.67 2544.26   77.56 2590.48   77.82 2631.26   78.18 2647.59   78.04
  2693.8   78.22 2699.24   78.35 2772.03   78.46 2823.24   78.72 2878.11    78.9
 2892.28   78.86 2930.34   79.13 2947.61   79.11    2982   79.49 3009.19   79.98
 3020.07   79.41 3041.82   79.55 3061.01   79.26 3112.51   79.45 3166.88   79.55
 3221.96   79.42 3248.45   79.45 3349.98   79.83 3379.25   79.74 3422.46   79.91
 3430.61   79.85 3468.68   79.99 3512.19   80.05 3531.22   79.98 3569.47   80.07
 3612.79   80.01 3624.33   80.16 3649.94   79.97 3682.87   79.92  3697.5   80.15
 3713.39   80.07 3746.01   80.15 3792.24   79.92 3805.83   79.99 3816.71    79.8
 3860.21   79.99 3876.52   79.79 3909.65   79.96 3942.57   79.96 3968.19   79.76
 3990.72   79.97 4004.76   79.68 4015.73    79.9 4048.66    79.7 4064.13   79.87
 4080.45   79.73 4096.21    79.9 4125.47   79.69 4132.79   79.83 4162.06   79.69
 4200.08   79.94 4227.89   79.86 4242.53   79.69 4257.17    79.8 4278.94    79.7
 4304.71   79.92    4323   79.75 4385.19   79.78 4398.57   79.63 4418.11   79.78
 4444.79    79.5 4466.54   79.49 4502.24   79.68 4516.87   79.45 4542.67   79.71
 4553.54   79.55 4564.42   79.78 4610.65   80.21 4619.29   80.57  4632.4   80.43
 4643.27   80.73 4656.86   81.48 4667.74   81.24 4681.34   81.26 4692.46   80.07
 4724.84   79.35 4741.15   79.66 4749.31   79.56 4798.54   79.94 4820.48   79.82
 4830.88   80.05 4844.47   79.64 4858.07   79.83 4879.01   79.44  4890.7   79.54
 4917.89   79.26 4928.76    79.6 4941.19   79.32 4972.27   79.35 4988.58   79.69
  5034.8   79.17 5048.4479.70148 5056.55   80.07 5072.87   81.82  5089.4    80.2
 5094.7879.97818 5099.04   79.48 5108.68   77.16 5119.69   75.51 5126.58    72.9
 5136.52   70.03 5151.36   67.45 5169.25   65.77 5174.76   64.59 5180.26   64.32
 5189.54   61.51 5195.66   60.84 5200.14   56.76 5229.26   56.02 5250.26   55.79
 5262.85   55.44 5271.25   53.64  5284.5    54.4  5301.955.03925 5304.37   55.13
 5305.02   57.91 5313.94   58.37 5339.81   59.09 5351.48   59.99 5357.5760.83488
  5380.6   64.03 5392.68   64.67 5399.92   66.41 5404.75   68.26 5411.99   69.11
 5421.64   73.31 5426.47   75.04 5433.71   76.85 5440.96   77.55  5465.1   77.69
 5469.93   77.58 5506.14   77.83 5513.38   79.37 5525.45    79.8 5531.05   79.01
 5536.66   79.72 5542.25   79.23 5553.45   78.83 5581.44   78.97  5615.4   78.62
 5640.22   78.68 5648.61   78.56  5676.6    78.6 5710.19   78.34 5729.78   78.38
 5763.37   78.08 5771.76   78.16 5820.28   78.11 5860.26   78.33 5885.24   78.22
 5942.49   78.26 5985.19   78.19 5995.18   78.28 6015.17   78.92 6026.46   78.97
 6045.15   78.34 6099.23   77.98 6146.81   78.03 6174.79   77.93 6180.39   78.11
 6230.77   78.17 6255.96   78.01 6300.75   78.05 6339.93   77.94 6367.91   78.07
 6379.11   77.63 6419.92   77.71  6454.9   77.86 6474.88   78.15 6489.88   79.23
 6499.88   79.32 6519.86   79.83 6544.85   79.84 6559.84   79.33 6569.83   79.21
 6599.81   79.35 6647.79   79.36 6670.18   79.45 6723.37    79.2 6756.95   79.25
 6765.35   79.45 6790.54   79.23 6812.92   79.35 6838.11   79.22 6846.51   79.35
 6916.49   79.18 6933.28   79.51 6972.46   79.27 7003.25   79.59 7025.63   79.39
 7064.82   79.27  7109.6   79.48  7129.2   79.87 7179.57   80.03 7185.17   80.84
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 7190.77   82.75 7196.36   80.82 7201.96    82.1 7207.56   80.91 7227.15   80.58
 7269.14   80.56 7280.33   80.64 7325.11   80.61  7347.5   80.47 7395.08   80.63
 7437.06   80.54 7453.85   80.64 7540.62   80.47 7571.41   80.34 7607.79   80.31
 7639.19   80.14 7669.37   80.19 7697.36   80.04 7714.15   80.09 7742.14   79.88
 7758.93   79.94 7781.32   79.75  7820.5   79.74  7831.7    79.6 7854.09   79.67
 7909.03   79.37 7957.65    79.2 8041.61   78.66    8078   78.63 8117.18   78.33
 8147.97   78.23 8192.75   78.32 8243.12   78.14  8315.9   78.14 8355.08   78.28
 8374.68   78.56 8402.67   78.79 8464.24   79.87 8478.24   80.32 8506.23   80.78
 8542.61   81.15  8556.6   80.97 8576.19   81.01 8643.37   80.91 8665.76   80.79
 8676.96   80.88 8721.74   80.43 8758.13   80.39 8772.12   79.77 8800.12   80.04
 8861.69    80.1 8889.68   79.62 8912.07   79.38 8931.66   79.59 8945.66   79.46
 8951.25   79.77 8956.85   78.88 8965.25   78.65 8970.84   77.91 8976.44   78.02
 8982.04   77.09 8990.44   74.07 8998.84   72.27 9012.83   71.25 9021.23   71.31
 9035.22   70.85 9060.41   69.59 9066.01   69.17  9082.8   68.87    9094   68.96
  9102.4   68.55  9110.8   68.63 9130.39   68.27 9141.58   68.32 9149.98   69.09
 9161.17   68.59 9183.56   68.77 9205.96   69.43 9225.55   69.35 9245.14   70.23
 9250.74   69.73 9273.13   69.65 9295.53   70.05 9315.12   69.86 9326.31   70.09
 9340.31    69.9 9348.17   70.06 9379.49   70.14 9387.89   69.86 9399.09   70.18
 9410.28   69.78 9424.28   69.97 9429.88   69.76 9455.06   69.76 9477.45   69.36
 9485.85   69.86 9497.04   69.45 9519.44   69.31 9536.23   68.98 9544.63   69.04
 9567.02   68.59 9583.81   68.65  9620.2   67.99 9687.37   67.24 9704.17   66.84
 9726.56   66.57 9746.15   66.07 9776.94   65.59 9821.73    64.6 9841.32   64.67
  9874.9   64.39 9919.69   64.36 9939.28   64.16 9958.87   64.36 9967.27   64.06
 9986.86   64.4710006.45   63.9510014.85   64.0610045.64   65.6510062.43   66.86
10087.62   69.1710107.21   73.2210118.42   74.1610132.69   74.9410147.69   76.22
10162.67   77.1410177.19   77.0910207.97   76.4610224.77   76.4910255.56   77.03
10277.95   77.1910294.74   76.3310303.14   76.1810350.72    75.810387.54   75.98
10415.09    76.310465.48   76.5310532.46   77.5310542.46   77.7410572.44   77.82
10591.43   78.3710597.03   78.0910602.62   77.1410608.22   77.4710613.82   78.67
10622.22   81.4710638.99   84.5310655.65   84.6210668.59   81.1910675.07   80.37

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3009.19    .085 5099.04     .07 5119.69    .025 5399.92     .07
 5525.45    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5099.04 5525.45          1964.77    1391  1506.6             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5099.04   79.48       T
 5525.4510675.07    79.8       T
Left Levee      Station=   24.94      Elevation=88.65667
Right Levee     Station=10655.65      Elevation=   84.62
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 8963.8610685.03   77.14

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 127.97*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   84.16   15.45   87.76   18.02   88.06   33.48   88.24   36.43   86.62
   42.34   80.64   45.59   80.31   61.73   80.05   73.83   79.34   95.54    78.7
  106.12   78.21  137.27   78.67  167.26   78.63  176.26   78.06  182.26   77.16
  209.26   77.27  215.26   77.59  224.26   77.22  236.26   77.39  248.25   77.13
  257.25   77.55  266.25   77.03  272.25   77.11  284.25   78.37  299.24   78.35
  308.24   78.68  320.24   78.36  338.24   78.63  362.23   78.67  386.24   79.08
  398.23   78.75  404.23   78.91  437.22   79.06  446.22   78.88  467.22   79.07
  476.22   78.87  491.21   79.38  515.21   79.05  527.21   79.18   545.2    78.8
  582.31   78.94   602.2   78.87   617.2   79.12  647.19   78.87  656.19   79.11
  677.18   79.04  692.18   79.22  707.41   79.05   751.8    79.3  764.17   79.12
  788.17   79.27  815.16   79.19  830.16    79.4  848.16   79.25  872.86   79.66
   876.9    79.5  897.07   77.16  905.14   76.77  917.25   76.68   945.5   76.97
  957.61   77.51  995.13   77.34 1007.13   77.15 1022.13   77.26 1034.13   77.08
 1076.13   77.28 1088.12   77.07 1130.12    77.3 1148.11   77.53 1175.11   77.26
 1187.11   77.48 1211.11   77.32  1244.1   77.51  1253.1   77.31 1289.09    77.4
 1298.09   77.55 1319.08   77.23 1364.08   77.44 1379.08   77.94 1388.08   78.52
 1429.76   77.92 1442.07   78.18 1490.07   77.73 1499.06   78.35 1508.06   77.74
 1517.06    77.8 1544.06   75.55 1556.05   75.37 1583.11   75.88 1601.04   75.84
 1616.05   75.55 1634.05   75.69 1661.04   75.55 1700.03   75.74 1763.03   75.91
 1781.02   75.74 1826.01   75.91 1856.01    75.8    1880    76.1    1898   75.87
    1931   75.97    1943   75.74 1987.99   75.73 1993.99   75.93 2002.99   75.56
 2017.98   75.74 2041.98   75.62 2062.97   75.78 2091.57   75.65 2125.97   75.73
 2140.97   75.55 2146.97   75.75 2173.96   75.56 2194.96   75.68 2203.95   75.54
 2224.95   75.64 2251.94   75.58 2269.94   75.68 2305.93   75.67 2329.94   75.45
 2338.93    75.6 2377.93   75.08 2389.92    74.8 2395.92   75.03 2431.91   74.94
 2449.91   75.19 2461.91   75.04  2482.9    75.4  2503.9   75.24  2524.9   75.39
  2539.9   75.19  2551.9   75.78  2563.9   77.05 2575.89   77.47 2584.8177.42242
 2596.89   77.03 2614.88   76.98 2620.88   76.65 2641.88   76.66 2665.87    76.4
 2683.87   76.44 2710.86   76.74 2743.87   76.53 2770.86   76.72 2782.86   76.63
 2797.86   77.08 2812.85    76.8 2842.85      77 2854.84   77.29 2863.84   77.18
 2890.84   77.68 2908.83   77.85 2926.84   77.63 2938.83   77.81 2977.83   77.94
 2983.83   78.18 3001.82   78.07 3019.82   78.17 3025.82   78.47 3034.81   78.19
 3073.81   78.45  3112.8   78.48  3142.8   78.84 3196.79   78.85 3238.78   79.22
 3257.83   79.28 3295.77   79.85 3325.76   80.79 3337.77   79.63 3361.76   79.79
 3376.76   79.27 3391.76    79.4 3424.75    79.4 3439.75   79.54 3484.74   79.48
 3499.74   79.63 3520.73   79.43 3526.73   79.57 3547.73   79.37 3589.73   79.28
 3604.72   79.48 3613.72   79.34 3649.71   79.44 3676.71   79.67  3721.7   79.52
  3757.7   79.53 3781.69   79.73 3790.69    79.6 3832.68   79.87 3853.69   79.74
 3916.68   79.81 3952.67   79.72 4036.66   79.86 4072.66   79.69 4081.66   79.94
 4102.65   79.81 4138.65   80.04 4165.64   79.84 4180.65   79.95 4189.65   79.75
 4204.64   79.95 4216.64    79.6 4243.63   79.56 4264.63   79.92 4282.63   79.59
 4309.63   79.65 4330.62   79.93 4345.62   79.77 4369.62   79.87 4393.61   79.69
 4408.62      80 4417.62   79.67 4441.61   79.89  4480.6   79.66  4489.6   79.81
 4507.61   79.61  4534.6   79.86 4573.59   79.54 4615.59   79.67 4639.59   79.89
 4648.58    79.7 4726.77   79.65 4735.58    79.9 4807.56   79.61 4816.56   79.83
 4858.56   79.61 4867.56   79.85 4909.55   79.37 4918.55   79.67 4933.54   79.37
 4942.55    79.6 4966.55   79.45 4978.54   79.59 5002.54   79.31 5017.53    79.7
 5029.53   79.44 5041.53   79.81 5062.53   79.94 5077.53   80.23 5092.53   79.94
 5101.53   80.42 5116.52   80.03 5128.52   80.53 5143.52   81.91 5155.52    81.3
 5170.52   81.09 5188.52   79.66 5218.51   79.09 5236.51   79.67 5245.51   79.35
  5266.5   79.44 5287.51   79.82  5320.5   79.49  5335.5   79.81 5350.49   79.25
 5365.49   79.66 5377.49   79.18 5401.49    79.2 5407.49   78.94 5431.48   78.62
 5443.48   79.37 5461.48   78.76 5491.48   78.75 5509.48    79.5 5515.48   79.22
 5530.47   79.16 5560.47   78.34 5584.46   79.53 5602.47   81.65 5611.78   81.12
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 5618.77   80.16 5626.5979.74256 5630.41   79.36 5646.71   79.14 5656.01   77.78
    5663   76.32 5672.31   75.32 5681.62   75.79 5693.26   72.95 5711.87   70.52
 5725.84   68.24 5735.15   67.27 5749.12   66.72  5765.4   66.54 5774.72   65.01
 5784.03   65.28 5788.68   64.55 5793.33   62.25 5797.99   61.22 5810.06   59.93
 5817.63   57.63 5838.46   56.95 5852.66   56.92 5859.76   56.24 5866.86   56.43
 5888.16   56.19 5895.26   55.84 5902.36   56.16 5915.9855.74025 5923.66   55.63
 5937.86   52.24 5959.09   53.81 5959.51   59.32 5966.93   59.63 5981.82   60.88
  5989.3   62.23 6007.98   66.51 6015.72   67.77 6023.46   70.56  6028.1    71.6
  6034.3   74.53 6041.36   77.14 6046.68   77.73 6056.22      78 6088.48   78.25
 6093.13   79.04 6100.87   79.29 6124.05   78.83 6147.22   78.85 6175.35    78.5
 6202.85   78.45 6270.06   78.12 6297.87   77.82 6357.41   77.66 6378.09   77.97
 6398.78   77.78 6423.61   77.86 6481.54    77.6 6489.82   77.77 6506.36   79.15
 6514.64   79.04 6531.19   77.75 6539.47   77.54  6576.7   77.16 6638.54   77.09
 6643.17    77.2 6684.89   77.29  6729.8    77.1 6770.64   77.15 6798.45   77.09
 6841.51   76.85 6870.47   77.01 6887.02    77.6 6899.44   79.75 6907.72   79.94
 6924.27   80.91 6944.95   80.82 6957.37   79.82 6965.64   79.57 6983.85   79.69
 7048.73   79.69 7092.77   79.54 7127.53   79.66 7148.39   79.55 7252.68   79.46
 7266.59   79.62 7299.03   79.46 7324.52   79.58  7375.5   79.35 7412.59   79.43
 7428.81   79.61 7470.52    79.6 7479.79   80.96 7484.43   79.99 7489.06   80.64
  7493.7   80.05 7509.92   79.89 7553.96    79.9 7609.58   79.72 7660.77   79.72
 7697.64   79.81 7750.94   79.72 7813.87   79.78  7851.1    79.6 7871.78   79.73
 7936.34    79.5 8053.85   79.54  8075.4   79.38 8114.79   79.32 8190.38   79.09
 8211.08   79.18 8246.89   78.98 8309.46   78.97 8411.43    78.8 8443.88   78.86
 8483.28   79.08 8534.26   79.68 8550.37   79.99 8599.16   80.38 8666.22    80.1
  8710.4   80.04 8747.49   79.66 8777.61   79.51 8793.83   79.22 8863.36   79.09
 8886.54   78.67 8905.08   78.53 8937.53    78.6 8942.16   78.13 8958.38   77.62
 8969.98   75.66 8976.93   74.78 8988.52    74.3 9007.06   74.08 9032.55   73.19
 9055.73   73.09 9062.68   72.86 9095.12    72.7 9102.08   73.09 9111.35   72.83
 9129.89   72.88 9148.43   73.17 9164.65   73.17 9180.88    73.5 9185.51   73.22
 9204.05   73.14  9222.6   73.31 9248.09   73.16 9292.12   72.73 9317.62   72.07
  9354.7   71.63 9373.24   71.21 9380.19   71.35 9389.46   70.98  9447.4   69.78
  9461.3   69.68 9491.44   69.01 9579.51   67.32 9605.47   66.61  9658.3   65.45
 9692.37   65.04 9717.19   64.94 9762.71   64.41 9795.04   64.64 9808.22   64.17
  9828.9   64.71 9845.45   64.92 9866.14   65.98  9882.7   67.65 9894.69   70.03
 9903.38   71.07 9915.79      73 9928.21   75.77 9940.62   77.57 9957.17   77.32
 9965.44   76.84 9992.04   76.7810036.07   77.0610049.97    76.610096.33    76.2
10191.35   76.5610246.81   77.3510255.09   77.6710279.91    77.910308.39   79.09
10321.13   82.6710335.02   84.3210348.81   84.4910361.68   80.8610368.13   80.27

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .114 5602.47    .066 5810.06    .025 5915.98    .066 6100.87    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5602.47 6100.87          1964.77    1391  1506.6             .1       .3
Left Levee      Station=   33.48      Elevation=88.24333
Right Levee     Station=10348.81      Elevation=   84.49
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  812.39 3304.65   79.01 3318.42 5149.74   80.78 7469.88 7490.53   80.87
 7490.5310333.91   80.92

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 127.7

INPUT
Description: RGV-02, Begin Wall, Bathymetric elevations translated from IBWC
             2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.72   19.39   87.11   22.62   87.57   42.02   87.83   45.25   86.44
   51.71   80.24    90.5   79.74  109.89   79.02  116.35   78.48  132.56    78.2
  155.52   78.47  188.32   78.35  198.16    77.6  204.72   76.35  211.28   75.91
  234.25   76.17  240.81   76.63  250.65   76.06  263.77   76.34  276.89   75.98
  286.73   76.62  296.57   75.86  303.13   75.99  316.25   77.77  322.81    78.1
  332.65   77.79  342.49   78.31  355.61   77.87  375.29   78.23  401.53   78.33
  427.78   78.95   440.9   78.43  447.46   78.65  483.54   78.97  493.38   78.68
  516.34   78.95  526.18   78.67  542.58   79.43  568.82   78.93  581.94   79.13
  601.62   78.56  608.18   78.68  663.95   78.66  680.35   79.03  713.15   78.62
  722.99   79.02  745.95   78.86  762.35   79.11  768.91   78.89  831.24   79.25
  841.08   79.02  867.32   79.14  896.84   79.08  913.24   79.41  932.92   79.14
  975.56   79.46  988.69   79.27 1024.77   79.75 1047.73   79.63 1093.65   79.98
 1106.77   79.72 1123.17   79.91 1136.29   79.62 1165.82   79.66 1182.22   79.91
 1195.34   79.56 1241.26   79.94 1260.94   80.26 1290.46    79.8 1303.59   80.12
 1329.83    79.9 1365.91   80.22 1375.75   79.89 1415.11   79.93 1424.95   80.19
 1447.91    79.8 1497.12   80.03 1513.52   80.71 1523.36   81.56 1543.04   81.42
 1569.28   80.71  1582.4   81.12 1605.36    80.9 1634.89   80.37 1644.73   81.16
 1654.57   80.09 1664.41   80.06 1670.97   79.46 1693.93   76.31 1707.05   75.89
 1720.17   76.26 1730.01   75.98 1756.25   75.98 1772.66    75.5 1792.34   75.72
 1821.86   75.48 1857.94   75.56  1864.5   75.73 1933.39   75.95 1953.07   75.73
 2002.27   75.97 2018.67   75.84 2028.51   76.13 2035.07   75.77 2061.31   76.18
 2080.99   75.82 2117.08   75.98  2130.2   75.62  2179.4   75.56 2185.96   75.86
  2195.8   75.31  2212.2   75.57 2238.44   75.39  2261.4   75.58 2267.96   75.39
 2330.29   75.48 2346.69   75.18 2353.25   75.47 2382.77    75.2 2405.73   75.41
 2415.57   75.18 2438.53   75.28 2468.05   75.14 2487.73   75.27 2527.09   75.22
 2553.34   74.93 2563.18   75.16 2605.82   74.34 2618.94    73.9  2625.5   74.24
 2664.86   74.13 2684.54   74.48 2697.66   74.26 2720.62   74.71 2743.58   74.38
 2766.55   74.51 2782.95   74.03 2796.07   74.76 2809.19   76.14 2822.31   76.62
 2838.71   76.32 2845.27    75.8 2864.95   75.87 2871.51   75.42 2894.47   75.74
 2920.71   75.53 2940.39   75.62 2969.91   76.03    3006   75.67 3035.52   75.96
 3048.64   75.84 3065.04   76.48 3081.44   76.05 3114.24    76.3 3127.36   76.72
  3137.2   76.54 3166.72   77.27  3186.4   77.52 3206.09   77.23 3219.21   77.51
 3261.85   77.66 3268.41   78.01 3288.09   77.82 3307.77   77.96 3314.33    78.4
 3324.17   77.97 3366.81   78.38 3399.61   78.47 3409.45   78.32 3442.26    78.9
 3465.22   78.76  3501.3   78.84 3547.22   79.31 3553.78   79.18 3609.54    80.2
 3642.34   81.61 3655.47   79.85 3668.59   80.15 3681.71   80.03 3698.11   79.23
 3714.51   79.47 3750.59   79.44 3766.99   79.63 3816.19    79.5 3832.59   79.72
 3855.55   79.41 3862.11   79.61 3885.08   79.31    3931    79.1  3947.4   79.37
 3957.24   79.15  3996.6   79.23 4026.12   79.58 4075.32    79.3 4104.85   79.42
 4114.69   79.27 4140.93   79.54 4150.77   79.36 4196.69   79.74 4219.66   79.47
 4249.18   79.57 4272.14   79.45 4288.54    79.6  4327.9   79.41 4360.71   79.55
 4370.55   79.38 4419.75   79.74 4436.15   79.46 4459.12   79.42 4468.96   79.74
 4491.92   79.54 4531.28   79.93  4560.8   79.68 4577.21   79.87 4587.05   79.58
 4603.45   79.91 4616.57   79.41 4632.97   79.52 4646.09   79.27 4669.05   79.85
 4688.73   79.38  4695.3    79.6 4718.26   79.47 4741.22   79.91 4757.62   79.65
 4783.86   79.83  4810.1   79.58 4826.51   80.03 4836.35    79.6 4862.59   79.87
 4875.71   79.59 4882.27   79.87 4905.23   79.55 4915.07   79.76 4934.76   79.48
 4964.28   79.82 5006.92   79.32 5020.04    79.5 5052.85   79.53 5079.09   79.84
 5088.93   79.55 5174.22   79.59 5184.06   79.93 5203.74   79.64 5229.98   79.78
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 5239.82   79.55 5262.78   79.54 5272.62   79.87 5318.55   79.58 5328.39   79.91
 5341.51   79.56 5374.31   79.25 5384.15    79.7 5400.55   79.26  5410.4    79.6
 5436.64    79.3 5449.76   79.54    5476   79.11  5492.4   79.68 5505.52   79.32
 5518.64   79.84 5541.61   79.97 5558.01   80.29 5574.41   79.66 5584.25   80.28
 5600.65   79.62 5613.77   80.33 5630.17   82.34 5643.29   81.35  5659.7   80.93
 5679.38   79.44 5712.18   78.84 5731.86   79.67  5741.7   79.14 5764.66   79.22
 5787.63   79.82 5804.03   79.27 5823.71   79.18 5840.11   79.58 5856.51   78.85
 5872.91    79.5 5886.03   78.68 5912.28   78.87 5918.84   78.46 5945.08   77.98
  5958.2   79.14 5977.88   78.22 6010.69   78.16 6030.37    79.3 6036.93   78.89
 6053.33   78.83 6073.01   77.86 6086.13   77.51 6102.53   78.63 6112.37   78.98
 6132.06   81.48 6145.18   80.85 6155.02   79.53 6161.58   79.46 6171.42   78.53
 6194.37   78.79 6207.48   77.28 6217.32   75.47 6230.43    74.5 6243.55   76.07
 6259.94   73.01 6286.16   71.14 6305.83   68.16 6318.95   67.08 6338.62   66.87
 6361.56   67.31 6374.68   65.42 6387.79   66.23 6394.35   65.34  6400.9   62.09
 6407.46   60.76 6424.46   59.03 6444.46   58.03 6464.46   57.53 6484.46   57.53
 6494.46   56.53 6504.46   56.83 6534.46   56.53 6544.46   56.03 6554.46   56.53
 6564.46   56.03 6584.46   55.83 6604.46   50.83    6614   60.73 6617.27   60.84
 6623.83   62.66 6640.22   71.66 6650.06   77.65 6656.61   78.39 6676.28   78.77
 6705.79   78.85 6735.29   78.38 6745.13    78.5 6777.91   78.06  6794.3   78.07
 6846.76   77.36  6869.7   77.39 6879.54   77.16 6895.93   77.61 6912.32   77.35
 6931.99   77.49 6977.89      77 6984.45   77.27 6997.56   79.37 7004.12   79.09
 7017.23   77.17 7023.79   76.86 7053.29   76.35 7086.07   76.12 7122.14   76.41
 7154.92   76.43 7174.59    76.2 7194.26   76.27  7233.6   76.08 7243.43   76.23
  7263.1      76 7286.05   76.17 7299.16   77.05    7309   80.27 7315.56   80.55
 7328.67   81.99 7345.06    81.8  7354.9   80.31 7361.45   79.92 7381.12      80
 7446.69   79.89 7528.65   79.87 7554.87   79.67 7567.99   79.78  7610.6   79.71
 7689.28   79.41 7738.46   79.35 7764.69   79.15 7813.86   79.25  7853.2   79.01
 7912.21   78.86 7935.16   78.99 7971.22   78.96 8033.51   79.23 8063.01   79.06
  8079.4   79.27 8135.14   79.11 8223.65   79.54 8240.04    79.4 8331.83   79.54
 8348.23   79.72 8371.17   79.64 8476.08   79.59 8525.26    79.4 8541.65   79.48
 8574.43   79.31 8617.05   79.56 8630.16   79.41 8662.95   79.66 8708.84   79.28
 8735.07   79.28 8839.97   78.19 8862.92   78.11 8885.87   77.68 8905.54   77.67
  8941.6   77.21 8971.11   77.38 8990.78   77.18 9013.73   77.28  9033.4   77.02
 9056.34   77.11 9089.13   76.91 9105.52   76.99 9121.91   76.67 9148.14    76.6
  9184.2      76 9203.87   75.37 9223.54   74.41 9269.43   73.06 9292.38   72.05
 9321.89    71.1 9348.11   70.49 9403.85   68.77 9439.91   67.88 9453.02   67.35
 9521.87   65.62 9541.54   65.46  9577.6   64.64 9584.15    64.9 9603.82   64.81
 9613.66   64.33 9630.05   64.59 9643.16   64.04    9653   64.54 9659.55   64.22
 9672.67   65.16 9689.06   68.07 9698.89   71.05 9708.73   75.32 9718.56   77.99
 9731.68   77.63 9738.23   76.97  9757.9   77.07 9826.75   76.79 9866.09   76.32
 9872.65   76.53 9895.59   76.45 9934.93   76.71 9961.16   77.16 9967.72   77.61
 9987.39   77.9810000.35   79.0410009.95   80.8510016.36   83.4310019.56   83.85
10041.98   84.3610048.38   82.8610054.78   80.5310061.19   80.17

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .114 6194.37    .066 6407.46    .025 6617.27    .066 6676.28    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6194.37 6676.28         1186.43    1486 1991.76             .1       .3
Left Levee      Station=   42.02       Elevation=   87.83
Right Levee     Station=10041.98       Elevation=   84.36
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1664.03 3608.94   80.04 3644.24 5631.98   80.04 7331.1110023.65   81.98

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             81.94    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.114      0.050     0.074
  W.S. Elev (ft)             81.89    Reach Len. (ft)          1186.43    1486.00    1991.76
  Crit W.S. (ft)             63.50    Flow Area (sq ft)       13173.10    8274.50    2987.18
  E.G. Slope (ft/ft)      0.000095    Area (sq ft)            13173.10    8274.50    2987.18
  Q Total (cfs)           20000.00    Flow (cfs)               2795.85   15592.92    1611.24
  Top Width (ft)           7268.20    Top Width (ft)           6134.79     481.91     651.50
  Vel Total (ft/s)            0.82    Avg. Vel. (ft/s)            0.21       1.88       0.54
  Max Chl Dpth (ft)          31.06    Hydr. Depth (ft)            2.15      17.17       4.59
  Conv. Total (cfs)       2052838.0    Conv. (cfs)              286971.0   1600486.0   165380.4
  Length Wtd. (ft)         1418.58    Wetted Per. (ft)         6137.20     493.35     652.49
  Min Ch El (ft)             50.83    Shear (lb/sq ft)            0.01       0.10       0.03
  Alpha                       4.18    Stream Power (lb/ft s)      0.00       0.19       0.01
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)    15864.13   12810.90   10114.77
  C & E Loss (ft)             0.01    Cum SA (acres)           4690.48     698.55    3212.29


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 127.4

INPUT
Description: RGV-02, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   79.04   12.99   79.88   25.98   80.25   32.47   81.26   58.44   87.27
   64.94   87.78   71.43   86.49   77.93   84.42   90.91   81.26  107.31   79.23
  120.43   78.19  130.27   77.74  146.68   77.68  153.24   78.11   159.8   77.91
  169.64   76.25   176.2   77.45  182.76   77.75  228.68   77.51  264.76    78.2
  281.16   77.99  304.12   78.29  310.68   78.15  350.04   78.21  359.88   78.43
  366.44   78.15  376.28   78.35  402.52    78.2  415.64   78.51   422.2   78.33
  435.33   78.75  484.53    78.8  494.37   79.18  504.21   79.07  537.01   79.11
  543.57   79.29  573.09   79.08  602.61   79.21  664.93   79.04  678.05   79.33
  694.46   79.29   720.7   78.97  746.94   79.11  756.78   78.93  766.62   79.25
  776.46   79.02  783.02   79.39  789.58    79.1  822.38    79.3  825.66    79.1
  842.06   79.25  871.58   79.04   901.1   79.48   933.9   79.11  953.59   79.67
  973.27   79.28  983.11   79.54  992.95   79.39 1009.35   79.54 1015.91   79.84
 1038.87   79.47 1078.23   79.55 1084.79    79.9 1120.87   79.56 1137.27    79.8
 1160.23    79.8 1179.91   79.51 1189.75   79.69 1222.55   79.73 1232.39   79.44
 1242.23   79.78 1252.08   79.57  1265.2   79.96 1271.76   79.77 1284.88   80.19
 1294.72   79.88 1324.24   80.03 1340.64   79.83 1360.32   79.95 1389.84   79.71
 1399.68   79.81  1429.2   79.71 1455.44   80.15    1462   79.96 1475.12   80.23
 1488.24   79.91 1524.32   79.91 1547.28   80.09 1580.08   79.93 1593.21   80.05
 1606.33   79.88 1629.29   79.92 1635.85   80.11 1662.09   80.16 1704.73      80
 1734.25   80.22 1767.05   80.07 1790.01   80.25 1806.41      80 1829.37   80.14
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 1875.29   80.25 1904.81   80.75 1924.49   80.73 1937.62   81.17 1954.02   81.07
 1963.86   80.71 1986.82    80.9 1996.66   80.54 2013.06   80.66  2022.9   80.23
 2029.46   80.36 2058.98   79.96 2068.82   79.61  2072.1   80.02 2081.94   79.34
  2088.5   79.49 2098.34   79.11  2104.9   79.62 2108.18   79.05 2114.74   79.15
 2127.86   78.49 2144.26   78.25 2163.94   77.53 2183.63   77.46 2186.91   78.87
 2190.19   78.54 2206.59   78.64 2213.15   78.13 2226.27      78 2229.55   78.33
 2239.39   77.75 2242.67   78.08 2259.07   78.02 2275.47   77.51 2285.31    77.7
 2318.11   77.29 2341.07   77.24 2347.63   77.48 2357.47   77.21 2370.59   77.26
 2396.84   76.69 2406.68   76.86 2423.08   76.55 2449.32   76.84 2478.84   76.53
  2485.4   76.69 2531.32    76.7 2554.28   76.29 2564.12   76.41 2573.97   76.13
 2583.81   76.58 2600.21   76.17 2613.33   76.16 2623.17   76.71 2629.73    76.2
 2636.29   76.41 2646.13   76.07 2655.97   76.33 2669.09   76.18 2698.61   76.24
 2705.17   76.58 2711.73   76.23 2754.37   76.64 2760.93   76.27 2793.74   76.53
 2797.02   76.37  2816.7   76.58  2849.5   76.38 2862.62   76.55 2888.86   76.58
 2905.26   76.42 2928.22    76.9 2954.46   76.62 2983.99    76.8 3010.23   76.81
 3036.47      77 3052.87   76.66 3065.99   76.96 3069.27   76.39 3095.51   76.35
 3102.07   76.57 3144.71    76.3 3177.51   76.69 3203.76   76.72 3226.72   76.39
  3246.4   76.86 3269.36   76.85 3289.04   76.49 3302.16   76.82  3328.4   76.89
 3348.08   76.46 3357.92    76.8  3361.2   76.49 3390.73   76.71 3410.41   76.38
 3443.21   76.68 3459.61   76.45 3472.73   76.59 3492.41   76.41 3505.53   76.63
 3518.65   76.41 3561.29   76.59 3603.94   76.49 3623.62   76.59  3643.3   76.49
 3679.38   76.57 3722.02   76.52 3761.38   76.57 3823.71   76.48 3830.27   76.61
 3882.75   76.52 3908.99   76.67 3974.59   76.52 4010.68   76.57 4050.04   76.51
 4112.36   76.67 4161.56   76.59 4319.01   76.48 4332.13   76.55 4374.78    76.4
 4433.82   76.43 4466.62   76.27 4505.98    76.5  4535.5    76.3 4558.46   76.44
  4568.3   76.25 4587.99    76.4 4617.51   76.31 4630.63   76.14 4647.03   76.32
 4699.51   76.26 4774.96   76.38  4784.8   76.23  4817.6   76.42  4850.4   77.04
 4896.32   76.89 4902.88   76.29 4909.44   76.81  4965.2   76.87 4978.33   76.75
 5001.29      77 5020.97   76.97 5030.81   76.75 5063.61   76.77 5073.45   76.89
 5096.41   76.63 5152.17   76.85 5165.29   76.63 5194.82   76.61  5198.1   76.43
 5217.78   76.68 5221.06   76.51 5244.02   76.63 5286.66   76.34 5322.74   76.39
 5339.14   76.18 5378.45   76.48 5394.79   76.44 5404.59   75.49 5417.65   78.69
 5424.19   80.82 5430.72   81.42 5450.32    81.2 5456.85   79.96 5460.12   78.36
 5466.65   76.32 5473.19   75.38 5482.99   74.87 5492.79   74.76 5518.92   73.28
 5541.79   72.48 5551.59   71.77 5584.25   72.12 5590.79      72 5603.85   72.66
 5607.12   73.28 5613.65   75.75 5623.45   78.66 5626.72   78.96 5636.52   75.95
 5639.79   75.84 5646.32   77.18 5656.12   77.34 5665.92   76.18 5672.45   73.33
 5678.99   71.91 5685.52   69.13 5692.05   66.93 5701.85   66.34 5708.39   65.33
 5718.19   64.92 5724.72   61.49 5731.25   60.66 5800.25    55.8 5812.25    55.7
 5824.25    55.2 5837.25    55.4 5858.25    56.4 5865.25    56.6 5886.25    56.8
 5894.25    56.5 5915.25    56.7 5933.79    56.1 5937.06   60.83 5943.59   62.85
  5959.9   69.33 5963.16    71.3 5966.42   74.66 5969.69   75.54 5982.74   77.86
    5986   79.16 5992.52   83.26 5995.79    84.6 6002.31   85.37 6018.62   85.07
 6054.51   83.52 6067.56   83.64 6077.35   82.93 6083.87   81.55  6090.4   81.04
 6096.92   79.86 6106.71   79.56 6129.55    78.4 6136.07   78.45 6149.12   77.36
 6155.65   77.16 6175.22   75.79  6194.8   75.53 6217.63   75.92 6233.95    75.7
 6240.47   75.91 6260.05   75.95  6273.1   75.76 6279.62   75.96 6302.46   75.65
 6308.98   75.86 6338.35   75.63 6344.87   75.89 6364.45   75.57 6387.28   75.74
 6400.33   75.45 6423.17   75.37 6442.75   75.74 6459.11   75.44 6491.91   75.38
 6531.27   75.47  6541.1   75.28  6557.5   75.42 6567.34   75.26 6619.82    75.5
 6665.74   75.19  6688.7   75.32 6705.09   75.19 6734.61   75.35 6741.17    75.2
 6764.13   75.31 6777.25   75.14 6783.81   75.34 6836.29    75.4 6852.68   75.65
 6872.36   75.53 6908.44   75.95 6954.36   76.18 6983.88   76.21 7000.27   75.99
 7006.83   76.79 7019.95   75.79 7023.23   76.32 7033.07   76.71 7042.91   76.31
 7059.31   76.53 7111.79   76.49 7121.63   76.26 7134.75   76.46 7187.22   76.48
 7203.62   75.86 7210.18    77.2 7216.74   76.68  7256.1   76.98  7272.5   77.24
 7302.02   77.44 7308.57   77.64 7344.65   78.12 7351.21   78.01 7387.29   78.45
 7416.81   78.48 7436.49   78.92 7456.17   78.84 7485.68   79.16 7492.24   79.07
  7498.8   80.15 7502.08   78.78 7505.36   79.77 7511.92   79.28 7518.48   79.66
 7538.16   79.65 7603.76   79.11 7610.31   79.25 7656.23    79.4 7666.07   79.24
 7711.99   79.22 7728.39   79.03 7744.79   79.11 7777.58   78.88  7790.7   79.04
  7823.5   78.85 7846.46   79.02 7879.26   78.64 7892.38   78.77 7912.06   78.64
 7918.61   78.83 7931.73   78.55 7957.97   78.61 7984.21   78.36 8000.61   78.48
 8020.29   78.31 8030.13   78.51 8049.81    78.3 8056.37   78.47  8082.6   78.27
 8112.12   78.42 8144.92   78.19 8177.72   78.22 8203.96      78 8243.31   78.34
 8253.15   78.07 8262.99   78.23 8299.07    78.1 8318.75   78.32 8335.15   78.22
 8358.11   78.31 8364.67   78.17 8440.11   78.43 8466.35   78.34 8472.91   78.55
 8489.31   78.45 8545.06   78.72  8571.3   78.61 8597.54   78.76  8604.1   78.52
 8610.66   79.46 8613.94    78.6  8620.5   79.64 8623.78    78.8  8653.3   78.88
 8682.82    79.1 8712.34   78.83 8722.18   79.11 8741.86   79.12 8754.98   79.35
  8768.1   80.06 8781.21   82.51 8791.05   83.81 8814.01   83.98 8823.85   82.48
 8830.41   80.64 8836.97   79.71 8846.81   79.23 8856.65   79.43

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5665.92     .07 5724.72    .025 5937.06     .07 6002.31    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5665.92 6002.31          1737.71 1757.01  769.76             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5665.92   76.18       T
 6002.31 8856.65   85.37       T
Left Levee      Station=   64.94      Elevation=   87.78
Right Levee     Station= 8814.01      Elevation=   83.98

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             81.84    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.066      0.044
  W.S. Elev (ft)             81.82    Reach Len. (ft)          1737.71    1757.01     769.76
  Crit W.S. (ft)             63.58    Flow Area (sq ft)       22982.93    6630.67
  E.G. Slope (ft/ft)      0.000045    Area (sq ft)            23433.32    6630.67   11621.34
  Q Total (cfs)           20000.00    Flow (cfs)               8926.07   11073.93
  Top Width (ft)           8596.47    Top Width (ft)           5577.29     324.30    2694.88
  Vel Total (ft/s)            0.68    Avg. Vel. (ft/s)            0.39       1.67
  Max Chl Dpth (ft)          26.62    Hydr. Depth (ft)            4.12      20.45
  Conv. Total (cfs)       2978195.0     Conv. (cfs)            1329178.0   1649017.0
  Length Wtd. (ft)         1750.75    Wetted Per. (ft)         5582.33     334.54
  Min Ch El (ft)             55.20    Shear (lb/sq ft)            0.01       0.06
  Alpha                       3.53    Stream Power (lb/ft s)      0.00       0.09
  Frctn Loss (ft)             0.15    Cum Volume (acre-ft)    15365.61   12556.67    9780.79
  C & E Loss (ft)             0.01    Cum SA (acres)           4530.98     684.80    3135.78


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION
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RIVER: Rio Grande
REACH: Lower Reach RS: 127.05*

INPUT
Description: RGV-02,
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.35	17.4	82.72	39.14	86.91	43.49	87.27	49.11	86.71
58.38	84.74	65.99	82.86	80.2	79.92	100.09	76.47	115.62	74.73
125.67	73.94	134.19	72.38	139.88	72.72	150.53	72.46	185.34	72.35
216.6	72.69	230.81	72.59	250.7	72.74	256.38	72.67	290.48	72.7
299	72.81	335.94	72.69	352.99	72.76	375.44	73.2	406.99	73.11
421.98	73.41	429.74	73.26	460.77	73.52	491.78	73.38	499.54	73.71
518.93	73.92	526.69	73.68	534.44	73.81	542.2	73.63	553.84	73.69
573.23	74.26	588.73	76.27	592.61	76.97	608.12	78.97	634.32	79.05
643.03	79.22	659.9	79.09	665.58	79.39	681.8	78.8	705.07	78.78
720.59	78.98	732.22	78.81	751.61	78.87	767.88	78.63	778.75	78.31
786.51	78.49	796.29	78.34	813.35	78.62	830.4	78.42	838.92	78.54
861.66	78.55	867.34	78.68	887.23	78.57	921.33	78.54	930	78.77
958.27	78.56	972.48	78.73	992.37	78.76	1009.42	78.59	1046.36	78.71
1054.88	78.58	1065.73	78.78	1083.31	78.89	1088.99	78.79	1100.35	79
1134.45	78.96	1148.66	78.83	1165.71	78.91	1191.28	78.8	1225.38	78.78
1248.11	79.07	1265.16	79.09	1276.53	78.93	1327.68	79.05	1341.07	78.96
1367.47	79.06	1378.83	78.96	1427.14	79.18	1464.08	79.06	1489.66	79.19
1518.07	79.16	1537.96	79.22	1552.17	79.1	1611.84	79.33	1635.78	79.56
1647.42	79.46	1665.84	79.98	1678.45	79.94	1682.32	79.46	1693.96	77.23
1701.72	76.42	1716.99	75.67	1739.72	75.19	1752.12	75.21	1759.88	74.52
1782.34	74.53	1790.87	74.22	1805.08	74.18	1810.76	74.46	1830.65	73.92
1844.86	73.81	1861.91	73.42	1878.96	73.35	1881.81	74.06	1884.65	73.9
1898.86	73.98	1904.54	73.74	1918.75	73.87	1927.27	73.59	1930.11	73.75
1944.32	73.71	1958.53	73.45	1973.17	73.58	1988.69	73.4	2040.93	73.42
2063.67	73.19	2072.2	73.3	2086.41	73.16	2109.14	73.31	2134.71	73.16
2140.4	73.26	2180.18	73.4	2217.13	73.13	2225.65	73.34	2239.86	73.11
2251.22	73.11	2259.75	73.44	2265.43	73.2	2279.64	73.15	2288.16	73.3
2299.53	73.24	2336.47	73.39	2372.6	73.7	2379.09	73.51	2427.41	73.73
2455.82	73.76	2489.92	73.96	2504.13	73.94	2523.84	74.28	2546.75	74.15
2582.02	74.33	2632.01	74.81	2643.38	75.15	2646.22	74.91	2668.95	75.01
2674.63	75.13	2702.24	75.19	2729.37	75.66	2741.01	76.09	2764.28	76.49
2782.62	76.21	2799.67	76.45	2819.56	76.51	2836.61	76.34	2853.47	76.69
2870.71	76.71	2887.76	76.5	2899.12	76.51	2924.71	76.74	2934.92	76.6
2969.81	77.42	2984.38	77.32	2995.74	77.46	3012.79	77.34	3024.16	77.46
3051.26	77.28	3109.41	77.35	3126.46	77.42	3175.35	77.35	3210.25	77.4
3225.77	77.35	3373.69	77.4	3450.7	77.34	3485.6	77.42	3516.63	77.39
3549.87	77.49	3594.19	77.4	3679.5	77.51	3698.89	77.47	3714.41	77.55
3780.33	77.59	3788.08	77.52	3830.75	77.62	3856.78	77.5	3869.52	77.65
3961.92	77.68	3998.86	77.53	4032.4	77.68	4059.55	77.63	4071.19	77.69
4109.96	77.67	4121.6	77.84	4132.42	77.71	4160.84	77.72	4189.25	78.04
4229.04	78.02	4234.72	77.72	4241.82	77.92	4280.6	78.03	4300.08	77.91
4319.97	78.09	4345.55	77.96	4382.49	78.04	4402.38	77.87	4450.69	78.01
4487.63	77.83	4490.48	77.73	4530.26	77.86	4552.07	77.75	4559.83	77.57
4598.45	77.71	4641.12	77.52	4660.87	77.59	4669.36	77.14	4680.68	78.73
4686.34	79.79	4692	80.08	4708.98	79.95	4714.64	79.32	4723.13	77.5
4728.79	77.03	4745.77	76.72	4768.41	75.99	4788.22	75.6	4796.71	75.25
4825.01	75.33	4830.82	75.25	4844.82	76.12	4858.97	79.05	4861.8	79.31
4868.36	77.77	4874.92	78.35	4888.05	77.43	4892.42	76	4896.8	75.17
4905.54	71.5	4912.1	69.84	4923.04	66.19	4927.42	63.36	4939.38	60.35
4945.84	59.86	4954.56	57.15	4958.21	56.5882	4974.31	54.11	4994.05	53.07
5002.06	53.42	5011.38	53.47	5026.07	53.83	5034.07	54.48	5041.5654	.73495
5050.08	54.67	5058.08	56.35	5074.09	58.66	5076.71	58.74	5081.95	59.98
5089.81	61.11	5100.29	61.48	5108.15	60.57	5113.39	60.8	5118.63	61.89
5126.49	62.68	5136.97	64.4	5140.01	66.84	5152.7	67.78	5168.42	70.57
5173.66	71.29	5179.14	73.04	5183.48	75.1	5205.23	77.39	5209.57	78.25
5218.26	80.58	5222.62	81.23	5231.3	81.73	5244.3	81.57	5252.09	81.15
5262.49	81.18	5301.84	80.73	5319.47	80.96	5332.7	80.68	5341.51	80.01
5350.84	79.85	5359.14	79.31	5369.04	79.32	5376.83	79.09	5403.23	78.72
5412.04	78.75	5429.68	78.33	5439.2	78.4	5459.99	77.65	5496.37	77.44
5522.25	77.84	5544.3	77.8	5566.54	77.99	5592.57	77.85	5602.98	77.99
5618.6	77.91	5636.81	77.66	5660.25	77.75	5673.25	77.6	5694.17	77.79
5720.63	77.47	5751.48	77.51	5769.11	77.34	5806	77.31	5816.41	77.46
5899.7	77.02	5954.36	77.13	5959.32	77.05	6016.82	76.79	6024.63	76.96
6065.69	76.93	6110.53	76.65	6158.76	76.61	6220.79	76.49	6229.66	76.38
6251.08	76.45	6278.41	76.25	6287.27	76.33	6326.56	76.37	6339.57	76.28
6380.33	76.35	6406.92	76.26	6428.06	76.42	6443.68	76.4	6467.11	76.54
6477.52	76.45	6519.16	76.54	6529.57	76.48	6557.61	76.58	6579.75	76.4
6588.62	76.84	6606.35	76.29	6610.78	76.54	6624.07	76.69	6637.37	76.45
6659.71	76.49	6685.74	76.32	6730.44	75.94	6743.74	75.74	6761.46	75.74
6823.68	75.43	6841.91	75.23	6854.52	74.88	6863.39	75.53	6872.25	75.24
6914.79	75.15	6930.4	75.22	6969.44	75.21	6987.48	75.15	7045.08	75.35
7053.95	75.2	7091.77	75.23	7104.79	75.35	7133.42	75.21	7169.18	75.59
7193.28	75.52	7235.64	75.84	7244.51	75.81	7253.37	76.37	7257.8	75.7
7262.23	76.21	7271.1	75.98	7279.96	76.2	7323.42	76.33	7354.65	76.55
7365.07	76.52	7383.28	76.68	7430.13	76.81	7453.56	77.01	7484.8	76.99
7492.6	76.79	7500.41	76.16	7516.03	75.6	7531.64	74.71	7542.05	74.39
7552.47	74.33	7565.48	74.02	7583.7	74.13	7617.54	73.57	7627.95	73.6
7640.96	73.94	7646.17	73.53	7659.18	73.16	7682.6	73.22	7693.02	73.11
7739.87	73.47	7747.67	73.42	7789.32	73.93	7810.14	74.32	7830.96	76.33
7841.38	76.21	7849.19	77.4	7870	78.1	7880.42	78	7896.03	77.52
7916.86	77.52	7929.87	77.72	7932.47	77.33	7948.09	78.27	7961.11	79.4
7971.31	79.48	7976.72	79.02	7992.34	78.62	8010.55	79.02	8018.36	78.89
8093.84	78.9	8132.89	78.65	8158.91	78.75	8206.19	78.47	8259.36	78.57
8272.65	78.4	8285.95	78.54	8325.49	78.35	8335.91	78.46	8361.29	78.47
8390.56	78.33	8398.37	78.41	8421.79	78.23	8445.22	78.33	8484.27	78.32
8497.27	78.19	8507.69	78.27	8549.33	78.16	8560.73	78.06	8585.77	78.13
8596.19	78.01	8635.22	78.06	8682.07	77.98	8702.54	77.86	8737.99	77.91
8746.86	77.78	8755.72	78.21	8760.15	77.76	8769.02	78.23	8773.45	77.8
8807.01	77.87	8817.42	77.76	8830.43	77.87	8853.22	77.87	8893.11	77.69
8911.12	77.91	8929.34	77.95	8937.14	78.16	8947.56	79.08	8957.97	79.11
8968.46	79.46	8986.17	80.79	8999.46	81.48	9030.49	81.72	9043.78	81.15
9052.65	80.15	9064.68	79.81	9075.1	80.35	9080.29	81.23	9088.11	81.68

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	4861.8	.066	4958.21	.025	5041.56	.066	5231.3	.074

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4861.8	5231.3	1737.71	1757.01 769.76	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
5231.3	9088.11	81.73	T

Left Levee Station= 43.49 Elevation= 87.27

Right Levee Station= 9030.49 Elevation= 81.72
Blocked Obstructions num= 1
Sta L Sta R Elev
40.16 4853.7 79.25

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 126.7

INPUT
Description: RGV-02, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.66	12.59	85.84	22.04	86.77	28.34	86.97	34.63	86.09
40.93	84.51	69.92	75.2	76.48	73.74	83.04	71.69	99.44	68.37
112.56	67.19	286.38	67.19	302.77	67.63	335.57	67.38	342.13	67.72
348.69	67.45	374.93	67.77	401.16	67.64	407.72	68.25	424.12	68.66
430.68	68.21	437.24	68.48	443.8	68.16	453.64	68.32	460.2	68.93
470.04	69.23	483.15	73.24	486.43	74.7	499.55	78.93	522.51	79
529.07	79.5	538.91	78.93	548.75	79.42	561.86	78.43	581.54	78.44
594.66	78.74	604.5	78.49	620.9	78.53	643.85	77.28	650.41	77.75
666.81	77.41	676.65	77.65	693.05	77.5	699.61	77.65	722.56	77.5
735.68	77.67	768.48	77.51	771.76	77.67	794.72	77.56	817.67	77.74
847.19	77.64	883.27	77.73	886.55	77.84	919.34	77.8	925.9	78
955.42	77.82	978.37	77.9	1027.57	77.84	1047.25	78.05	1057.08	77.92
1099.72	78.1	1119.4	77.91	1135.79	78.1	1152.19	78.03	1188.27	78.22
1234.18	78.08	1260.42	78.29	1280.1	78.19	1306.33	78.21	1342.41	78.41
1368.64	78.4	1378.48	78.18	1398.16	78.95	1404.72	78.79	1408	77.94
1417.84	73.7	1424.4	72	1434.24	70.99	1447.35	70.14	1467.03	70.17
1473.59	68.91	1486.71	69.26	1493.27	69.01	1519.51	69.34	1545.74	69.37
1575.26	69.24	1611.33	69.43	1647.41	69.38	1653.97	69.54	1667.09	69.42
1690.04	69.65	1703.16	69.54	1742.52	69.76	1791.71	69.8	1821.23	70.06
1847.46	70.19	1886.82	70.03	1896.66	70.18	1926.17	70.28	1991.77	70.77
2011.44	70.71	2044.24	70.93	2060.64	71.14	2080.31	71.21	2119.67	71.66
2152.47	71.7	2168.87	71.85	2178.7	72.14	2195.1	72.33	2227.9	73.62
2247.58	73.69	2270.54	74.01	2277.09	74.5	2293.49	74.78	2303.33	75.49
2323.01	76.29	2342.69	75.97	2368.93	76.17	2378.76	76.07	2398.44	76.54
2437.8	76.54	2460.76	76.79	2467.32	76.69	2477.15	77.29	2496.83	78.17
2503.39	78.08	2516.51	78.34	2536.19	78.26	2555.87	78.36	2565.71	78.07
2585.38	78.01	2618.18	78.24	2664.1	78.25	2670.65	78.14	2700.17	78.28
2713.29	78.15	2788.72	78.28	2795.28	78.17	2818.24	78.24	2844.48	78.09
2867.43	78.21	2903.51	78.12	2933.03	78.31	2959.27	78.21	2975.66	78.34
3024.86	78.21	3097.01	78.51	3113.41	78.43	3126.53	78.61	3152.77	78.55
3182.28	78.77	3188.84	78.63	3224.92	78.82	3251.16	78.71	3257.71	78.94
3274.11	78.81	3300.35	79.03	3306.91	78.85	3326.59	78.96	3379.06	78.92
3395.46	79.07	3418.42	78.99	3428.26	79.09	3461.05	78.98	3470.89	79.31
3493.85	79	3539.77	79.06	3566	79.17	3572.56	79.03	3605.36	79.21
3621.76	79.07	3641.44	79.19	3667.67	79.16	3674.23	79.29	3713.59	79.08
3729.99	79.18	3769.34	79.17	3782.46	79.02	3821.82	79.11	3834.94	79.05
3841.5	78.74	3861.14	79.02	3887.33	79.04	3910.25	78.61	3933.17	78.8
3975.73	78.67	4047.77	78.73	4070.68	78.5	4077.23	78.86	4090.33	79.09
4096.88	79.65	4103.42	79.55	4106.7	78.69	4113.25	78.66	4116.52	78.12
4123.07	72.75	4129.62	65.58	4136.17	60.83	4139.44	60.53	4143.86	56.04
4153.86	52.04	4163.86	50.94	4173.86	51.54	4193.86	51.54	4203.86	51.74
4213.86	52.74	4223.86	53.04	4233.86	52.74	4243.86	56.04	4253.86	58.54
4263.86	60.53	4267.13	60.68	4273.68	63.3	4283.5	65.71	4290.05	65.79
4296.6	66.37	4306.42	64.5	4312.97	64.92	4319.52	67.17	4329.34	68.94
4335.89	71.09	4342.43	72.63	4348.98	73.3	4362.08	72.8	4381.72	73.72
4388.27	73.59	4398.09	75.29	4404.64	75.95	4411.19	75.99	4424.29	76.66
4440.66	77.91	4457.03	77.82	4460.3	78.08	4470.12	77.76	4476.67	77.94
4486.49	77.21	4499.59	77.58	4512.69	77.58	4529.06	77.88	4548.7	77.94
4578.17	78.39	4604.36	78.5	4610.91	78.73	4627.28	78.77	4633.83	79
4643.65	78.79	4660.02	79.03	4692.76	79.06	4709.13	79.27	4722.23	79.67
4748.42	79.25	4768.07	79.46	4784.44	79.46	4794.26	79.28	4810.63	79.65
4846.64	79.91	4869.56	79.86	4882.67	80.05	4899.07	79.87	4915.47	79.89
4928.58	80.08	4941.7	79.82	4948.26	79.99	4971.21	79.67	5000.73	79.72
5017.12	79.49	5046.64	79.71	5053.2	79.47	5085.99	79.32	5141.74	79.23
5161.41	79.3	5184.37	79.17	5197.49	79.33	5213.88	79.06	5230.28	79.14
5279.47	78.9	5302.42	78.65	5325.38	78.84	5335.22	78.68	5354.89	78.68
5371.29	78.91	5400.8	78.53	5443.43	78.4	5449.99	78.24	5459.83	78.55
5541.81	78.25	5568.05	78.03	5600.84	78.04	5627.07	77.9	5653.31	77.93
5718.89	77.56	5745.13	77.62	5751.69	77.46	5791.04	77.31	5840.23	77.36
5856.62	77.17	5866.46	77.28	5899.26	77.07	5945.17	76.99	5968.12	77.13
5987.8	76.95	6017.31	77.08	6030.43	76.87	6050.1	76.99	6056.66	76.88
6082.9	76.9	6096.01	76.77	6138.64	76.98	6155.04	76.75	6168.16	76.91
6259.98	76.45	6266.54	76.28	6292.77	76.13	6322.29	75.69	6358.36	75.29
6420.66	74.72	6466.57	74.39	6476.41	74.2	6489.53	74.25	6499.37	73.94
6564.95	73.6	6581.35	73.39	6601.03	73.4	6617.42	73.2	6650.21	73.07
6689.57	72.71	6722.36	72.56	6745.31	72.58	6755.15	72.4	6804.34	72.11
6820.74	72.24	6837.13	72	6856.81	71.94	6883.04	72.29	6932.23	72.19
6938.79	72.33	7033.89	72.7	7096.2	73.11	7135.55	73.74	7148.67	73.75
7171.62	74.17	7230.65	74.31	7260.16	74.65	7279.84	74.52	7299.52	74.74
7309.35	74.34	7319.19	73.08	7329.03	72.37	7338.87	71.98	7345.43	71.17
7351.98	70.97	7358.54	70.2	7371.66	69.56	7384.78	69.54	7401.17	69.01
7404.45	69.35	7411.01	68.93	7424.13	69.16	7443.8	68.61	7466.76	68.2
7479.88	68.31	7496.27	68.9	7502.83	68.03	7519.23	67.32	7532.35	67.31
7548.74	67.55	7561.86	67.37	7601.21	67.7	7620.89	68.07	7630.72	68.04
7660.24	68.8	7683.19	69.12	7693.03	69.57	7709.43	70	7735.66	73.99
7748.78	73.86	7758.62	76.24	7768.46	76.91	7778.29	77.08	7784.85	77.59
7797.97	77.44	7817.64	76.59	7843.88	76.63	7860.28	76.96	7863.55	76.18
7870.11	77.12	7883.23	78.17	7899.63	80.45	7912.74	80.44	7919.3	79.58
7925.86	79.2	7938.98	78.9	7945.54	79.25	7961.93	79.59	7971.77	79.37
7984.89	79.55	8060.31	79.32	8066.87	79.45	8076.71	79.07	8083.27	79.27
8096.38	79.16	8109.5	79.31	8116.06	79.11	8148.85	79.28	8168.53	79.05
8198.04	78.94	8257.07	78.89	8296.42	78.71	8302.98	78.86	8339.05	78.78
8358.73	78.58	8371.85	78.81	8381.68	78.7	8424.31	78.55	8440.71	78.42
8450.55	78.55	8480.06	78.27	8486.62	78.45	8503.02	78.28	8509.58	78.43
8542.37	78.26	8558.77	78.31	8575.16	78.02	8588.28	78.15	8604.68	77.99
8640.75	77.96	8647.31	77.81	8676.82	77.66	8686.66	77.78	8699.78	77.55
8716.17	77.59	8742.41	77.41	8748.96	77.51	8768.64	77.36	8807.99	77.29
8814.55	77.12	8886.7	77.06	8919.49	76.81	8952.28	76.74	8965.4	76.87
8978.52	76.62	8994.91	76.76	9027.71	76.63	9090.01	76.53	9096.57	76.7
9119.53	76.79	9129.36	77.15	9142.48	78.85	9155.6	78.57	9162.16	78.88
9178.55	78.83	9185.11	79.05	9237.58	79.27	9263.81	79.82	9270.37	79.54
9290.05	80.03	9303.17	81.47	9309.72	83.14	9319.56	83.94		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	4116.52	.066	4129.62	.025	4273.68	.066	4460.3	.074

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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4116.52  4460.3           587.49 1806.25 1797.03             .1       .3
Left Levee      Station=   28.34      Elevation=   86.97
Right Levee     Station= 9319.56      Elevation=   83.94
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   23.66 4116.52   78.12    4461 4600.13   78.08 4721.94 4883.85   80.02
 4929.12 7902.81    80.1  7914.4 9551.37   80.46

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             81.33    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                0.110      0.051     0.074
  W.S. Elev (ft)             81.26    Reach Len. (ft)          587.49    1806.25    1797.03
  Crit W.S. (ft)             63.03    Flow Area (sq ft)       11741.23    5640.30    5546.71
  E.G. Slope (ft/ft)      0.000182    Area (sq ft)            11741.23    5640.30    5546.71
  Q Total (cfs)           20000.00    Flow (cfs)               4343.87   14009.02    1647.12
  Top Width (ft)           9250.23    Top Width (ft)           4065.48     343.78    4840.98
  Vel Total (ft/s)            0.87    Avg. Vel. (ft/s)            0.37       2.48       0.30
  Max Chl Dpth (ft)          30.32    Hydr. Depth (ft)            2.89      16.41       1.15
  Conv. Total (cfs)       1480679.0    Conv. (cfs)              321593.5   1037143.0   121942.5
  Length Wtd. (ft)         1641.42    Wetted Per. (ft)         4066.56     356.63    4841.74
  Min Ch El (ft)             50.94    Shear (lb/sq ft)            0.03       0.18       0.01
  Alpha                       5.73    Stream Power (lb/ft s)      0.01       0.45       0.00
  Frctn Loss (ft)             0.26    Cum Volume (acre-ft)    14216.71   12055.49    9325.00
  C & E Loss (ft)             0.01    Cum SA (acres)           4147.57     656.51    3002.51


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 126.35*

INPUT
Description: RGV-02,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.16   48.05   83.84   86.73   84.57    94.9    84.9   105.1   86.73
  108.16   86.97  114.76   86.14  121.38   84.48  139.73   78.64  151.81   75.41
   158.7   74.28  165.59    72.7   182.8      70  196.58   69.04  202.89   69.01
  314.84   69.07  360.77   68.98  379.06   69.01  396.27   69.34   430.7   69.15
  437.59   69.41  444.48   69.21  472.03   69.46  499.56   69.39  506.45   69.84
  523.67   70.15  530.55   69.84  537.44   70.02  544.33   69.76  554.66   69.89
  561.55   70.36  571.88    70.6  585.64   73.61  589.08    74.7  602.86   77.87
  626.96   77.93  633.85   78.31  644.18    77.9  654.51   78.27  668.27   77.54
  688.93   77.58  702.71   77.78  713.04    77.6  730.26    77.6  754.35   76.71
  761.24   77.06  778.45   76.81  788.79   76.98     806   76.86  812.89   76.97
  836.98   76.89  850.76      77  885.19   76.91  888.64   77.03  912.74   76.95
  936.83   77.09  967.83   77.04  1005.7   77.08 1009.15   77.17 1043.57   77.17
 1050.46   77.32 1081.45   77.15 1109.98   77.28 1115.72   77.19 1173.13   77.29
 1187.49   77.22  1196.1   77.36 1227.67   77.48  1253.5   77.29  1273.6    77.4
 1305.17   77.38 1310.91   77.55 1374.07    77.4  1391.3   77.63 1422.87    77.5
 1428.61   77.71 1445.84   77.57 1465.93   77.72 1503.24   77.66 1515.27   77.73
  1525.6   77.54 1546.26   78.17 1553.15   78.04 1556.59    77.4 1566.92   74.21
 1573.81   72.92 1584.14   72.22  1597.9   71.55 1618.56   71.57 1625.45   70.73
 1639.22   70.92 1646.11   70.71 1663.99   70.99 1669.74   70.92 1704.18   71.03
 1724.28    70.9 1744.37   71.06 1807.93   71.03 1821.88   71.19 1830.49   71.02
 1852.69   71.24 1882.16   71.23 1953.93   71.41  1965.4   71.36 1990.42   71.55
 2031.43   71.72 2059.28   71.53 2069.61   71.65  2103.2   71.74  2180.7   72.26
 2192.18   72.07 2278.29    72.6 2304.13   72.92 2315.62   72.77 2327.09   72.91
 2355.39   73.02 2382.92   73.42 2413.22   74.19 2417.36   74.45 2436.18   74.39
 2462.12   74.69    2469   75.05 2486.22   75.22 2496.55   75.86 2517.21   76.38
 2537.87   76.16 2575.74   76.22  2596.4   76.56 2614.16   76.63 2637.72   76.57
 2661.82   76.82 2668.71   76.72 2699.69   77.86 2706.58   77.77 2728.98   78.06
 2743.33   77.94 2761.68   77.99 2789.26   77.73  2843.8   77.97 2852.41   77.88
  2875.3   77.99  2892.6   77.86 2913.17   78.01 2950.01   77.87 2967.23   78.04
 2981.59   77.96 3006.13   78.05 3013.02   77.88 3050.48   77.92  3067.7   77.79
 3096.41   78.01 3105.02   77.89  3136.6   77.91 3157.64   78.04 3185.18   77.96
 3208.36   78.14 3239.94   77.98 3245.68   78.12 3260.03   78.01 3329.79   78.26
 3357.63   78.24 3369.11   78.42  3380.6   78.24 3397.82    78.3 3415.04   78.52
 3435.14   78.37 3463.84   78.54 3481.07   78.46  3498.5   78.67 3515.72    78.5
 3543.26   78.75 3561.44   78.57 3615.97   78.62  3633.2   78.74 3667.22   78.72
  3690.6    78.8 3711.97   78.68  3722.3    78.9 3746.41    78.7 3762.37   78.79
 3799.68   78.75 3819.77    78.9 3831.26   78.73 3859.96   78.96 3877.19   78.81
 3901.36   78.93  3914.5   78.86 3935.78   78.99 3977.65   78.84 4023.57   78.96
 4066.63   78.79 4086.73    78.9  4104.5   78.78 4111.39   78.54 4135.52   78.86
  4159.5   78.85 4183.56   78.52  4224.5   78.67 4230.25   78.58 4270.43   78.52
 4299.13   78.64 4333.58   78.56 4351.99   78.59 4368.01   79.16 4373.76   79.16
  4379.5   79.79 4382.78   79.68 4389.28   78.51 4394.19   76.98    4404    75.3
 4408.89   73.64 4415.59   69.82 4418.69   68.51 4428.49   63.01 4430.4762.24098
  4438.3    59.2 4443.19   59.02  4449.8   55.76 4464.77   52.73 4479.73   51.61
 4487.98    52.1 4512.71   52.35 4520.95   53.07 4529.19   53.27 4537.44   53.02
 4547.1455.87728 4553.92   57.49 4562.17   60.43 4564.86   60.59 4570.26   62.65
 4578.36   64.86 4589.16   65.91 4597.25   64.81 4602.65   65.33 4608.05   67.22
 4616.15   68.86 4626.94   72.15 4632.34   72.91 4643.13   72.85 4659.32   73.76
 4664.72   73.67 4672.82   74.94 4678.22   75.44 4694.42   76.03 4707.91   77.02
  4721.4   77.01  4724.1   77.22 4733.57    76.8 4739.89    76.9 4749.36   76.35
    4762   76.66 4774.64   76.65 4790.43   77.01 4815.44   77.42  4837.8   78.57
 4851.98   78.58 4863.06   78.33 4885.17    78.4 4891.49   78.58 4900.96   78.45
 4916.75   78.67 4946.98    78.7 4964.12   78.86 4976.76   79.17 5002.02   78.85
 5020.97   79.01 5046.24   78.87 5062.03   79.15 5096.76   79.39 5118.87   79.37
 5131.52   79.52 5163.15   79.39  5175.8   79.53 5188.46   79.32 5194.78   79.46
 5219.23   79.21  5245.4   79.31 5261.21   79.14 5289.68   79.31 5296.01   79.13
 5315.04   79.02 5337.15   79.05 5381.41   78.97 5400.39   79.03 5422.53   78.94
 5435.19   79.06    5451   78.85 5466.82   78.91 5514.27   78.71  5536.4   78.54
 5558.55   78.67 5587.02   78.56 5602.84   78.75  5631.3   78.48 5672.42   78.38
 5678.75   78.26 5688.24   78.51 5727.76   78.47 5767.32   78.32 5792.63   78.16
 5824.26   78.18 5849.56    78.1 5874.87   78.14 5938.13    77.9 5963.44   77.97
 5969.77   77.85 6007.72   77.78 6055.17   77.83 6070.98   77.69 6080.47   77.78
 6112.11   77.63  6156.4   77.61 6178.54   77.74 6197.52   77.61 6225.98   77.68
 6238.64   77.52 6257.61   77.63  6301.9   77.42 6343.02   77.58 6358.84   77.41
 6371.49   77.52 6435.28   77.18 6460.06   77.11 6472.12   76.89 6491.69   76.82
 6542.13   76.27 6608.47    75.8 6681.48   75.41 6690.98   75.18 6754.23   74.91
 6770.05   74.76 6789.04   74.78 6804.85   74.63 6836.94   74.55 6874.44   74.26
 6906.07   74.12 6928.21   74.15  6937.7   74.02 6985.15   73.77 7000.97   73.86
 7016.78   73.65 7035.76   73.56 7061.06   73.75 7108.51   73.49 7120.68   73.63
 7187.01    73.6 7266.67    73.8 7304.63   74.19 7317.29   74.16 7339.42   74.38
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7396.36	74.35	7424.83	74.52	7443.81	74.37	7462.8	74.48	7472.28	74.16
7481.77	73.2	7500.75	72.34	7507.08	71.72	7513.4	71.55	7519.73	70.96
7532.38	70.46	7545.04	70.42	7560.85	69.99	7564.01	70.24	7570.34	69.91
7582.99	70.06	7601.97	69.62	7624.11	69.28	7636.77	69.35	7652.58	69.78
7658.91	69.13	7674.73	68.58	7703.19	68.71	7715.85	68.55	7753.8	68.75
7772.79	69.02	7782.27	69	7810.74	69.55	7832.88	69.77	7858.19	70.4
7883.49	73.38	7896.15	73.28	7905.64	75.05	7915.13	75.54	7924.61	75.66
7930.94	76.03	7943.6	75.9	7962.57	75.25	7987.88	75.27	8003.7	75.51
8006.86	74.92	8013.18	75.62	8025.84	76.39	8041.66	78.08	8054.3	78.06
8066.96	77.12	8079.62	76.9	8085.94	77.16	8101.75	77.4	8111.24	77.22
8123.9	77.35	8196.65	77.11	8202.98	77.21	8212.47	76.91	8244.1	77.09
8250.43	76.94	8282.05	77.05	8301.04	76.86	8340.42	76.77	8386.44	76.74
8424.4	76.55	8430.73	76.68	8465.72	76.6	8484.5	76.48	8497.16	76.67
8539.42	76.61	8557.84	76.86	8579.96	78.11	8601.54	77.94	8607.87	78.07
8623.68	77.95	8677.46	78.14	8693.27	77.95	8705.93	78.07	8721.75	77.97
8756.54	77.95	8791.33	77.77	8800.82	77.88	8813.48	77.72	8829.29	77.77
8854.6	77.63	8860.92	77.72	8893.19	77.56	8917.86	77.55	8924.19	77.43
8993.78	77.39	9022.16	77.19	9057.04	77.19	9069.7	77.28	9082.35	77.08
9098.16	77.18	9125.34	77.08	9189.89	76.98	9196.22	77.1	9218.37	77.12
9227.85	77.38	9240.5	78.63	9253.16	78.41	9259.49	78.64	9275.3	78.6
9281.63	78.76	9328.02	78.81	9335.39	78.96	9342.77	79.47	9350.14	80.35
9357.51	80.71	9363.87	80.5	9395.51	80.92	9401.82	81.94	9411.31	82.46

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	4379.5	.066	4430.47	.025	4547.14	.066	4724.1	.074

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4379.5	4724.1	587.49	1806.25	1797.03	.1	.3

Left Levee Station= 108.16 Elevation= 86.9675
Right Levee Station= 9411.31 Elevation= 82.46
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
109.01	4377.51	79.77	4721.74	9391.85	77.34

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 126.00*

INPUT
Description: RGV-02,
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.67	39.02	81.18	83.51	81.83	120.59	82.16	150.74	82.36
164.93	82.94	173.79	84.38	182.66	86.52	187.98	86.96	193.99	86.36
203.02	84.12	209.02	82.07	221.05	78.38	227.07	76.82	233.71	75.61
248.13	73.72	266.17	71.64	280.6	70.9	287.2	70.83	356.37	70.87
404.47	70.94	452.58	70.77	471.74	70.84	503.7	71.1	525.84	70.93
569.12	71.16	597.97	71.13	605.18	71.43	623.22	71.63	644.86	71.37
655.68	71.46	673.71	71.98	688.13	73.99	691.74	74.71	706.17	76.81
731.41	76.85	738.63	77.12	749.45	76.87	760.27	77.12	774.69	76.65
810.76	76.81	834.45	76.74	864.85	76.13	872.06	76.37	890.1	76.21
900.92	76.32	978.77	76.27	1005.51	76.39	1030.76	76.34	1062.97	76.47
1088.46	76.44	1167.8	76.54	1175.02	76.64	1204.29	76.48	1237.36	76.66
1243.37	76.48	1279.46	76.58	1288.48	76.68	1303.51	76.58	1309.53	76.78
1318.55	76.51	1327.57	76.78	1342.6	76.68	1360.64	76.87	1366.66	76.68
1402.74	76.61	1408.75	76.71	1441.82	76.64	1447.84	76.96	1456.86	76.83
1483.93	76.74	1489.93	76.88	1513.99	76.73	1532.04	77.05	1550.07	76.84
1565.11	76.81	1571.12	77.22	1589.17	76.93	1607.2	76.89	1610.21	77.15
1628.25	76.94	1634.27	77.07	1649.3	76.92	1652.3	77.09	1672.72	76.9
1694.36	77.4	1701.57	77.3	1705.18	76.86	1716	74.72	1723.21	73.85
1748.45	72.95	1770.09	72.97	1777.31	72.54	1791.74	72.58	1798.95	72.41
1817.68	72.75	1823.7	72.56	1859.78	72.7	1880.83	72.53	1901.88	72.81
1922.92	72.64	1943.97	72.71	1965.02	72.65	1983.06	72.89	1992.08	72.61
2022.15	72.83	2031.17	73.03	2046.21	72.84	2091.31	72.88	2097.32	73.06
2106.34	72.89	2121.38	73.03	2133.4	72.88	2166.48	73.07	2196.55	73.07
2202.56	73.29	2211.58	73.08	2231.73	73.03	2271.72	73.28	2277.74	73.18
2313.82	73.45	2352.9	73.51	2358.92	73.77	2370.95	73.43	2404.02	73.64
2419.06	73.65	2425.07	73.89	2437.1	73.66	2452.13	73.94	2461.15	73.82
2473.18	74.03	2479.19	73.92	2488.22	74.17	2500.25	73.86	2512.27	74.13
2541.9	74.19	2560.37	74.31	2602.48	74.91	2605.49	75.27	2626.53	75.1
2653.71	75.37	2660.91	75.61	2683.66	75.77	2689.67	76.22	2711.41	76.47
2734.77	76.34	2761.9	76.33	2812.96	76.71	2830.99	76.6	2849.04	76.66
2855.05	76.86	2870.1	76.75	2894.14	77.42	2915.19	77.47	2933.23	77.82
2948.26	77.61	2978.33	77.6	2996.37	77.44	3014.41	77.62	3023.44	77.48
3053.5	77.69	3062.52	77.51	3098.6	77.79	3104.62	77.53	3137.7	77.86
3164.76	77.55	3182.8	77.86	3197.84	77.67	3223.54	77.83	3230.76	77.6
3260.97	77.56	3270	77.68	3288.04	77.48	3318.1	77.83	3327.13	77.62
3342.16	77.79	3360.21	77.65	3382.24	77.77	3426.35	77.73	3435.37	77.95
3450.41	77.74	3468.45	77.72	3474.47	78	3489.5	77.79	3510.55	77.81
3528.59	77.94	3579.71	78.03	3591.73	77.91	3603.76	78.24	3615.79	77.9
3618.8	78.12	3633.83	77.98	3639.84	78.21	3660.89	78.3	3672.92	78.07
3703.23	78.26	3721.03	78.17	3739.29	78.39	3757.32	78.18	3786.18	78.48
3805.22	78.22	3826.26	78.37	3838.29	78.25	3844.3	78.47	3856.32	78.51
3862.34	78.32	3880.38	78.5	3889.4	78.34	3901.42	78.5	3916.02	78.44
3940.51	78.56	3962.9	78.38	3982.6	78.56	4009.67	78.36	4015.69	78.56
4054.77	78.43	4075.81	78.64	4087.84	78.43	4117.91	78.73	4135.95	78.51
4169.03	78.66	4175.04	78.54	4187.07	78.75	4220.14	78.56	4277.27	78.62
4289.29	78.76	4301.32	78.54	4322.36	78.69	4334.39	78.52	4355.45	78.7
4381.28	78.35	4406.55	78.71	4421.59	78.55	4436.63	78.66	4442.64	78.49
4499.76	78.58	4505.78	78.42	4541.86	78.52	4547.87	78.36	4562.91	78.55
4577.94	78.57	4595.97	78.43	4614.02	78.45	4633.3	78.69	4650.09	79.32
4656.1	79.13	4662.12	79.93	4666.49	79.75	4675.15	77.46	4681.69	75.26
4694.94	71.88	4710.365	16335	4714.31	64.27	4727.37	60.43	4740.42	57.57
4746.94	57.51	4755.75	55.48	4765.58	54.64	4775.68	53.42	4795.61	52.28
4802.1	52.66	4820.615	2.95513	4828.04	53.41	4841.02	53.3	4853.99	56.43
4859.97	60.15	4862.6	60.5	4873.22	64.01	4881.71	65.44	4888.08	65.12
4892.33	65.74	4896.58	67.27	4902.95	68.78	4911.44	71.67	4915.69	72.53
4924.19	72.9	4931.16	73.59	4941.18	73.74	4947.55	74.6	4964.54	75.41
4975.16	76.14	4987.9	76.35	4994.94	75.91	5003.11	75.85	5012.24	75.49
5024.41	75.74	5040.69	75.77	5075.88	76.8	5097	78.74	5111.09	78.71
5121.76	78.17	5139.24	78	5192.04	78.4	5203.9	78.35	5231.28	78.66
5255.62	78.46	5273.88	78.56	5298.21	78.47	5313.42	78.65	5346.88	78.87
5380.36	78.99	5410.84	78.9	5423.02	78.98	5464.86	78.74	5490.06	78.9
5505.29	78.8	5532.72	78.9	5557.15	78.67	5578.44	78.8	5621.09	78.7
5660.7	78.71	5672.89	78.78	5688.12	78.64	5703.36	78.68	5731.09	78.52
5770.39	78.44	5819.14	78.45	5834.38	78.59	5861.8	78.42	5901.41	78.36
5916.65	78.47	5954.72	78.53	6017.21	78.29	6096.43	78.35	6157.37	78.23
6270.12	78.3	6338.08	78.19	6367.62	78.24	6388.95	78.36	6407.24	78.27
6434.66	78.28	6446.85	78.18	6465.12	78.27	6507.78	78.06	6547.4	78.18

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 6574.82   78.13 6604.31   77.92 6636.27   77.79 6660.14   77.78 6671.76   77.53
 6690.61   77.51 6721.46   77.32  6739.2   77.11  6803.1   76.83 6824.41    76.8
 6882.58   76.43 6920.24   76.34 6958.76   76.13 6977.04   76.15 7016.08   75.98
 7023.18   76.03 7048.04   75.85 7079.98   75.79 7090.63   75.67 7111.11   75.72
 7147.42   75.47 7181.19   75.48 7214.71   75.19 7239.08   75.22 7284.79   74.79
 7296.51    74.9 7310.72   74.78 7360.41   74.59 7388.81   74.61 7437.15    74.5
 7473.71   74.64  7485.9   74.56  7530.8   74.55 7562.08   74.38  7589.5    74.4
 7607.79   74.22 7626.07   74.23 7635.21   73.99 7644.35   73.32 7662.64   72.69
 7668.73   72.26  7693.1   71.36 7705.29    71.3 7720.52   70.97 7741.86   70.96
 7781.47   70.35 7793.66   70.39 7808.89   70.67 7814.99   70.22 7830.22   69.83
 7857.64   69.86 7869.83   69.74  7906.4    69.8 7933.82   69.97 7961.25   70.29
 7982.57   70.41 8006.96   70.81 8031.33   72.77 8043.52   72.69 8052.66   73.87
 8077.04   74.47 8089.23   74.36  8107.5   73.91 8131.88   73.91 8147.12   74.06
 8150.16   73.66 8156.26   74.12 8168.45   74.61 8183.69   75.71 8195.87   75.68
  8201.7   75.25 8220.25    74.9 8241.58    75.2 8332.99   74.91 8348.23   74.75
  8378.7   74.87 8384.79   74.77 8415.26   74.83 8439.54   74.64 8535.38   74.54
 8549.59   74.39 8560.23    74.5 8610.28   74.38 8622.47   74.54 8663.17   74.63
 8680.93   75.25 8702.23   77.74 8723.02    77.6 8729.11    77.7 8755.48   77.64
 8796.15   77.98 8811.38   77.88 8823.57   77.98 8851.32   77.98 8878.42   77.89
 8942.41   77.95 8961.36   77.84 8975.56   77.93 9003.96   77.79 9033.82   77.75
  9078.5   77.78  9128.2   77.55 9131.75   77.62 9173.99   77.69 9186.18   77.55
 9201.41   77.59  9227.6    77.5  9248.9   77.52 9273.74    77.4 9295.87    77.5
 9317.21   77.44 9326.34    77.6 9338.53   78.42 9350.72   78.25 9356.82    78.4
 9383.79   78.48 9422.84   78.38 9429.94   78.59 9437.04   79.45 9444.14   81.03
 9451.24    81.6 9457.36   81.47 9475.48   81.56 9485.83   80.43 9503.07   80.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4662.12     .07  4710.3    .025 4820.61     .07  4987.9    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4662.12  4987.9           587.49 1806.25 1797.03             .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 4662.12   79.93       T
Left Levee      Station=  187.98      Elevation=  86.965
Right Levee     Station= 9451.24      Elevation=    81.6
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  183.59 2931.73   77.81  2943.2 3247.27      77 6540.45 9357.43   78.29

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 125.65*

INPUT
Description: RGV-02,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   79.17   32.84   79.41   55.58   79.44   68.21    79.7   78.32   79.55
   88.42   79.81   93.48   79.66  131.37   79.88  156.63    79.9   171.8   80.04
  214.74   80.14   229.9   80.53  234.96   80.99  247.59   83.12  260.22   86.31
   267.8   86.96  274.09   86.44  283.52    84.1   289.8   81.91  302.37   78.13
  308.66   76.66   315.6   75.82  333.81   74.55  349.53   73.27  371.52   72.65
  415.52   72.71  424.96    72.8  443.82    72.7  468.96    72.8  478.39   72.69
  494.11   72.82   544.4   72.56  597.83   72.88  607.26   72.72  636.05   72.73
  666.22   72.85  696.37   72.88  703.91   73.02  737.85   73.11   756.7   73.03
  775.55   73.35  809.47   75.75  830.41   75.75  843.41   75.94  866.03   75.97
  874.43   75.77     909   75.89  943.57   75.86     975   75.56  982.89   75.68
 1031.91   75.58 1080.91   75.67 1094.44    75.6 1122.39   75.74 1148.78   75.73
 1182.45   75.84 1239.03   75.87 1254.34   75.82 1299.58   75.96 1330.17    75.8
 1355.32   75.89 1364.75   76.04 1371.03   75.78 1408.76   75.95 1418.18    76.1
  1433.9   75.87 1440.18   76.16 1449.62   75.81 1459.05   76.19 1474.76   76.02
 1493.62   76.27  1499.9   75.98 1522.01   76.04 1537.62   75.88 1543.91   76.03
 1578.48    75.9 1584.76   76.37  1594.2   76.16 1622.49   76.03 1628.77   76.24
 1653.92   76.05 1666.49   76.17 1672.78   76.47 1691.63   76.14 1707.35   76.11
 1713.64   76.73  1732.5    76.3 1751.35    76.2  1754.5   76.57 1773.36   76.22
 1779.64    76.4 1795.35   76.18  1798.5   76.43 1819.83   76.26 1839.36   76.61
    1850   76.55 1865.08   75.22 1872.62   74.77    1899   74.36 1930.51   74.45
 1951.79   74.11 1971.37   74.51 1977.66   74.19 1993.38   74.17 2015.37   74.38
 2037.38   74.16 2059.38   74.57 2081.38   74.25 2103.39   74.36 2125.38   74.28
 2144.24    74.6 2153.68   74.19  2185.1   74.44 2194.53   74.77 2210.25   74.45
  2257.4   74.43 2263.69    74.7 2273.12   74.44 2288.84   74.64  2301.4   74.39
 2335.98   74.55 2354.83   74.44 2361.12   74.77 2367.41   74.53  2373.7   74.87
 2383.13   74.57 2404.19   74.52 2445.99   74.78 2452.28   74.63 2489.99    74.9
 2530.85   74.89 2537.14   75.29 2549.71   74.78 2584.28   74.99    2600   74.93
 2606.29   75.27 2618.86    74.9 2634.57   75.27    2644   75.04 2656.58    75.3
 2662.87    75.1  2672.3   75.43 2684.87   74.95 2697.44   75.36 2747.73   75.36
 2754.01   75.63 2791.74   75.64 2794.88   76.12 2816.88   75.81 2852.82   76.16
  2876.6   76.12 2882.89   76.59 2901.75   76.49  2920.6   76.68 2930.03   76.51
 2961.47   76.38 2970.89   76.56 2986.61   76.53 3011.76    76.8 3030.61   76.63
 3049.47   76.66 3055.76   76.94  3071.5   76.78 3096.62   77.21 3118.62   77.12
 3137.49   77.58  3153.2   77.28 3178.35    77.2 3184.63   77.37 3203.49   77.15
 3222.35   77.38 3231.78   77.14 3263.21   77.42 3272.64   77.15 3310.35   77.61
 3316.64    77.2  3335.5   77.37 3351.22   77.71  3379.5   77.23 3398.36   77.68
 3414.08   77.39 3442.37   77.61  3448.5   77.31 3480.08   77.24 3489.51   77.43
 3508.37   77.16  3539.8   77.64 3549.23   77.34 3564.95   77.61 3583.81   77.38
 3621.53   77.54 3652.96   77.44 3662.39   77.76  3678.1   77.47 3696.97   77.46
 3703.25   77.89 3718.96   77.57 3740.97   77.56 3759.83   77.72 3781.83   77.57
 3784.97    77.7 3813.26   77.82 3825.83   77.58  3838.4   78.07 3850.98   77.57
 3854.12    77.9 3869.84   77.66 3876.12   77.99 3888.69   78.09 3894.98   77.81
 3898.12    78.1  3910.7   77.77 3916.99   77.91 3942.38   77.99 3960.99   77.87
 3973.55   78.15 3998.93   77.87 4030.13   78.21 4048.99   77.88 4070.99   78.07
 4083.56    77.9 4089.85   78.23 4102.42   78.29  4108.7   78.01 4127.57   78.25
    4137   77.99 4149.56   78.24 4177.86   78.15 4190.42   78.31    4225   78.06
 4234.42   78.24 4262.72   78.04    4269   78.34 4309.86    78.1 4331.86   78.37
 4344.43   78.12 4375.86   78.49 4394.72   78.22  4407.3   78.38 4429.29   78.39
 4435.58   78.22 4448.15   78.54 4454.43   78.36 4476.44   78.38 4482.73   78.26
 4504.72   78.37 4523.58   78.29 4536.16    78.5 4542.45   78.35 4555.01   78.55
 4567.59   78.23 4589.58   78.52 4602.16   78.25 4624.16   78.49 4630.45    78.3
 4651.16   78.15 4677.59   78.55  4693.3    78.3 4709.02   78.52 4715.31   78.31
 4743.59   78.46 4759.31   78.34 4775.02    78.5 4781.31   78.26 4797.03   78.41
 4803.31   78.29 4819.02   78.44 4825.31   78.19 4841.03   78.48 4856.74    78.5
 4875.59   78.29 4894.45   78.33 4903.87   78.64 4922.74   78.99 4932.16   79.47
 4938.45   79.11 4944.73   80.07 4950.19   79.81 4952.93    79.1 4969.18   73.55
 4985.73   68.49 4990.1465.90205 5004.77   60.55 5009.93   60.03 5026.24   57.86
 5042.55   55.94 5050.69      56 5061.69   55.21 5073.97   54.93 5086.59   54.11
 5100.65   53.59 5111.48   52.95 5116.21   53.22 5135.13   53.74 5144.59   53.58
 5154.05   55.38 5158.41   60.12 5163.63   61.39 5168.07   63.16 5174.27   64.98
 5182.01   66.15 5189.63   68.65 5195.95   71.19 5199.97   72.36 5210.1373.71008
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 5217.63   73.82 5222.27   74.25 5242.41   75.25  5251.7   75.49 5258.47   74.95
 5275.11   74.63 5286.82   74.82 5302.48   74.82 5336.33   76.19  5346.5   77.44
 5353.26   78.73 5356.65   78.92 5370.19   78.83 5383.74   77.76 5397.28   77.62
 5448.06   78.08 5458.22   77.99 5485.81   78.16 5509.22   78.06 5550.19   78.06
 5587.56   78.31 5629.21   78.47 5681.97   78.33 5703.65   78.41 5710.48   78.28
 5734.73   78.49 5775.76    78.5 5799.26   78.31 5819.74   78.54 5867.55   78.43
 5910.59   78.51  5939.9   78.45 5966.57   78.28 6000.71   78.35 6033.69   78.28
 6065.93   78.43 6130.41   78.35 6181.68    78.6 6195.34   78.49 6263.63   78.41
  6304.6   78.56  6352.4   78.53 6485.06   78.78 6550.44   78.77 6598.24   78.97
 6655.06   78.83 6680.19   78.91 6713.67   78.71 6751.77   78.79  6799.7   78.63
 6806.52   78.51 6837.26   78.39 6861.16   78.44  6871.4   78.18 6919.21   78.15
 6936.27   77.94 6997.74   77.85 7018.23   77.89 7053.67   77.72 7110.41   77.64
 7147.46   77.49 7165.05   77.53  7202.6   77.42 7209.43   77.51 7233.34   77.36
 7264.07   77.38 7274.31   77.23    7294   77.29 7328.94    77.1 7359.67   77.11
 7376.07   76.94  7417.1   76.68  7462.1   76.08 7472.35   76.17 7486.01   75.97
  7509.9   75.83 7533.81   75.57 7561.12   75.53 7607.62   75.19 7642.79   75.09
 7680.63   74.74  7697.7   74.71 7711.35   74.51 7754.17   74.27 7789.35   73.97
 7853.83   72.26    7889   71.87 7900.72   71.86 7938.82   71.43  7965.2   71.55
 7985.72   71.09 8023.82   70.92 8063.05   70.85 8111.75   71.04 8132.27   71.06
 8155.72   71.21 8179.16   72.15 8190.89   72.11 8199.68   72.68 8223.13   72.91
 8252.43   72.57 8290.54   72.61 8293.47    72.4 8311.06   72.83 8325.72   73.35
 8360.89    72.9  8381.4   73.01 8469.33    72.7 8483.99    72.6 8513.29   72.65
 8548.46    72.6 8571.82   72.45 8588.89   72.54 8602.55   72.44 8664.01   72.41
 8677.67   72.22 8687.91   72.32 8718.46   72.24 8786.93   72.66 8797.18   73.05
 8804.01   73.64 8814.25   75.63 8817.67   75.88  8824.5   77.37 8875.72   77.26
 8906.45   77.76 8967.91   77.98 8981.56   77.92 9039.61   78.06 9046.44   78.15
 9073.75   78.04 9087.41   78.15 9114.74   78.02 9165.96   78.13 9186.44   78.12
 9234.24   77.91 9237.66   78.02 9278.28   78.09 9329.85   77.93 9350.34   77.98
 9374.24   77.83 9395.52    77.9 9424.83   77.83 9436.55    78.2 9448.28   78.09
 9480.09   78.19 9517.65   77.94 9524.48   78.21 9531.31   79.42 9538.14   81.72
 9544.97   82.49 9568.28   82.33 9578.24   80.03 9584.88   79.47 9594.83    79.5

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4952.93     .07 4990.14    .025 5210.13     .07  5251.7    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4952.93  5251.7           587.49 1806.25 1797.03             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4952.93    79.1       T
  5251.7 9594.83   75.49       T
Left Levee      Station=   267.8      Elevation= 86.9625
Right Levee     Station= 9544.97      Elevation=   82.49

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 125.3

INPUT
Description: RGV-02, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   77.67   29.51   77.67   42.63   77.79   72.15   77.69   88.54   77.97
  101.66    77.7  114.78   77.99  121.34   77.76  170.53   77.85  203.32   77.79
     223   77.92  259.07   77.84  278.75   77.92  298.43   78.42  304.99   79.03
  321.38   81.86  337.78    86.1  347.62   86.96  354.18   86.52  364.02   84.08
  370.57   81.74  383.69   77.87  390.25    76.5  396.81   76.04  416.49   75.69
   429.6   74.97  455.84   74.47  501.75   74.55  511.59   74.67  531.27   74.54
   557.5   74.67  567.34   74.52  583.74   74.69  636.21   74.35  649.33   74.48
  678.84   74.48  691.96   74.66   701.8   74.47  741.15   74.49   796.9   74.63
  819.86   74.57  829.69   74.72  849.37   74.55  885.44   74.78   908.4   74.65
  928.08   74.83  934.63   74.67  967.43   74.86  980.55   74.74  990.38   74.93
 1016.62      75 1026.46   74.88 1052.69   74.97 1059.25    74.8 1085.49   74.98
    1115   75.01 1151.08   74.92 1183.87   75.06  1210.1   74.93 1233.06    75.1
 1292.09   75.13 1301.93   75.22 1360.96   75.26 1374.08   75.13 1419.99    75.3
 1456.06   75.12  1482.3   75.22 1492.13   75.42 1498.69   75.08 1538.05   75.32
 1547.88   75.51 1564.28   75.16 1570.84   75.53 1580.68    75.1 1590.52    75.6
 1606.91   75.36 1626.59   75.67 1633.15   75.27  1656.1   75.42  1672.5   75.15
 1679.06   75.34 1715.13   75.16 1721.69   75.78 1731.53   75.48 1761.05   75.32
  1767.6   75.61 1793.84   75.37 1806.96   75.51 1813.52   75.89 1833.19   75.43
 1849.59   75.42 1856.15   76.24 1875.83   75.66  1895.5   75.51 1898.78      76
 1918.46    75.5 1925.02   75.73 1941.41   75.44 1944.69   75.77 1967.65   75.62
 1987.33   75.86 2026.68   75.67 2033.24    75.9 2052.91   75.74 2075.87   75.78
 2082.43   76.28 2102.11   75.75 2125.06   76.27 2131.62   75.82 2148.02   75.78
 2170.97   76.05 2193.93   75.79 2207.05   75.95 2216.89   76.32 2239.84   75.87
  2262.8   76.01 2285.75   75.91 2305.43   76.31 2315.27   75.78 2348.06   76.06
  2357.9   76.51  2374.3   76.06 2397.26   75.95 2423.49   75.98 2430.05   76.34
 2439.89   75.99 2456.29   76.26  2469.4    75.9 2505.48   76.04 2525.15   75.86
 2531.71    76.3 2538.27   75.98 2544.83   76.45 2554.67   76.06 2584.18   76.01
 2620.26   76.29 2626.82   76.07 2666.17   76.35  2708.8   76.27 2715.36   76.81
 2728.48   76.13 2764.55   76.35 2780.95   76.21 2787.51   76.64 2800.63   76.14
 2817.02    76.6 2826.86   76.26 2839.98   76.56 2846.54   76.27 2856.38   76.68
  2869.5   76.04 2882.61   76.58 2915.41   76.53 2935.08    76.4 2941.64   76.74
    2981   76.36 2984.28   76.97 3007.23   76.52 3030.19   76.74 3056.42    76.7
 3069.54   76.46  3076.1   76.96 3095.78    76.6 3115.45   76.88 3125.29   76.69
 3158.09   76.46 3167.92   76.72 3184.32   76.57    3204   76.68 3210.56   76.89
 3230.23   76.66 3249.91   76.66 3256.47   77.01 3276.15   76.77  3299.1   77.01
 3322.06   76.77 3341.74   77.34 3358.13   76.95 3384.37   76.85 3390.93   77.14
  3410.6   76.86 3430.28   77.14 3440.12    76.8 3472.91   77.14 3482.75   76.78
  3522.1   77.42 3528.66   76.87 3548.34   77.07 3564.74   77.55 3594.25   76.91
 3613.93    77.5 3630.33   77.11 3659.84   77.39  3666.4   77.02 3699.19   76.91
 3709.03   77.19 3728.71   76.85 3748.39   77.09  3761.5   77.46 3771.34   77.06
 3787.74   77.44 3807.42   77.11 3846.77    77.3 3879.56   77.14  3889.4   77.57
  3905.8    77.2 3925.48    77.2 3932.04   77.77 3948.43   77.35 3971.39   77.31
 3991.07    77.5 4014.02   77.27  4017.3   77.44 4046.82   77.62 4059.93   77.25
 4073.05   77.89 4079.61   77.83 4086.17   77.24 4089.45   77.68 4105.85   77.34
  4112.4   77.77 4125.52   77.87 4132.08    77.5 4135.36   77.91 4148.48   77.47
 4155.04   77.65 4181.27   77.71 4200.95   77.58 4214.06   77.95  4240.3   77.55
 4273.09   77.94 4286.21   77.86 4292.77   77.53 4315.72   77.78 4328.84   77.55
  4335.4      78 4348.51   78.08 4355.07   77.71 4374.75   78.01 4384.59   77.63
  4397.7   77.97 4427.22   77.84 4440.33   78.07 4476.41   77.65 4486.24   77.92
 4515.76   77.71 4522.32   78.11 4541.99   78.04 4564.95   77.77  4587.9   78.11
 4601.02   77.81 4633.81   78.26 4653.49   77.93 4666.61   78.13 4689.56   78.13
 4696.12    77.9 4709.24   78.33 4715.79   78.08 4738.75   78.11 4745.31   77.95
 4768.26   78.13 4787.94      78 4801.06   78.27 4807.62   78.07 4820.73   78.34
 4833.85   77.91  4856.8   78.35 4869.92   77.98 4892.88   78.29 4899.44   78.03
 4919.11   77.93 4945.35   78.22 4948.62   78.39 4965.02   78.06 4981.42   78.37
 4987.98   78.13 5017.49   78.38 5033.89   78.19 5050.28   78.41 5056.84    78.1
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5073.24	78.32	5079.8	78.16	5096.19	78.36	5102.75	78.03	5119.15	78.41
5128.98	78.21	5135.54	78.43	5155.21	78.14	5174.89	78.22	5184.72	78.66
5204.4	79.03	5214.23	79.62	5220.79	79.08	5227.35	80.21	5233.9	79.88
5237.18	78.94	5253.58	72.92	5269.97	67.19	5276.53	65.11	5283.09	60.95
5286.36	60.1	5299.36	55.92	5322.36	55.42	5346.36	54.22	5373.36	55.12
5382.36	55.22	5414.36	54.32	5427.36	53.62	5438.36	54.22	5449.36	53.82
5456.86	60.1	5460.14	60.72	5466.7	64.46	5476.48	68.57	5482.98	72.07
5489.49	73.88	5499.24	73.91	5515.5	74.62	5522	73.99	5531.75	73.7
5548.01	73.9	5564.27	73.87	5596.78	75.57	5606.54	77.18	5613.04	78.86
5616.29	79.1	5629.3	78.96	5642.31	77.47	5655.31	77.24	5704.08	77.76
5713.84	77.64	5769.2	77.67	5824.94	77.64	5838.06	77.8	5887.25	77.97
5929.88	77.83	5949.55	77.96	5956.11	77.81	5982.34	78.11	6034.81	78.09
6041.37	77.96	6061.04	78.29	6106.95	78.16	6126.63	78.25	6175.82	78.22
6202.05	78.04	6234.84	78.24	6261.08	78.13	6306.99	78.31	6366.01	78.33
6408.64	78.66	6421.76	78.54	6487.34	78.54	6526.69	78.77	6572.6	78.8
6661.14	79.19	6762.79	79.34	6808.7	79.58	6828.38	79.6	6857.89	79.46
6887.4	79.59	6913.64	79.35	6969.38	79.4	7002.18	79.24	7008.73	79.09
7038.25	79	7061.2	79.11	7071.04	78.82	7116.95	78.99	7133.34	78.78
7146.46	78.86	7192.37	78.87	7212.05	78.99	7241.56	78.89	7300.58	78.95
7326.82	78.84	7359.61	78.92	7389.12	78.86	7395.68	78.99	7418.64	78.87
7448.15	78.97	7457.99	78.78	7484.22	78.89	7510.45	78.72	7539.97	78.74
7585.87	78.31	7638.34	77.37	7648.18	77.44	7661.3	77.15	7684.25	76.94
7707.21	76.55	7733.44	76.45	7762.95	76.04	7815.42	75.51	7848.21	74.93
7864.61	74.87	7877.72	74.59	7897.4	74.42	7949.87	73.74	8051.52	72.82
8097.43	72.5	8130.22	72.41	8215.48	71.87	8235.16	71.9	8320.42	71.55
8343.38	71.52	8386.01	71.25	8431.92	71.17	8484.38	70.89	8497.5	70.91
8622.12	70.43	8671.3	70.43	8704.1	70.26	8720.49	70.4	8733.61	70.27
8792.64	70.28	8805.76	70.05	8815.59	70.14	8845.11	70.06	8871.34	70.25
8910.69	70.68	8920.53	71.22	8927.09	72.03	8936.93	74.68	8940.21	74.99
8946.77	77	8956.6	76.91	8986.12	76.98	8995.96	76.88	9025.47	77.59
9084.5	77.98	9097.61	77.9	9153.36	78.22	9159.92	78.35	9186.15	78.23
9199.27	78.37	9225.51	78.25	9274.7	78.47	9294.37	78.47	9340.28	78.27
9343.56	78.43	9373.07	78.53	9432.1	78.36	9451.78	78.44	9474.73	78.25
9491.13	78.35	9507.53	78.14	9546.88	77.92	9576.39	77.89	9612.46	77.5
9619.02	77.84	9625.58	79.4	9632.14	82.41	9638.7	83.38	9648.35	83.41
9661.09	83.1	9670.65	79.63	9677.03	78.36	9686.58	78.02		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	5237.18	.07	5269.97	.025	5476.48	.07	5515.5	.066

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
5237.18	5515.5	2076.9	1775 1633.38	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	5237.18	78.94	T
5515.5	9686.58	74.62	T

Left Levee Station= 347.62 Elevation= 86.96
Right Levee Station= 9641.98 Elevation= 83.38

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	80.40	Element			
Vel Head (ft)	0.06	Wt. n-Val.	0.066	0.039	0.066
W.S. Elev (ft)	80.34	Reach Len. (ft)	2076.90	1775.00	1633.38
Crit W.S. (ft)	62.68	Flow Area (sq ft)	6773.94	5410.04	12719.58
E.G. Slope (ft/ft)	0.000079	Area (sq ft)	18911.59	5410.04	16015.91
Q Total (cfs)	20000.00	Flow (cfs)	1691.47	12903.41	5405.13
Top Width (ft)	9252.31	Top Width (ft)	4861.86	278.32	4112.13
Vel Total (ft/s)	0.80	Avg. Vel. (ft/s)	0.25	2.39	0.42
Max Chl Dpth (ft)	26.72	Hydr. Depth (ft)	1.39	19.44	3.09
Conv. Total (cfs)	2248857.0	Conv. (cfs)	190193.5	1450896.0	607767.9
Length Wtd. (ft)	1760.44	Wetted Per. (ft)	4863.93	288.07	4113.89
Min Ch El (ft)	53.62	Shear (lb/sq ft)	0.01	0.09	0.02
Alpha	5.77	Stream Power (lb/ft s)	0.00	0.22	0.01
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	13507.50	11157.46	7109.59
C & E Loss (ft)	0.00	Cum SA (acres)	3907.26	603.42	2264.64

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 125

INPUT
Description: RGV-02, Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.18	9.76	75.74	29.28	76.73	42.3	76.85	61.82	77.49
81.34	81.18	87.84	82.78	100.86	85.14	113.87	86.67	130.14	86.49
139.9	85.31	165.93	79.53	185.45	76.24	195.21	75.1	201.72	74.76
214.73	74.79	227.75	74.12	247.27	71.49	299.53	71.46	332.32	71.57
335.6	71.86	348.72	74.44	352	74.67	368.4	73.96	381.51	72.94
401.19	71.83	407.75	72.11	456.94	72.39	493.01	72.3	522.53	72.47
568.44	72.35	588.11	72.51	653.7	72.66	666.82	72.49	689.78	72.67
742.25	72.51	748.8	72.65	804.55	72.92	817.67	72.73	879.98	72.93
912.77	72.89	952.12	73.11	968.52	72.96	975.08	73.19	988.2	72.97
1043.95	73.18	1066.9	73.13	1073.46	73.38	1086.58	73.18	1139.05	73.4
1155.45	73.33	1162.01	73.54	1171.84	73.32	1178.4	73.57	1188.24	73.31
1201.36	73.68	1207.92	73.35	1221.03	73.72	1227.59	73.46	1240.71	73.73
1250.55	73.46	1260.39	73.81	1266.95	73.55	1273.5	73.83	1296.46	73.63
1325.97	73.9	1335.81	73.75	1345.65	74.02	1368.61	73.8	1378.44	74.03
1388.28	73.79	1394.84	74.13	1404.68	73.9	1414.52	74.3	1421.08	73.97
1434.19	74.22	1440.75	73.98	1476.83	74.05	1503.06	74.27	1516.18	74.17
1539.13	74.4	1565.37	74.24	1575.21	74.52	1585.05	74.34	1621.12	74.6
1637.52	74.46	1676.87	74.73	1719.5	74.62	1749.02	74.91	1794.93	75.04
1821.16	74.91	1840.84	75.15	1850.68	75.03	1893.31	75.26	1919.54	75.14
1926.1	75.36	1939.22	75.16	1952.34	75.33	1998.25	75.23	2047.44	75.52
2080.23	75.48	2096.63	75.64	2106.47	75.29	2129.42	75.6	2142.54	75.57
2165.5	75.9	2198.29	75.8	2211.41	75.91	2247.48	75.8	2257.32	75.92
2306.51	75.95	2329.46	75.77	2395.05	75.98	2418.01	76	2454.08	76.21
2483.59	76.13	2496.71	76.32	2536.06	76.11	2559.02	76.44	2585.25	76.3
2624.61	76.45	2677.08	76.51	2683.63	76.4	2713.15	76.62	2768.9	76.52
2824.65	76.81	2844.32	76.63	2906.63	76.85	2916.47	76.69	2988.61	76.92
3047.64	76.96	3054.2	77.13	3129.63	77.01	3162.42	77.14	3182.1	77.07

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 3211.61   77.19 3218.17   77.09  3277.2   77.17 3287.04   77.04 3326.39   77.27
 3352.62   77.15 3359.18   77.25 3414.93   77.25 3431.33   77.56 3441.17   77.28
 3480.52   77.33 3493.64   77.62 3503.47   77.36 3513.31   77.63 3519.87   77.43
  3578.9   77.47 3592.02   77.61 3621.53   77.49 3631.37   77.68 3641.21   77.47
 3654.32   77.78 3664.16   77.45 3703.51   77.63 3710.07   77.84 3723.19   77.64
 3736.31   77.72 3755.98   77.53  3785.5   77.78 3795.34   77.58 3854.36   77.71
 3870.76   77.91  3880.6   77.73 3942.91   77.68 3956.02    77.9  3975.7   77.71
 4011.77    77.8 4028.17   77.95 4100.32   77.82 4110.15   77.96 4139.67   77.89
 4185.58   78.15 4211.82   78.05 4231.49   78.22 4267.57   78.24 4274.13   77.99
 4297.08   78.65 4306.92   79.73 4313.48   79.46 4316.76   78.39 4323.32   74.15
 4329.88   68.36 4336.43   60.84 4339.71   59.85 4341.71   55.24 4351.71   51.24
 4361.71   50.64 4371.71   50.64 4381.71   50.24 4391.71   50.64 4401.71   50.64
 4411.71   51.24 4421.71   50.94 4431.71   51.24 4441.71   51.94 4451.71   51.24
 4461.71   51.24 4471.71   51.64 4491.71   53.74 4493.85   59.85 4497.13   60.38
 4506.96   66.81 4510.24   67.62  4516.8   67.08 4526.64   63.58  4533.2   62.86
 4539.76   62.98 4546.32   64.13 4556.16   68.29 4562.72    72.5    4566   72.98
 4579.12   72.48 4588.96   72.76 4608.64   72.66 4625.03   73.66 4634.87   74.85
 4647.99   75.82 4657.83   76.12 4667.67   75.81 4684.07   75.99 4693.91   75.77
 4716.87   75.72 4733.26   75.97 4749.66   75.81 4756.22   76.03  4792.3   75.83
 4805.42   76.01 4848.05   76.09 4854.61   76.38 4874.29   76.67 4887.41   76.25
 4907.09    76.2 4926.77   76.54  4936.6   76.23 4975.96   76.37 4998.92   76.36
 5008.76   76.15 5028.44   76.35    5035   76.15 5054.67   76.25 5067.79   76.09
 5103.87   76.23 5126.83   76.09 5133.39   76.27 5153.06   76.14 5189.14   76.17
  5195.7   76.82 5205.54   76.37  5228.5   76.26 5241.62   75.98 5261.29   75.95
 5271.13   76.23 5294.09   75.96 5303.93   76.05 5336.73   75.89  5372.8   76.01
 5402.32   75.87 5441.68   76.36 5458.08   76.03 5487.59   75.92 5526.95   76.36
 5540.07   77.14 5549.91   78.22 5563.03   78.99 5572.87   78.72 5579.43    78.9
 5592.54   77.38  5599.1   77.16 5641.74   76.91 5654.86   77.26 5671.26   77.26
 5677.82   77.68 5684.38   77.35 5694.21   77.72 5717.17   77.75 5730.29   78.26
 5736.85   79.22 5746.69   79.25 5753.25   79.72 5772.93   80.05 5782.77   79.06
    5809   78.69 5818.84   78.91  5825.4   78.62 5848.36    78.9 5877.88   78.25
 5884.44   77.68 5894.28   77.58 5904.11   78.21 5923.79   78.69 5936.91   79.74
 5950.03   79.93 5972.99   79.08 5986.11   79.22 5992.67   78.89  6018.9   79.13
 6041.86   79.13 6058.26   78.62  6068.1   79.12 6077.94   78.24 6087.78   79.43
 6094.34   79.07 6107.46   79.42 6127.13    79.2 6136.97   78.44 6150.09   78.72
 6156.65   79.46 6169.77    79.1 6179.61   79.91 6205.85   79.82 6215.69    79.4
 6248.48   79.56 6264.88   79.14 6271.44   79.35 6307.52   79.11 6337.03    79.2
 6435.43   78.59  6455.1   79.12 6464.94   78.68  6504.3   78.48 6510.86   78.28
 6540.38   78.27 6553.49    78.1 6579.73   78.19 6605.97   78.08 6632.21    77.8
 6661.72   77.83 6668.28   78.12 6684.68   78.24 6694.52   77.84 6704.36   78.05
 6710.92   77.76 6724.04      78 6737.16   77.89 6743.72   78.25  6763.4   77.38
 6802.75   77.28 6822.43   77.74 6848.67   77.27 6865.07   77.85 6888.02   77.63
 6894.58   77.26 6917.54   77.15 6927.38    77.5 6937.22   77.09  6973.3   77.03
 6986.41    77.4 6999.53   77.35 7012.65   76.92 7022.49   77.22 7029.05   77.01
 7042.17   77.47 7055.29   77.16 7065.13   77.68 7081.53   77.51 7094.64   77.75
  7101.2    77.4  7117.6   77.61 7124.16   77.32 7140.56   77.46 7147.12   77.24
 7156.96   77.49 7173.36   77.23 7202.87   76.49 7215.99   76.38 7245.51   76.62
 7288.15   76.08  7311.1   76.41  7327.5   76.24 7347.18   76.43 7363.58   76.25
 7373.42   76.46 7396.38   76.22 7435.73   76.36 7458.69   76.14 7478.37   76.17
 7517.72   76.56 7530.84   76.45 7563.64   76.77 7583.32    76.3    7603    76.7
 7609.56   76.29 7622.67   76.19 7635.79   76.61 7645.63   76.21 7675.15   76.03
 7688.27   76.25 7694.83   76.91 7704.67   76.19 7717.79   76.29 7740.74   77.84
  7747.3   79.21 7757.14   79.33 7776.82   79.12 7786.66    78.6  7796.5    78.8
 7806.34   78.59  7812.9   77.92 7826.02   77.88 7835.85   77.14 7848.97   76.77
 7878.49    75.5 7891.61   75.56 7914.57   76.24 7937.53   75.91 7947.36   76.02
 7960.48   76.54  7973.6   76.78 7993.28   78.13 8019.52   78.06  8039.2   78.23
 8049.04   77.77 8055.59   77.88 8068.71   77.31 8075.27   77.65 8091.67   77.34
 8098.23   77.52 8131.03   77.46 8140.87   77.66 8180.22   77.62 8206.46   77.88
 8222.86   77.42 8249.09   77.71 8275.32   77.51 8288.44   77.54 8317.96    77.2
 8334.35   77.28  8390.1   76.75 8436.01   76.43 8475.36   75.74 8495.04   75.19
 8521.27   74.88 8531.11   75.21 8544.23   74.82 8557.34   74.17 8570.46   73.16
 8590.14   73.06 8603.25   73.25 8609.81   73.06 8626.21   73.19 8639.33   73.01
 8649.16   73.79    8659   74.11 8668.84   74.79  8675.4   75.82 8681.96   76.26
 8691.79   78.31 8698.35   81.54 8701.63   82.53 8727.87   82.48 8734.43   81.38
 8740.98   78.98 8744.26   78.49 8773.78   78.04 8793.45   78.27 8842.64   78.46

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108 4306.92    .066 4341.71    .025 4493.85    .066 4634.87    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4306.92 4634.87           941.35 1489.33 1466.35             .1       .3
Left Levee      Station=  113.87      Elevation=   86.67
Right Levee     Station= 8701.63      Elevation=   82.53
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  123.94 4306.92   79.81 5560.56 8721.13   80.43

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             80.19    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.11    Wt. n-Val.                0.108      0.050      0.074
  W.S. Elev (ft)             80.08    Reach Len. (ft)          941.35    1489.33    1466.35
  Crit W.S. (ft)             59.59    Flow Area (sq ft)       1108.54    6194.75    3628.23
  E.G. Slope (ft/ft)      0.000191    Area (sq ft)            1108.54    6194.75    3628.23
  Q Total (cfs)           20000.00    Flow (cfs)                87.45   17414.08    2498.47
  Top Width (ft)           5397.10    Top Width (ft)          4143.46     327.95     925.69
  Vel Total (ft/s)            1.83    Avg. Vel. (ft/s)           0.08       2.81       0.69
  Max Chl Dpth (ft)          29.84    Hydr. Depth (ft)           0.27      18.89       3.92
  Conv. Total (cfs)       1448227.0    Conv. (cfs)              6332.5   1260977.0   180917.3
  Length Wtd. (ft)         1474.59    Wetted Per. (ft)        4143.49     348.63     927.18
  Min Ch El (ft)             50.24    Shear (lb/sq ft)           0.00       0.21       0.05
  Alpha                       2.07    Stream Power (lb/ft s)     0.00       0.59       0.03
  Frctn Loss (ft)             0.22    Cum Volume (acre-ft)    13030.23   10921.02    6741.29
  C & E Loss (ft)             0.02    Cum SA (acres)           3692.58     591.07    2170.19


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 124.80*

INPUT
Description: RGV-02,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   76.52   13.91   76.29   41.73   77.24   60.28   77.24    88.1   77.52
  115.91   79.77  131.46   81.72  137.62   82.68     152   85.56  162.27   86.54
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   178.4   85.75  191.52   83.75  210.1979.95104  220.77   78.37  234.84   76.67
  242.91   75.25  260.98   74.49   275.6   74.61  290.23   74.16  312.16   72.37
  370.88    72.4  407.72   72.48  411.41   72.66  426.15   74.37  429.84   74.53
  448.26   74.09     463   73.36  485.11   72.64  492.48   72.84  547.75    73.1
  588.28   73.03  624.59   73.18  673.03   73.09  713.29   73.34  750.92   73.45
  761.67   74.21  783.57   74.21  809.37   74.38  858.44   74.23  909.51   74.55
  931.01   74.53  960.58   74.66  979.39   74.46 1023.09   74.71 1041.22   74.73
 1062.72   74.55 1104.14   74.69 1122.57   74.57 1129.94   74.75 1144.68   74.65
 1233.11   74.79 1240.48   74.96 1255.22   74.84 1296.57   74.93 1351.02    74.9
  1358.4   75.07 1369.45   74.91 1384.19   75.21 1391.56      75  1406.3   75.24
 1413.67   75.06 1428.41   75.24 1439.46   75.04 1450.52   75.25 1457.89   75.07
 1465.25    75.3  1490.1   75.13 1524.21   75.45 1535.26   75.32 1546.32   75.48
 1572.12   75.35 1583.16   75.51 1594.22   75.35 1601.59   75.57 1612.65   75.42
  1623.7   75.72 1631.07   75.52 1645.81   75.71 1659.44   75.46 1705.13   75.55
 1723.19    75.7 1737.93   75.66 1763.72   75.84  1793.2   75.63 1804.26   75.83
 1815.31   75.73 1852.97   76.04 1904.05   75.95 1925.55   76.09 1966.38   76.02
 1999.55   76.23 2008.87   76.11 2016.94   74.74 2038.44   73.62 2051.88   73.55
 2080.61   73.06 2129.84   73.08  2137.9   73.44 2151.33   73.47 2167.47   73.14
 2202.41   73.33 2223.91   73.16 2229.29   73.48 2253.48   73.28 2277.68   73.33
  2293.8   73.16 2299.17   73.38 2326.05   73.29 2344.87   73.47 2363.69   73.27
 2390.13   73.49 2404.01   73.19 2414.76   73.37 2430.88   73.25 2447.01   73.86
 2468.51      76 2476.58   76.48 2490.02   76.74 2500.78   76.46  2516.9   76.64
 2527.65   76.58 2541.09   75.24 2559.63   75.18 2602.91   75.43 2610.98    75.6
 2621.73   76.96 2637.86   76.35 2651.75    76.3 2748.06   76.79 2772.26   76.84
 2815.27   76.53 2839.67   76.65 2883.89   76.59 2909.68   76.93 2939.16   76.75
 2983.38   76.73 3041.05    76.6  3049.7   76.52    3076   76.68 3145.51   76.63
 3208.15   76.97 3248.02   76.75 3300.27    76.9 3311.32   76.79 3371.67    76.9
 3392.38      77 3411.99   76.91 3458.71   76.99 3468.44    77.1 3514.13   76.99
  3543.7   76.99 3567.88   77.17 3609.79   77.11 3650.32   77.14 3702.28   77.39
 3731.85   77.38 3750.67   77.59 3771.92   77.67 3796.35   77.61 3823.24   77.39
  3871.4   77.38 3889.83   77.53 3900.88   77.31 3930.75   77.19 3952.25   77.46
 3971.07   77.98 3987.19   76.53  4008.7   76.17 4043.64   76.31 4054.39   76.16
 4070.38   76.38 4102.77   76.28 4126.97   76.69 4153.84   76.56 4167.28   77.13
 4180.72   77.07 4195.65   77.26 4215.66   77.71  4229.1   77.74 4255.98   76.97
 4272.11    77.2 4287.78   76.93  4296.3   76.58 4341.99   76.91 4355.43   76.86
 4383.58   77.25 4417.25   77.17 4422.63    77.3 4444.13   77.17 4479.38   77.39
 4501.49   77.12 4524.76   77.16 4562.33   76.82 4586.48   76.39  4599.9   76.29
 4607.95   76.45 4629.43   76.38 4652.56    76.5 4682.3876.38584 4707.26   76.78
 4712.63   77.08 4731.41    77.5 4760.94   77.34 4774.36   77.07 4790.45   77.39
 4811.93   76.99 4829.44   77.78 4844.13   78.03 4852.19   77.78  4862.6   78.12
 4873.66   78.89 4881.89   78.16 4901.66      75  4906.6   73.27 4910.74 71.0069
 4931.99   62.43 4938.47   61.91 4942.42   59.08 4947.77   58.67 4954.36   56.85
 4967.53   54.05 4969.18   52.32 4985.28   51.23 4995.84   51.29 5021.49   50.26
 5040.81   50.88 5048.63   51.46 5056.46   51.53 5072.9352.75007 5079.93   52.58
 5095.58   53.42 5111.23   55.39 5112.91   59.52 5115.47   59.97 5123.16   64.47
 5125.73   65.04 5130.86   64.75 5138.56   62.52  5143.7   62.19 5148.83   62.62
 5153.96    63.9 5161.66   67.47  5166.8   70.81 5171.64   71.56 5179.63   71.64
 5202.8673.19576 5215.55   74.47 5223.25    75.5 5235.27   75.94  5253.3   75.74
 5268.32   75.89 5298.37   74.98 5315.44   75.08 5327.46   75.85 5351.51      76
 5418.54   76.06 5442.57   76.48 5454.59    76.2 5472.62   76.15 5490.65   76.41
 5507.83   76.19 5531.93   76.35 5556.74   76.29 5565.75   76.15 5583.78   76.23
 5589.79   76.09 5620.27   76.16 5632.32   77.24 5648.39   77.36 5656.42   77.13
 5664.45   76.41 5680.52   75.57  5700.6   75.09 5730.99   75.19    5737   75.59
 5746.01   75.24 5767.05   75.15 5779.07   74.93 5797.08   74.85  5806.1   75.01
 5827.13   74.77 5866.19   74.77 5899.23   74.89 5926.27    74.8 5962.33   75.07
 5977.35   74.87 6004.39   74.79 6040.44   75.02 6052.46   75.52 6061.47   76.24
 6073.49   76.75 6088.52   76.68 6100.52   75.65 6106.53    75.5 6145.59   75.28
 6157.61   75.53 6172.64   75.54 6178.65   75.82 6184.65   75.61 6193.66   75.86
 6214.69    75.9 6226.71   76.25 6232.72   76.87 6265.77   77.39 6274.78   76.73
 6294.95   76.71 6307.83   77.48 6313.84    77.6 6327.08   78.41 6335.11   78.58
 6347.14   77.69 6361.91   77.77 6367.92   77.39 6376.93   77.31 6385.94   77.73
 6403.97   78.06 6415.98   78.77    6428    78.9 6449.04   78.28 6461.05   78.38
 6467.06   78.16 6491.09   78.32 6512.12    78.3 6527.15   77.92 6536.16   78.24
 6545.17   77.65 6554.19   78.45  6560.2   78.21 6572.22   78.45 6590.23   78.29
 6599.25   77.76 6611.27   77.92 6617.28    78.4 6629.29   78.16 6638.31    78.7
 6662.35   78.65 6671.36   78.37  6701.4   78.47 6716.42   78.19 6722.43   78.33
 6755.48    78.1 6782.51   78.15 6872.65   77.68 6890.67   78.02 6899.69   77.74
 6935.74   77.58 6941.75   77.45 6968.79   77.43  6980.8   77.31 7028.88   77.32
 7052.91   77.15 7079.95   77.13 7100.98    77.4 7109.99   77.13 7125.01   77.06
 7137.03   77.26 7149.05   77.17 7155.06    77.4 7173.09   76.81 7209.14   76.72
 7227.16   76.99  7251.2   76.68 7266.22   77.07 7287.25   76.93 7293.26   76.69
 7314.29   76.67  7323.3   76.93 7332.32   76.65 7365.37   76.56 7377.38    76.8
 7401.41   76.48 7416.44   76.56 7428.46   76.84 7440.47   76.64 7449.49   76.99
 7464.51   76.86 7476.52      77 7482.53   76.76 7497.55    76.9 7503.56   76.71
 7533.61   76.75 7555.91   76.47 7575.66   76.01 7614.72   76.05 7668.34   75.61
 7696.45   75.95 7728.57   75.19 7740.62   74.15 7752.93   73.68 7788.98   73.57
 7810.01   73.41 7853.04   73.52 7869.11   73.63 7885.17   74.42 7897.22   74.59
 7905.25    74.4 7913.27   73.61 7924.17    73.2  7942.2   73.44 7960.22   73.02
 7972.24    73.3 7981.25   73.04  8008.3   72.93 8020.31   73.08 8026.32   73.51
 8035.34   73.02 8047.36   73.16 8057.83   73.98 8068.38    75.2 8074.39   76.51
 8093.97   78.18 8110.44   77.49 8128.47   77.48 8134.48   77.15  8146.5   77.13
  8155.5   76.63 8167.52   76.37 8194.56    75.5 8206.58   75.53 8227.62   75.97
 8248.65   75.73 8281.69   76.24 8299.72   77.09 8323.75   77.04 8341.78   77.15
  8356.8   76.92 8368.82   76.54 8375.04   76.76 8389.85    76.5  8425.9   76.59
 8434.92   76.73 8470.96    76.6    8495    76.8 8510.02   76.42 8534.05   76.64
 8597.14   76.28 8612.15   76.33 8668.17   75.92 8684.23   75.97 8705.28   75.83
 8741.33   75.32 8759.35   74.98 8783.38   74.82  8792.4   75.08 8816.42    74.5
 8828.79   73.67 8840.83   73.87 8858.48   73.91 8891.53   73.63 8908.99   74.53
 8918.56   75.42 8930.58   77.05 8939.59   79.21  8948.6   82.72  8969.5   82.71
 8974.73   81.98 8982.56   80.04 9027.89   78.23 9034.51    78.1 9060.94   78.16

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108 4873.66    .066 4947.77    .025 5072.93    .066 5223.25    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4873.66 5223.25             941.35 1489.33 1466.35            .1       .3
Left Levee      Station=  162.27      Elevation=86.54333
Right Levee     Station=  8948.6      Elevation=82.72334
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   200.8 4870.91   78.96 5215.15 8961.56   75.57

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 124.60*

INPUT
Description: RGV-02,
Station Elevation Data    num=     460
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.86	18.06	76.83	54.17	77.76	78.26	77.62	114.37	77.55
138.67	77.91	152	78.43	170.67	79.86	178.67	81	197.33	85.29
202.67	86.04	210.67	86.42	216.64	86.23	228.58	84.99	234.6383	.73177
249.46	80.86	264.38	78.2	291.23	75.93	300.18	74.28	320.24	74.22
336.47	74.43	352.71	74.2	377.05	73.25	416.54	73.28	487.22	73.47
503.58	74.29	517.98	74.4	544.84	73.77	569.03	73.45	577.21	73.56
638.56	73.82	708.94	73.74	723.86	73.89	738.77	73.8	762.64	73.89
783.53	73.83	822.32	74.13	864.09	74.27	876.02	75.78	928.97	76.09
947.63	76.14	983.43	75.92	1040.12	76.3	1063.98	76.16	1084.87	76.51
1096.81	76.57	1117.69	76.11	1153.49	76.43	1186.32	76.56	1210.18	76.19
1225.11	76.35	1272.84	76.17	1284.8	76.3	1329.54	76.44	1377.27	76.31
1407.51	76.54	1469.77	76.52	1487.66	76.42	1517.95	76.57	1550.66	76.51
1567.03	76.75	1575.21	76.64	1591.56	76.76	1616.11	76.75	1648.83	76.58
1660.71	76.79	1684.58	76.63	1693.54	76.81	1720.39	76.99	1762.16	76.85
1787.89	77	1820.61	76.93	1832.89	77.13	1854.65	77.22	1872.55	76.94
1923.28	76.97	1943.32	77.14	1985.94	77.29	2012.79	77.01	2033.31	77.15
2057.54	77.17	2087.38	77.5	2111.25	77.49	2144.07	77.27	2167.94	77.46
2213.27	77.42	2257.45	77.56	2260.43	77.28	2269.38	74.52	2278.34	73.82
2293.26	72.22	2308.17	72.06	2341	71.19	2367.84	71.01	2382.77	71.28
2394.7	71.06	2403.66	71.74	2409.61	71.47	2418.57	71.72	2424.54	71.23
2436.47	71.05	2460.34	71.27	2466.31	71.04	2475.26	71.36	2481.23	71.16
2499.13	71.04	2505.1	71.62	2531.95	71.28	2558.81	71.43	2567.75	71.07
2576.7	71.02	2582.67	71.43	2591.62	71.23	2612.51	71.1	2618.47	71.45
2633.4	71.42	2654.28	71.06	2672.18	71.43	2693.07	71.26	2699.04	71.05
2710.98	71.28	2728.87	70.92	2746.78	72.07	2758.71	73.9	2770.64	76.11
2779.59	77.09	2794.52	77.65	2806.45	77.1	2824.35	77.39	2836.29	77.28
2851.21	74.64	2872.09	74.57	2901.93	74.7	2919.83	74.93	2928.78	75.27
2934.75	77.14	2940.72	77.98	2958.62	76.84	2974.03	76.82	3045.15	77.3
3080.95	77.59	3107.8	77.57	3155.54	76.9	3182.63	76.97	3218.2	76.94
3254	77.42	3293.06	77.2	3424.08	76.62	3444.96	76.78	3480.76	76.7
3495.68	76.83	3516.57	76.74	3564.31	76.88	3591.65	77.13	3615.03	77.17
3635.91	76.82	3659.79	76.92	3706.17	76.89	3773.16	76.93	3797.03	77.08
3817.91	76.89	3844.77	77.02	3880.57	77.07	3931.3	76.93	3946.21	77.1
3964.11	76.97	3990.96	77.28	4037.48	77.15	4082.46	77.2	4125.22	77.43
4140.15	77.62	4172.96	77.7	4193.85	78.02	4244.57	78.06	4274.41	77.52
4348.33	77.5	4393.75	77.06	4417.61	77.46	4435.52	78.65	4438.5	78.6
4447.46	76.86	4456.4	75.57	4480.27	74.91	4492.2	75.06	4519.06	75.16
4531	74.84	4545.91	75.16	4569.78	74.97	4584.69	75.07	4602.6	75.45
4611.55	75.88	4629.45	75.5	4641.39	75.66	4656.31	76.75	4671.22	76.56
4680.17	76.66	4701.06	77.31	4710	77.74	4724.93	77.77	4745.82	76.62
4754.76	76.39	4772.66	76.74	4781.62	76.52	4799.51	75.53	4817.42	75.94
4829.36	75.8	4850.24	76.15	4865.16	76.03	4877.08	76.48	4889.02	76.61
4903.94	76.49	4933.78	76.62	4939.74	76.89	4963.61	76.64	4969.58	76.88
5005.38	76.87	5011.35	76.68	5041.19	76.43	5053.11	76.56	5070.98	76.39
5076.94	76.07	5088.86	76.15	5094.81	75.7	5112.69	75.35	5121.63	74.88
5136.52	74.7	5145.46	75.02	5169.29	74.91	5208.02	75.03	5225.89	74.81
5255.69	75.57	5261.65	76.14	5273.56	76.27	5282.5	76.89	5306.33	76.51
5315.27	76.61	5330.17	76.04	5348.04	76.56	5371.87	75.75	5377.83	76.06
5386.77	76.99	5398.69	77.77	5407.62	77.88	5416.56	77.18	5440.39	78.04
5447.78	77	5452.7	76.75	5462.54	74.88	5472.38	74.41	5479.7874	.51952
5482.23	74.4	5489.61	72.63	5494.53	70.29	5501.91	68.28	5508.2	67.06
5527.55	64.02	5537.23	63.96	5543.14	62.93	5551.12	63.17	5560.97	60.87
5573.27	58.84	5580.65	57.02	5583.12	53.61	559252	.97071	5607.16	51.81
5622.94	51.95	5631.21	51.48	5661.27	50.28	5668.6	50.28	5691.2	52.12
5702.5	53.59	5708.15	53.93	5719.45	55.2	5730.75	57.04	5731.96	59.2
5739.37	62.12	5744.93	62.42	5753.09	61.39	5757.9	62.26	5761.61	63.67
5770.87	69.13	5774.37	70.26	5785.02	71.46	5800.99	74.66	5811.64	76.15
5822.55	76.06	5833.48	75.71	5855.32	75.79	5869.88	75	5880.81	74.19
5888.09	73.95	5895.38	74.2	5906.3	75.88	5917.22	75.71	5928.14	76.08
5942.63	75.97	5979.1	75.99	6010.86	76.28	6041	76.11	6054.53	76.27
6070.14	76.13	6092.03	76.34	6102.96	76.14	6114.56	76.22	6150.38	76
6172.27	76.23	6183.22	78.33	6186.86	78.59	6197.81	78.52	6205.1	78.06
6212.4	76.66	6226.99	74.88	6245.23	74.05	6278.3	74.35	6286.49	74.1
6305.59	74.05	6358.31	73.59	6425.66	73.77	6450.23	73.73	6471.39	73.84
6521.18	73.65	6553.93	73.68	6583.95	74.51	6597.6	74.46	6613.97	73.84
6649.45	73.66	6712.21	74.05	6728.59	74.52	6736.78	74.46	6758.61	74.73
6766.8	74.41	6777.82	74.36	6785.11	74.66	6814.3	78.03	6821.59	78.27
6832.53	76.77	6845.94	77.29	6859.59	77.03	6884.14	77.44	6895.06	77.8
6905.98	77.87	6925.08	77.49	6941.46	77.43	6971.15	77.52	6996.03	77.23
7004.22	77.35	7012.41	77.07	7020.6	77.47	7053.34	77.38	7061.53	77.08
7077.9	77.35	7088.82	77.22	7097.01	77.5	7127.03	77.35	7154.31	77.38
7203.44	77.09	7228	77.11	7277.57	76.95	7309.88	76.77	7326.24	76.93
7372.64	76.62	7408.11	76.53	7451.78	76.55	7498.17	76.44	7517.27	76.55
7540.22	76.37	7543.87	76.51	7566.4	76.54	7582.78	76.24	7615.52	76.16
7631.9	76.24	7653.73	76.08	7667.38	76.29	7691.93	76.12	7727.41	76.22
7755.43	76.09	7768.34	76.2	7790.18	76.05	7798.37	76.2	7825.66	76.12
7833.85	76.31	7863.86	76.13	7896.61	76.14	7915.92	75.92	7930.52	75.92
7948.46	75.53	7963.34	75.61	7988.87	75.41	8021.69	75.33	8032.64	74.92
8058.18	75.58	8072.77	74.64	8080.05	74.59	8087.35	73.99	8098.29	71.95
8109.24	71.15	8116.53	70.97	8161.33	70.69	8200.42	70.61	8207.71	70.36
8215.01	70.74	8222.3	71.73	8229.6	72.3	8240.54	72.5	8247.84	72.05
8258.77	70.29	8273.37	70.01	8281.41	70.17	8297.77	69.85	8341.44	69.84
8357.82	70.11	8366	69.84	8379.14	70.12	8386.43	70.91	8396.02	72.56
8401.48	73.81	8408.32	74.84	8415.62	76.7	8419.27	77.15	8434.23	76.38
8444.79	76.17	8450.6	76.38	8466.98	76.37	8510.64	75.51	8540.66	75.69
8559.77	75.54	8589.78	75.71	8606.16	76.06	8644.37	76.08	8668.92	75.76
8674.58	75.88	8700.11	75.62	8728.96	75.79	8758.47	75.57	8784.01	75.71
8798.59	75.41	8824.12	75.56	8849.66	75.4	8889.96	75.38	8940.84	75.13
8955.43	75.34	8974.55	75.23	9023.67	74.77	9045.49	74.77	9064.6	74.94
9083.09	74.68	9086.74	74.18	9097.67	74.66	9113.71	74.58	9143.73	74.25
9159.59	74.98	9166.79	75.82	9181.18	78.24	9195.57	82.92	9211.14	82.94
9220.87	81.59	9234.94	80.51	9254.63	78.16	9259.55	77.87	9279.24	77.86

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	210.67	.066	4435.52	.085	5440.39	.07	5551.12	.025
5744.93	.07	5811.64	.066						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
5440.39	5811.64	941.35	1489.33 1466.35	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	5440.39	78.04	T
5811.64	9279.24	76.15	T

Left Levee Station= 210.67 Elevation=86.41666
Right Levee Station= 9195.57 Elevation=82.91666

CROSS SECTION

RIVER: Rio Grande

REACH: Lower Reach RS: 124.4

INPUT
Description: RGV-02, End Wall, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.2	13.12	77.17	59.03	78.22	65.59	78.28	137.73	77.65
170.53	76.88	186.92	76.95	200.04	77.39	209.88	78	219.72	79.32
242.67	85.03	249.23	85.98	259.07	86.29	265.63	86.04	278.75	84.23
285.3	82.55	301.7	79.2	318.1	76.53	334.49	75.9	347.61	75.18
357.45	73.31	373.85	73.85	400.08	74.29	442.71	74.13	485.34	74.19
537.81	74.35	583.73	74.21	596.84	74.45	626.36	74.2	708.34	74.4
731.3	74.54	764.09	74.55	806.72	74.4	823.12	74.6	839.51	74.48
865.75	74.65	888.71	74.55	931.34	74.92	944.45	74.88	977.25	75.1
990.36	77.34	1013.32	77.64	1069.07	77.9	1108.42	77.61	1170.73	78.05
1196.96	77.8	1219.92	78.38	1233.04	78.48	1255.99	77.76	1295.34	78.19
1331.42	78.38	1357.65	77.84	1374.05	78.04	1426.52	77.76	1456.03	77.99
1488.83	78.13	1508.5	77.95	1541.3	77.88	1557.69	78.09	1603.6	78.18
1642.96	78.11	1662.63	77.93	1695.43	78.08	1724.94	78.05	1751.17	78.29
1806.92	78.26	1839.72	78.1	1852.83	78.29	1879.07	78.13	1888.91	78.37
1918.42	78.55	1964.33	78.32	1984.01	78.49	2026.64	78.43	2065.99	78.74
2085.67	78.41	2118.46	78.48	2141.42	78.39	2157.82	78.55	2210.29	78.74
2229.96	78.63	2239.8	78.38	2288.99	78.55	2321.79	78.96	2331.63	78.84
2348.02	79	2384.1	78.58	2410.33	78.84	2469.36	78.81	2508.71	78.87
2511.99	78.46	2518.55	75.3	2521.83	74.3	2531.67	73.25	2548.07	70.83
2564.46	70.57	2584.14	70	2600.54	69.33	2613.66	69.04	2620.21	69.23
2630.05	68.95	2646.45	69.39	2649.73	69	2659.57	69.03	2669.41	70.03
2675.96	69.62	2685.8	69.98	2692.36	69.23	2705.48	68.95	2731.71	69.33
2738.27	68.94	2748.11	69.39	2754.67	69.12	2774.35	68.92	2780.91	69.77
2810.42	69.28	2839.94	69.53	2849.77	68.97	2859.61	68.88	2866.17	69.48
2876.01	69.16	2898.96	68.92	2905.52	69.42	2912.08	69.13	2921.92	69.38
2944.88	68.84	2951.44	69.22	2964.55	69.37	2971.11	69.17	2987.51	69.2
2994.07	68.92	3007.19	69.2	3013.74	68.81	3026.86	68.58	3033.42	69.37
3046.54	70.29	3059.66	72.96	3072.77	76.22	3082.61	77.7	3099.01	78.55
3112.13	77.75	3121.96	77.76	3131.8	78.14	3144.92	77.98	3158.04	74.55
3161.32	74.03	3184.27	73.95	3217.07	74.08	3236.74	74.43	3246.58	74.93
3253.14	77.74	3259.7	78.99	3272.82	77.65	3279.38	77.33	3292.49	77.32
3374.48	77.98	3413.83	78.38	3443.35	78.3	3495.82	77.27	3564.69	77.33
3604.04	77.95	3771.29	76.79	3790.97	76.71	3813.92	76.88	3827.04	76.74
3853.27	76.76	3869.67	76.97	3892.63	76.85	3945.1	76.97	3991.01	77.46
4000.85	77.43	4023.8	76.88	4050.04	77	4174.65	76.97	4200.89	77.16
4223.84	76.87	4253.36	77.06	4292.71	77.04	4348.46	76.86	4364.85	77.13
4384.53	76.94	4414.04	77.38	4456.67	77.2	4502.58	77.17	4561.61	77.57
4578.01	77.85	4614.08	78.02	4637.04	78.45	4692.78	78.5	4725.58	77.66
4781.32	77.66	4837.07	77.24	4856.75	76.94	4873.14	77.42	4882.98	77.45
4892.82	78.06	4902.66	79.27	4905.94	79.22	4915.78	76.51	4925.61	74.61
4951.85	73.64	4964.96	73.86	4994.48	74.01	5007.6	73.53	5017.43	73.53
5023.99	73.95	5050.23	73.68	5056.79	73.98	5066.62	73.86	5086.3	74.38
5096.14	75.07	5115.81	74.4	5128.93	74.76	5145.33	76.37	5161.72	76.06
5171.56	76.19	5194.52	77.07	5204.35	77.78	5220.75	77.81	5237.15	76.78
5243.71	76.14	5253.54	75.82	5273.22	76.28	5283.06	75.92	5302.73	74.48
5322.41	75.1	5335.53	74.89	5351.92	75.05	5358.48	75.39	5374.88	75.2
5387.99	75.86	5401.11	76	5417.51	75.84	5424.07	76.1	5433.9	75.93
5450.3	76.07	5456.86	76.48	5483.09	76.12	5489.65	76.47	5506.05	76.53
5529	76.36	5535.56	76.11	5568.36	75.77	5581.46	75.96	5601.1	75.69
5607.65	75.19	5620.75	75.27	5627.3	74.58	5640.4	74.01	5646.95	74.06
5656.77	73.36	5673.14	73.1	5682.96	73.6	5709.16	73.45	5715.71	73.56
5751.73	73.57	5771.37	73.27	5791.02	74.03	5804.12	74.35	5810.67	75.19
5823.76	75.37	5833.59	76.27	5859.78	75.71	5869.61	75.88	5885.98	75
5895.8	75.16	5905.62	75.73	5931.82	74.51	5938.37	74.98	5948.19	76.36
5961.29	77.65	5971.11	77.73	5980.94	76.58	5997.31	77.18	6007.13	77.2
6016.96	75.69	6023.5	75.35	6036.6	72.74	6049.7	72.74	6056.25	73.62
6062.8	73.8	6072.62	71.98	6079.17	69.21	6088.99	67.3	6095.54	66.48
6118.46	65.56	6131.56	65.7	6141.38	66.4	6147.93	67.39	6154.48	67.68
6157.75	67.3	6167.58	64.9	6183.95	62.64	6193.77	59.99	6197.05	54.9
6207.05	54.2	6218.05	53.2	6229.05	52.4	6242.05	52.4	6250.05	52.6
6261.05	51.9	6301.05	50.3	6312.05	50.3	6323.05	52	6354.19	59.65
6364.01	60.54	6367.28	62.05	6377.1	68.95	6383.65	70.83	6393.47	75.43
6400.02	76.8	6419.66	75.56	6439.3	75.72	6452.39	74.63	6462.21	73.41
6468.76	72.99	6475.31	73.33	6485.13	75.91	6494.95	75.57	6504.77	76.16
6524.41	75.98	6550.59	75.95	6583.33	76.11	6606.24	76.04	6625.88	76.2
6632.44	76.06	6652.12	76.33	6661.95	76.02	6675.07	76.18	6704.59	75.91
6724.27	76.3	6727.55	76.97	6734.11	79.42	6737.39	79.8	6747.23	79.67
6753.79	78.99	6760.35	76.92	6773.47	74.19	6789.87	73	6809.55	73.35
6825.94	72.97	6845.62	72.94	6891.54	72.39	6947.3	72.64	6993.21	72.67
7003.05	72.49	7026.01	72.59	7075.21	72.29	7101.45	72.27	7153.92	72.03
7219.52	72.23	7235.92	72.02	7268.72	72.11	7275.28	72.62	7301.52	77.64
7308.08	77.96	7317.91	75.86	7331.03	76.9	7337.59	76.75	7383.51	76.85
7399.91	76.69	7442.55	76.71	7472.06	76.47	7508.14	76.53	7540.94	76.27
7580.3	76.32	7629.5	76.27	7649.17	76.09	7718.05	76.01	7757.41	75.81
7777.09	75.9	7793.48	75.8	7859.08	75.71	7891.88	75.87	7908.28	75.76
7954.2	75.67	7957.48	75.83	7980.43	75.67	8013.23	75.68	8039.47	75.46
8098.51	75.56	8111.63	75.78	8134.58	75.79	8147.7	75.62	8173.94	75.56
8187.06	75.7	8206.74	75.53	8213.3	75.65	8239.53	75.49	8275.6	75.48
8292	75.19	8305.12	75.36	8321.52	75.05	8334.63	75.2	8357.59	74.85
8387.1	74.93	8396.94	74.22	8406.78	74.47	8419.9	75.22	8433.02	73.77
8439.57	73.74	8446.13	72.8	8455.97	69.74	8465.81	68.61	8472.37	68.33
8495.32	67.99	8521.56	67.95	8547.79	67.69	8554.35	67.28	8560.91	67.86
8567.47	69.37	8574.03	70.17	8583.87	70.41	8590.43	69.69	8596.98	67.65
8600.26	67.19	8613.38	66.77	8623.22	66.96	8636.34	66.66	8682.25	66.76
8698.65	66.66	8708.48	66.95	8715.04	67.83	8734.72	72.61	8741.28	75.43
8744.56	76.12	8751.12	75.56	8767.51	74.88	8777.35	75.62	8793.75	75.62
8888.85	75.3	8908.53	75.02	8974.11	74.99	8997.07	74.68	9020.03	74.89
9049.54	74.55	9072.5	74.63	9085.61	74.39	9108.57	74.51	9131.53	74.33
9147.92	74.47	9213.51	74.34	9226.63	74.72	9275.82	74.47	9308.61	74.72
9341.41	75.28	9344.69	74.69	9354.52	75.44	9397.16	74.85	9410.19	75.42
9416.66	76.4	9429.6	78.98	9436.07	81.35	9442.54	83.11	9458.72	83.21
9468.42	81.7	9481.36	78.09	9484.6	77.64	9497.54	77.56		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	259.07	.066	5771.37	.085	6007.13	.07	6167.58	.025
6377.1	.07	6400.02	.066						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
6007.13 6400.02 1288.43 1489.08 953.22 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	6007.13	77.2	T
6400.02	9497.54	76.8	T

Left Levee Station= 259.07 Elevation= 86.29

Right Levee Station= 9442.54 Elevation= 83.11

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	79.70	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.03	Wt. n-Val.	0.067	0.049	0.066	
W.S. Elev (ft)	79.66	Reach Len. (ft)	1288.43	1489.08	953.22	
Crit W.S. (ft)	60.86	Flow Area (sq ft)	11806.55	6875.40	8565.18	
E.G. Slope (ft/ft)	0.000082	Area (sq ft)	20461.45	6875.40	16076.34	
Q Total (cfs)	20000.00	Flow (cfs)	3864.67	12637.81	3497.52	
Top Width (ft)	9120.94	Top Width (ft)	5707.70	392.89	3020.36	
Vel Total (ft/s)	0.73	Avg. Vel. (ft/s)	0.33	1.84	0.41	
Max Chl Dpth (ft)	29.36	Hydr. Depth (ft)	2.07	17.50	2.84	
Conv. Total (cfs)	2206385.0	Conv. (cfs)	426347.1	1394194.0	385843.8	
Length Wtd. (ft)	1334.15	Wetted Per. (ft)	5713.87	403.21	3026.25	
Min Ch El (ft)	50.30	Shear (lb/sq ft)	0.01	0.09	0.01	
Alpha	4.06	Stream Power (lb/ft s)	0.00	0.16	0.01	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	12265.17	10244.69	5478.21	
C & E Loss (ft)	0.00	Cum SA (acres)	3373.31	554.10	1865.02	

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 124.20*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	79.81	9.47	79.92	42.59	80.95	57.52	81.04	99.38	80.91
123.04	80.45	134.87	80.52	151.43	81.23	158.53	82.11	175.09	85.89
182.4786	59436	191.54	86.37	200.77	84.82	207.77	82.97	216.92	80.06
228.62	76.81	249.22	75.03	256.14	73.76	267.68	74.11	286.14	74.42
316.13	74.37	383.04	74.61	415.35	74.5	424.57	74.68	445.34	74.54
519.17	74.87	542.24	74.89	572.24	74.81	583.77	74.95	595.31	74.88
613.77	75	629.92	74.93	645.58	75.02	687.27	74.83	692.22	74.94
701.44	76.58	728.97	77.26	756.82	77.44	784.5	77.11	828.34	77.29
846.8	77.09	862.95	77.44	872.18	77.49	888.33	76.99	916.01	77.26
941.4	77.37	959.85	77	971.39	77.14	1008.31	76.97	1052.15	77.22
1089.06	77.04	1100.6	77.18	1132.9	77.24	1160.59	77.21	1174.43	77.09
1197.51	77.2	1218.27	77.19	1236.72	77.35	1270.94	77.35	1299.02	77.24
1308.25	77.36	1326.71	77.26	1333.63	77.42	1354.39	77.54	1386.69	77.39
1400.54	77.5	1430.53	77.46	1458.22	77.67	1472.07	77.45	1511.29	77.43
1522.83	77.54	1559.74	77.67	1580.51	77.43	1615.12	77.54	1638.19	77.81
1656.65	77.83	1682.03	77.55	1700.49	77.74	1769.7	77.78	1772.01	77.51
1778.93	74.73	1785.86	74.03	1797.4	72.42	1808.93	72.24	1834.31	71.41
1855.07	71.15	1866.61	71.44	1875.84	71.2	1882.77	71.87	1887.38	71.59
1894.3	71.83	1898.91	71.33	1908.14	71.15	1926.6	71.4	1931.21	71.15
1938.14	71.45	1956.6	71.14	1961.21	71.7	1981.98	71.38	2002.75	71.55
2016.59	71.12	2021.2	71.52	2028.12	71.31	2044.27	71.15	2048.89	71.48
2060.43	71.46	2076.58	71.1	2090.42	71.46	2106.57	71.35	2111.19	71.16
2120.42	71.35	2134.26	70.94	2148.1	72.08	2157.33	73.86	2166.56	76.04
2173.48	77.02	2185.02	77.59	2194.25	77.06	2208.09	77.32	2217.32	77.21
2228.86	74.58	2245.01	74.53	2268.08	74.61	2281.92	74.85	2288.85	75.18
2293.46	77.05	2298.08	77.89	2307.31	76.99	2321.15	76.77	2378.83	77.22
2406.52	77.48	2427.29	77.43	2464.2	76.74	2512.66	76.78	2540.34	77.21
2658.02	76.47	2671.86	76.41	2688.01	76.53	2715.69	76.45	2727.23	76.59
2743.39	76.51	2780.3	76.59	2812.6	76.91	2835.67	76.51	2854.14	76.59
2941.81	76.59	2960.27	76.73	2976.42	76.54	2997.19	76.67	3024.87	76.65
3064.09	76.52	3075.63	76.7	3089.47	76.57	3110.23	76.87	3140.23	76.75
3172.53	76.73	3214.06	77	3225.6	77.19	3250.98	77.31	3267.13	77.59
3306.35	77.6	3329.42	77.04	3368.64	77.04	3407.87	76.77	3421.71	76.58
3440.17	76.92	3456.32	78.1	3463.24	76.3	3470.16	75.03	3488.62	74.39
3518.61	74.64	3527.84	74.32	3539.38	74.61	3557.84	74.43	3569.37	74.55
3583.22	74.9	3590.14	75.36	3603.98	74.91	3613.21	75.15	3624.75	76.22
3636.28	76.01	3643.2	76.1	3659.36	76.68	3666.27	77.15	3677.81	77.17
3693.96	76.05	3700.88	75.84	3714.73	76.14	3721.65	75.9	3735.49	74.94
3749.34	75.35	3758.57	75.2	3774.71	75.53	3786.25	75.4	3795.48	75.84
3816.24	75.82	3839.31	75.98	3842.7476	18046	3862.39	76.02	3867	76.26
3894.69	76.2	3899.3	76.03	3922.38	75.82	3931.59	75.95	3945.41	75.77
3950.02	75.44	3959.24	75.5	3963.85	75.04	3977.67	74.7	3984.58	74.23
3996.1	74.05	4003.01	74.38	4021.44	74.26	4047.1374	32922	4065.21	74.16
4088.25	74.92	4092.86	75.49	4102.07	75.62	4108.99	76.23	4127.41	75.89
4134.33	76.02	4145.85	75.45	4159.66	75.96	4178.1	75.17	4198.83	77.3
4205.74	77.37	4212.66	76.62	4224.17	77.06	4231.08	77.1	4244.02	75
4254.38	72.14	4264.74	71.16	4275.09	71.36	4282.85	69.84	4288.03	67.84
4295.79	66.34	4300.97	65.64	4329.45	63.93	4335.77	64.01	4337.21	63.35
4342.39	63.56	4350.15	62.82	4357.92	60.6	4370.86	58.87	4378.62	56.97
4381.22	53.57	4406.51	51.8	4423.11	51.86	4431.81	51.33	4458.63	50.2882
4470.76	50.11	4488.35	51.61	4494.21	52.53	4511.8	54.46	4523.52	56.6
4525.96	58.51	4533.66	60.97	4539.42	61.21	4545.19	62.4	4550.96	61.96
4556.12	62.86	4571.3	67.07	4574.03	67.45	4581.42	69.35	4585.57	71
4591.34	72.29	4596.6	74.33	4606.72	76.16	4623.93	75.26	4643.28	75.35
4660	75.28	4677.75	74.49	4691.07	73.62	4699.95	73.43	4708.83	73.7
4722.15	75.53	4735.47	75.44	4746.5	75.78	4774.46	75.76	4836.82	75.88
4864.77	75.97	4886.4	75.95	4913.04	76.1	4921.94	76.04	4948.63	76.26
4961.96	76.08	4979.75	76.22	5019.79	76.15	5046.48	76.44	5050.93	76.88
5059.82	78.54	5064.27	78.79	5077.62	78.7	5086.52	78.27	5095.41	76.92
5113.21	75.11	5135.45	74.36	5162.14	74.65	5184.37	74.45	5228.21	74.45
5279.81	74.22	5340.03	74.54	5352.93	74.75	5359.38	75.33	5365.84	75.43
5370.14	75.13	5380.89	75	5411.22	74.98	5424.57	74.88	5460.45	74.96
5494.86	74.87	5522.43	74.72	5546.47	74.73	5632.49	74.45	5647.54	74.52
5651.84	74.76	5669.05	74.36	5701.31	74.29	5718.15	74.34	5740.39	74.22
5784.88	74.2	5793.77	74.55	5829.36	77.83	5838.26	78	5851.59	76.58
5869.38	77.2	5878.28	77.07	5931.4	77.11	5952.91	76.91	5991.61	76.8
6023.87	76.79	6060.43	76.58	6109.89	76.63	6154.07	76.41	6243.22	76.48
6274.18	76.44	6316.33	76.26	6359.34	76.25	6363.64	76.17	6400.2	76.21
6445.36	76.05	6458.26	76.14	6501.27	76.07	6535.68	76.09	6559.33	75.99
6585.54	76.01	6630.02	76.17	6714.54	76.01	6718.99	76.12	6750.12	76.02
6778.69	76.06	6830.19	75.82	6896.96	75.95	6928.05	76.07	6959.18	76.04
6976.97	75.9	7012.56	75.9	7030.35	75.98	7057.05	75.86	7075.46	75.96
7096.97	75.86	7109.87	76	7122.77	75.85	7144.28	75.99	7161.49	76.56
7174.39	76.45	7187.29	76.57	7195.89	76.29	7204.49	75.66	7219.54	75.34
7245.36	75.38	7258.26	75.16	7273.31	75.61	7288.36	75.27	7301.65	75.47
7315	74.98	7322.78	75.03	7346.14	75.59	7363.93	74.56	7372.82	74.51
7381.71	73.86	7395.06	71.79	7408.4	70.96	7417.3	70.75	7449.65	70.41

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 7469.01   70.37 7496.97   70.19 7519.59   69.92 7528.48   69.59 7537.38   69.94
 7546.28   71.01 7555.17   71.48 7568.52   71.61 7577.42   71.05  7586.3   69.69
 7590.75   69.36 7608.54   68.91  7621.7   69.07 7636.76   70.56 7649.66      70
 7658.26   70.31 7681.91    70.4 7705.57   70.38 7724.19   70.24 7737.52   70.47
 7746.42   71.08 7773.11   74.25    7782   76.04 7786.45   76.53 7795.35   76.18
  7817.4   75.68 7830.92   76.17 7856.11   76.18 7944.29   75.87 7961.49   75.87
 7993.74   75.71 8008.83   75.56 8034.61   75.68 8062.56   75.46 8092.67   75.53
 8112.03    75.5 8133.53    75.2 8160.05   75.46 8176.54   75.21  8200.2   75.17
  8217.4   75.04    8226   75.25 8262.57   74.87 8269.02   74.99 8311.27    74.8
 8320.63   75.02 8335.68   75.07 8352.89   74.53 8367.94   74.75 8406.65   74.69
 8417.41   74.42 8426.01   74.49 8434.61   74.91 8449.66   75.35 8466.86   75.46
 8496.98   75.43 8503.43    75.6 8533.53   75.56 8563.64   75.64 8580.85   74.91
 8595.92   74.89 8600.36   74.48 8613.69   75.06 8671.52   74.46 8684.07   74.71
 8696.97   75.88 8709.88   77.71 8718.34    80.2  8724.3   81.37 8733.07   82.62
 8747.63   81.54 8756.37    80.1 8768.01   77.41 8770.93   77.06 8782.58   76.65

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  182.47    .066 3456.32    .085 4231.08     .07 4350.15    .025
 4533.66     .07 4606.72    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4231.08 4606.72          1288.43 1489.08  953.22             .1       .3
Ineffective Flow     num=       2
   Sta L    Sta R    Elev  Permanent
       0 4231.08    77.1       T
 4606.72 8782.58   76.16       T
Left Levee      Station=  182.47      Elevation=   86.59
Right Levee     Station= 8733.07      Elevation=82.62334

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 124.00*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.42   26.15   83.68   35.32   83.93   61.02   84.18   75.55   84.03
   82.82    84.1   92.99   84.47   97.35   84.89  105.8886.45006  110.42   87.06
  114.78   87.14   122.8    85.4  126.85   84.08  138.91   77.11  154.84   74.22
  172.19   74.56  189.55   74.61  223.35   74.86  247.47    74.8  307.05    75.2
  337.75   75.22  361.79   75.35   380.2    75.3  404.32    74.6  407.18   74.78
  412.52   75.82  428.45   76.81  440.51   77.04  464.64   76.56  485.95   76.53
  496.63   76.37  511.32    76.5  520.67   76.23  551.38   76.37  562.06   76.17
  568.73   76.24   590.1   76.18  615.47   76.32  636.83    76.2  662.19   76.31
  686.23   76.25  722.27   76.41  774.35   76.39  790.37   76.53  809.06   76.45
  834.43   76.49  850.45   76.59  858.46   76.48  881.16   76.48   909.2    76.6
  921.21   76.48  965.27   76.65  979.96   76.52  990.64   76.63  1030.7   76.69
 1036.04   75.16 1046.72      74 1068.08   73.49 1092.12   73.38 1096.12   73.71
  1102.8   73.69 1110.81   73.35 1128.17    73.5 1138.85   73.35 1141.52   73.64
 1153.53   73.48 1165.55   73.57 1173.56   73.36 1176.23   73.56 1189.58   73.38
 1192.25   73.55 1208.28   73.36 1216.29   73.55 1241.66    73.3 1249.67   73.87
 1260.35   75.85 1264.35   76.35 1271.03   76.64 1276.37   76.37 1289.72   76.45
  1296.4   75.13  1319.1   75.15 1331.11   75.43 1336.45   76.79  1341.8   76.34
  1349.8   76.23 1399.21   76.58 1411.22   76.56 1432.59   76.22 1460.63   76.24
 1476.65   76.47 1502.05   76.38 1544.74   76.14 1578.12   76.14 1615.51   76.22
  1638.2   76.34 1647.55   76.13 1658.23   76.18 1728.99    76.2 1741.01   76.28
 1779.73   76.18 1806.43   76.36 1842.48    76.3 1887.87   76.59 1897.22   76.74
 1919.91    76.7 1933.27   76.41 1955.96   76.43 1986.67   76.21 1997.35   76.39
  2006.7   76.99 2014.71   75.46 2025.39   75.14 2042.75   75.28 2065.45   75.18
 2080.13   75.43 2084.14   75.65 2092.15   75.42 2097.49   75.54 2104.17   76.07
 2114.84      76 2128.19   76.52 2134.87   76.53 2148.22   75.85 2156.23      76
 2168.25   75.39 2176.26   75.59 2197.62   75.61  2208.3   75.87 2221.65   75.83
  2229.775.95183 2260.37   76.03  2276.4   75.86 2289.73   75.86 2319.06      75
 2323.05   75.16 2358.6875.05278 2372.38   75.49 2384.38    76.2 2399.05   76.15
 2405.71    75.9 2413.71   76.18 2424.38   75.84 2436.37   76.95 2444.37   76.65
 2455.04      77 2460.17   76.12 2464.55   74.66 2472.16   71.53 2479.77   69.59
 2487.38   68.92 2493.09   67.71 2496.89   66.48 2503.28  65.278 2511.46   64.28
 2521.72   63.38 2527.33   62.17 2531.98   60.52 2536.84   59.73 2542.55   58.34
 2547.62   56.42 2557.77    55.1 2563.48   53.95 2565.38   52.24 2583.98   51.21
 2596.18   51.12  2601.450.82592 2610.17   50.42 2625.81   49.93 2637.41   50.26
 2645.34   50.92 2653.27   51.12  2661.2   52.03 2677.06   52.66 2684.99    53.1
 2692.92   54.68 2700.85   55.52 2704.16   58.94 2706.76    59.5 2711.97   61.86
 2714.57   62.64 2722.37   62.57 2730.18    64.6 2732.78   64.44 2737.98   63.39
 2740.58   63.33 2756.19   64.78 2763.99   64.99  2769.2   65.45  2779.6   67.99
  2784.8   69.92 2792.5270.74342 2799.73   73.23 2803.02   74.05 2813.43   75.52
    2827   75.15 2835.15   74.52 2840.58   74.99 2851.44    74.9 2859.58   75.09
 2867.73   74.86 2880.69   74.83 2900.31   74.44 2919.92   73.83 2942.36   74.06
 2959.17   75.15 2989.92    75.5 2995.35   75.42 3026.44   75.55 3036.08   75.68
 3052.37   75.63 3079.52   75.76 3103.96   75.71 3139.26   75.86 3171.85   75.86
 3177.28   75.94  3253.3   76.12 3284.44   76.27 3310.32   76.23 3345.63    76.4
 3368.69   76.58 3374.31   76.78 3385.54   77.65 3391.16   77.77 3408.01   77.74
 3419.24   77.56 3430.48   76.92 3451.52   76.07 3481.03   75.72 3514.73   75.94
 3542.79   75.92    3590      76 3598.15   76.11 3663.31   76.04 3674.18   76.18
 3709.48   76.27 3739.35   76.47 3744.78   76.72 3755.64   76.87 3763.78   78.02
 3769.21   77.54 3771.93   78.21 3777.36   77.61 3790.93   77.35 3812.66   77.27
 3846.09   77.27  3891.4   77.35 3934.85   77.32 3940.28   77.24 3972.86   77.15
 4000.01   77.19 4067.89   76.99 4089.61   77.01 4108.62   76.87 4127.62   76.98
 4133.06   77.44 4138.49   76.75 4143.92   77.09 4154.79   76.59 4171.08   76.62
 4195.51    76.4 4233.53   76.48  4282.4   76.27 4301.04    76.3 4312.27   76.48
  4357.2   78.02 4368.44   78.04 4385.27   77.29 4410.02   77.51  4423.6   77.37
 4453.46    77.4 4472.47   77.33 4486.05   77.39  4513.2   77.07  4548.5   77.04
 4562.07   76.91 4586.51   76.88 4594.65   76.76  4602.8   76.89 4624.53   76.84
 4648.97   76.69 4676.12   76.77 4692.41   76.68 4711.42   76.73 4722.28   76.64
 4746.71   76.64 4757.57   76.56 4879.76   76.66 4885.19    76.6 4918.85   76.61
 4972.08   76.44 5026.38   76.46 5031.81    76.3 5077.98   76.44    5135   76.27
 5151.29   76.44  5170.3   76.32 5183.87   76.41 5205.59   76.35 5249.04   76.43
 5262.61   76.27 5300.63   76.27 5363.08   76.49 5379.38   76.39 5409.24   76.46
 5441.83   76.43 5474.89   76.34 5493.42   76.47 5515.14   76.36 5555.88   76.45
 5574.88    76.3 5623.76   76.18 5705.22   76.35 5713.37   76.29 5744.48   76.37
 5794.83    76.2 5830.13   76.26 5879.01   76.24 5889.87   76.29 5907.35   76.18
 5927.88   76.21  5930.6   76.32 5957.76    76.2 5974.05    76.5 5990.34   76.22
 6017.49   76.49 6039.22   77.79 6055.51    77.7  6071.8   77.82 6082.67   77.29
  6088.1   76.45 6093.53   76.15 6112.53   75.58 6123.39   75.45 6128.82   75.64
 6145.12   75.73 6161.41   75.44 6169.56   76.08 6180.42   76.34 6196.71    75.9
 6199.43   75.63 6210.29   76.07 6242.88   75.69 6253.74   75.85 6272.38   75.95
 6294.84   75.36 6306.06   75.29 6317.29   74.93 6334.14   73.84 6350.99    73.3
 6384.08   73.05 6403.08   72.84 6427.52   72.78 6462.82   72.53 6473.69    72.3
 6491.38   72.14 6502.62    71.9 6513.85   72.02 6525.27   72.65 6536.32   72.78
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 6553.17    72.8  6564.4    72.4 6575.62   71.73 6595.88   71.15 6606.74   71.04
 6620.31   71.18 6628.46   72.27 6639.33    74.4 6642.04   74.45 6647.47   73.84
 6655.62   73.32 6666.48   73.93 6696.35   74.08 6715.35   73.92 6726.21   74.01
 6750.66   73.82 6766.56   73.98 6791.39   74.88 6811.49   75.88 6828.34   76.94
 6872.85   76.45 6886.43   76.74    6900   76.65 6916.29   76.75 6927.15    76.6
 6948.88   76.65 6981.47   76.42  6986.9    76.5 7027.63   76.35 7049.35   76.38
 7071.08   76.24 7090.08   76.25 7095.51   76.12 7119.95    76.1 7141.68   76.36
 7155.25   76.11 7174.26   76.03 7176.98   75.92 7195.98   75.89 7214.99   76.06
 7220.42    75.9 7239.43   76.14 7255.72   76.02 7266.59   75.69 7280.16   75.69
 7299.17   76.04 7312.74   75.91 7320.89   75.67 7329.04   75.85 7334.47   75.71
 7350.76    75.8 7372.49   75.48 7383.35   75.89 7424.08   75.46 7429.51    75.3
 7437.66   75.52 7443.09   75.39 7464.81    75.4 7494.68   75.26 7502.82   75.64
 7521.83   75.68 7529.98   75.04 7543.56   74.63 7562.56   75.07 7611.44   75.01
 7625.02    74.5 7635.88   74.56 7646.74   75.21 7665.75   76.02 7679.33   76.07
 7687.47   76.31 7709.19   76.41 7725.49   76.35 7733.64   76.71 7771.65   76.51
  7798.8   76.56 7809.66   76.41 7831.39   74.72 7836.82   74.53 7850.42    74.5
 7856.04   74.28 7863.98   74.59 7877.55   74.68 7888.41   74.52 7912.85   74.42
 7940.01   74.09 7961.73   74.17 7978.02   75.46 7983.45   76.18  7991.6   76.82
 7994.31   77.27 8002.34   80.09    8005   80.65 8015.63   81.63  8023.6   82.14
 8027.27   81.78 8038.27    79.4 8049.27   77.48 8054.67   76.72 8067.61   75.74

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0      .1  114.78    .089 2358.68    .066 2503.28    .025 2792.52    .066
 2813.43     .07

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2455.04 2813.43          1288.43 1489.08  953.22             .1       .3
Left Levee      Station=  114.78      Elevation=   87.14
Right Levee     Station=  8023.6      Elevation=82.13667
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   97.53  2449.8   76.94 2811.24 3069.42   75.59 6276.53    6856   75.91

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 123.8

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     458
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   85.03    3.28   85.62   13.12   86.82   22.96   87.46    32.8   87.73
   42.64   87.57   45.92   85.19    49.2    77.4   52.48    74.7   55.76   74.61
   72.16   75.14   78.72   75.09   91.84   75.49  111.53   75.72  114.81   75.58
  121.37   74.38  127.93   76.36  131.21   76.64  137.77      76  150.89   75.49
  164.01   75.33  177.13   75.43  186.97   75.34  213.21   75.51  265.69   75.53
  275.53   75.47  288.65   75.61  311.62   75.54  357.54   75.68  410.02   75.69
  419.86   75.81  452.66   75.84  459.22   75.76  485.46   75.89   495.3   75.84
  528.11   75.88  534.67   75.78  577.31   75.95  616.67   75.78  639.63   75.99
  649.47   75.84  675.71   76.66  678.99    76.9  682.27   76.26  692.11   69.42
  695.39   67.71  701.95   65.83  715.07   63.36  721.63   62.27  724.91    60.5
  728.19   57.64  738.19   52.04  748.19   50.94  768.19   50.44  778.19   49.94
  788.19   49.74  798.19   49.94  808.19   50.64  818.19   50.64  828.19   51.54
  838.19   51.64  848.19   51.54  858.19   51.74  868.19   53.64  878.19   54.44
  882.36   59.38  885.64   60.06   892.2   63.29  895.48   64.32  902.04   63.85
  905.32   63.92  915.16    66.8  918.44   66.51     925   64.82  928.28   64.45
   941.4    64.5  947.96   64.26   957.8   63.26  964.36   63.45  977.48   66.52
  984.04   68.83  987.32   69.22  993.88   69.21 1003.73   72.41 1007.01    73.2
 1020.13   74.88 1036.53   74.57 1046.37   73.78 1052.93   74.58 1059.49   74.73
 1066.05   74.56 1075.89   74.82 1085.73   74.46 1095.57   74.47 1115.25   74.19
 1125.09   74.28 1138.21   74.04 1148.05   74.03 1161.17    74.3 1187.41   74.53
 1210.37   75.15 1233.34   75.22  1239.9   75.06  1256.3   75.12 1275.98   75.31
  1289.1   75.54 1308.78   75.47 1318.62   75.62 1335.02   75.57 1341.58   75.66
  1371.1   75.54 1400.62   75.61 1413.74   75.74 1453.11   75.76 1459.67   75.87
 1485.91   75.89 1508.87   76.05 1531.83   75.98 1538.39   76.11 1551.51   76.09
 1564.63   76.24 1600.71   76.35 1620.39   76.32 1649.92   76.63 1663.04   76.58
 1689.28   76.73  1702.4   76.66 1708.96   76.77 1731.92   76.74 1774.56   76.96
 1790.96   76.92  1800.8   77.07 1807.36   76.94  1817.2   77.07 1846.72    77.1
 1853.29   77.21 1876.25   77.26 1905.77   77.42 1958.25   77.57 1968.09   77.77
 1994.33   77.79 2000.89   77.89 2020.57   77.84 2030.41   77.96 2046.81   77.85
 2059.94   78.05  2082.9   78.09 2092.74   78.22 2102.58   78.14 2109.14   78.29
 2118.98   78.24 2138.66    78.4 2145.22   78.77 2158.34   78.98  2164.9   80.32
 2168.18   80.71 2174.74   79.98 2178.02   80.99 2184.58   80.09 2200.98   79.69
 2210.82   79.72 2227.22   79.57 2260.02   79.63 2282.98   79.74 2305.94   79.68
 2322.34   79.74 2351.87   79.72 2374.83   79.78 2381.39   79.67 2420.75   79.58
 2453.55   79.65 2499.47   79.52 2515.87   79.55 2535.55   79.42 2561.79   79.48
 2584.75   79.29 2607.71   79.43 2614.27   80.12 2620.83   79.08  2627.4   79.59
 2640.52   78.83  2660.2   78.85 2689.72    78.5  2709.4   78.57 2729.08   78.54
 2735.64   78.67    2775   78.49 2784.84   78.54 2794.68   78.37 2804.52   78.51
  2824.2   78.32 2830.76   78.41 2870.12   78.22 2879.96   78.25 2902.92   78.05
 2925.89   77.99 2942.29   77.76 2948.85   77.83 2965.25   77.67 3001.33    77.7
 3024.29   77.59 3040.69   77.67 3073.49   77.22 3086.61   77.33 3099.73   77.17
 3116.13   77.21 3132.53   77.01 3162.05   76.97 3171.89   76.78 3181.73   76.99
 3188.29   76.91 3207.98   76.97  3237.5    76.8  3270.3    76.9 3289.98   76.77
 3312.94   76.83 3326.06   76.72 3355.58   76.78  3368.7   76.68  3417.9   76.77
 3424.46   76.67 3453.98   76.76 3483.51   76.76 3516.31   76.85 3522.87   76.75
 3572.07   76.78 3588.47   76.71 3604.87   76.75 3627.83   76.62 3693.43   76.67
 3699.99   76.43 3706.55   76.62 3713.11   76.53 3732.79   76.61 3745.91   76.51
 3755.76   76.66 3791.84   76.53 3824.64    76.5 3841.04    76.6 3844.32   76.74
 3867.28   76.53 3883.68   76.68 3909.92   76.62 3952.56   76.68  3962.4   76.76
  3978.8   76.53 3998.48   76.51 4018.16   76.66 4024.72   76.55 4077.21   76.77
 4090.33   76.68 4100.17   76.81 4119.85   76.67 4132.97    76.8 4146.09   76.71
 4155.93   76.81 4185.45   76.72  4195.3   76.79 4237.94   76.67 4257.62   76.81
 4264.18   76.69 4283.86    76.7 4333.07   76.84 4356.03   76.61 4369.15   76.69
 4375.71   76.55 4415.07   76.54 4464.28   76.64  4477.4   76.57 4483.96   76.68
 4513.48   76.75 4523.32   76.66 4552.85    76.7 4592.21   76.51 4602.05   76.57
 4621.73   76.45 4657.81    76.5 4664.37    76.6 4723.42   76.52 4736.54   76.62
 4752.94   76.51 4782.46   76.51 4785.74   76.67 4818.55   76.55 4838.23   77.01
 4851.35   76.83 4857.91   76.59 4867.75   76.63 4890.71      77 4916.96   79.01
  4926.8   79.11 4936.64   78.94 4956.32   79.06 4969.44    78.3    4976   77.07
 4982.56   76.64 4995.68   76.29 5005.52   75.81 5012.08   75.89 5018.64   75.59
  5025.2   75.87 5038.33    75.9 5044.89   76.08 5058.01   75.93 5064.57   75.71
 5074.41   76.69 5087.53   77.07 5107.21    76.4 5110.49      76 5117.05   76.12
 5123.61   76.64 5130.17   76.55 5156.42    76.5 5162.98   76.35  5176.1   76.48
  5208.9   76.24 5215.46   76.29 5228.58   76.11 5274.51   75.89 5294.19   75.64
 5333.55   75.51 5356.51   75.26 5386.03   75.18  5392.6   74.93 5399.16   74.99
 5418.84   74.84 5428.68   74.86  5441.8   74.56 5454.92   74.47 5487.72   74.07
 5504.12   74.28 5527.09   73.95 5536.93   74.02 5550.05   73.76 5563.17   73.78
 5576.29   73.66 5589.41   73.27 5602.53   73.16 5618.93   73.29 5622.21   73.65
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5628.77	74.98	5635.34	76.86	5641.9	78.25	5645.18	78.34	5651.74	77.42		
5661.58	76.64	5674.7	77.55	5710.78	77.75	5733.74	77.51	5746.86	77.65		
5756.71	77.47	5776.39	77.39	5815.75	77.61	5825.59	77.44	5838.71	77.54		
5855.11	77.51	5861.67	77.22	5874.8	77.43	5894.48	77.4	5917.44	77.26		
5924	77.12	5940.4	77.3	5956.8	77.17	5976.48	77.32	5989.6	77.1		
6015.85	77.2	6022.41	77.06	6035.53	77.06	6055.21	76.89	6061.77	77.02		
6081.45	76.99	6110.98	76.83	6137.22	76.9	6163.46	76.7	6186.42	76.78		
6192.98	76.61	6222.5	76.64	6248.75	77.03	6265.15	76.66	6288.11	76.55		
6291.39	76.38	6314.35	76.34	6337.31	76.6	6343.87	76.36	6350.44	76.61		
6366.84	76.79	6386.52	76.67	6399.64	76.18	6409.48	76.32	6416.04	76.15		
6429.16	76.54	6439	76.62	6448.84	76.4	6455.4	76.47	6465.24	76.13		
6475.09	76.42	6481.65	76.23	6501.33	76.42	6507.89	76.17	6514.45	76.21		
6527.57	75.92	6540.69	76.52	6547.25	76.34	6560.37	76.31	6589.9	75.97		
6596.46	75.73	6606.3	76.04	6612.86	75.84	6639.1	75.87	6675.18	75.72		
6685.02	76.27	6707.98	76.29	6717.83	75.33	6734.23	74.72	6744.07	74.91		
6757.19	75.4	6776.87	75.35	6783.43	75.2	6793.27	75.37	6816.23	75.33		
6832.64	74.58	6845.76	74.63	6858.88	75.52	6865.44	75.72	6881.84	76.69		
6898.24	76.79	6908.08	77.15	6934.32	77.33	6954.01	77.27	6963.85	77.82		
6980.25	77.75	7009.77	77.45	7042.57	77.45	7055.69	77.18	7065.53	76.27		
7081.94	74.54	7088.5	74.23	7111.46	74.06	7121.3	74.36	7124.58	74.24		
7137.7	74.32	7150.82	74.13	7180.34	74.07	7213.15	73.68	7239.39	73.63		
7259.07	75.05	7265.63	75.83	7275.47	76.31	7278.75	76.83	7288.45	80.55		
7291.66	81.11	7304.5	81.52	7314.13	81.65	7317.34	81.1	7326.97	77.67		
7336.6	76.24	7343.02	75.97	7352.65	74.83						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	649.47	.066	724.91	.025	885.64	.066	1020.13	.07

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
678.99	1020.13	1216.82	1719 1770.81	.1	.3

Left Levee Station= 32.8 Elevation= 87.73
Right Levee Station= 7314.13 Elevation= 81.65
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
-53.81	679.09	76.93	1018.69	1208.73	74.87	2178.35	7300.22	80.54

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	79.42	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.10	Wt. n-Val.	0.098	0.049	0.070	
W.S. Elev (ft)	79.32	Reach Len. (ft)	1216.82	1719.00	1770.81	
Crit W.S. (ft)	59.67	Flow Area (sq ft)	1506.23	6684.86	3352.19	
E.G. Slope (ft/ft)	0.000151	Area (sq ft)	1506.23	6684.86	3352.19	
Q Total (cfs)	20000.00	Flow (cfs)	503.05	17700.44	1796.52	
Top Width (ft)	2111.62	Top Width (ft)	630.60	341.14	1139.88	
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)	0.33	2.65	0.54	
Max Chl Dpth (ft)	29.58	Hydr. Depth (ft)	2.39	19.60	2.94	
Conv. Total (cfs)	1625989.0	Conv. (cfs)	40897.6	1439035.0	146055.7	
Length Wtd. (ft)	1683.54	Wetted Per. (ft)	632.04	353.39	1139.96	
Min Ch El (ft)	49.74	Shear (lb/sq ft)	0.02	0.18	0.03	
Alpha	2.08	Stream Power (lb/ft s)	0.01	0.47	0.01	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	11335.87	9538.36	4502.93	
C & E Loss (ft)	0.02	Cum SA (acres)	3092.27	516.46	1616.06	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 123.48*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.62	14.67	81.11	31.43	81.82	37.72	82.75	54.48	86.49
58.68	87.21	67.06	87.62	75.44	87.68	94.47	86.66	105.89	85.16
113.5	83.46	122.91	82.48	134.78	78.49	146.65	76.37	155.36	75.71
164.88	75.26	185.81	75.15	204.84	75.25	235.29	75.21	248.61	75.37
280.96	75.1	284.76	75.19	301.89	75.12	311.41	75.35	317.11	75.29
336.14	75.57	339.95	76.03	347.56	76.4	351.37	76.14	362.78	76.02
366.59	76.3	395.93	75.75	412.26	76.57	431.54	76.93	448.42	76.69
471.25	76.51	480.77	76.53	518.82	76.28	568.3	76.3	577.81	76.44
589.23	76.29	600.65	76.42	615.87	76.33	640.61	76.41	646.32	76.33
676.76	76.4	686.28	76.29	697.7	76.52	703.41	76.32	733.85	76.4
741.47	76.31	771.91	76.46	798.55	76.33	829	76.38	834.71	76.56
848.03	76.4	863.25	76.49	945.08	76.47	983.14	76.74	1017.4	76.64
1070.68	76.7	1099.22	76.65	1108.74	76.71	1137.28	76.61	1171.54	76.71
1201.98	76.7	1215.3	76.76	1240.04	76.68	1247.65	76.79	1260.97	76.72
1289.52	76.77	1295.23	76.71	1318.06	76.77	1337.09	76.7	1342.8	76.77
1365.64	76.68	1380.86	76.76	1397.99	76.66	1428.43	76.76	1451.27	76.72
1477.91	76.83	1495.04	76.8	1512.16	76.87	1521.68	76.79	1561.64	76.92
1582.57	76.94	1593.99	76.79	1599.7	76.88	1626.34	76.75	1647.27	76.9
1662.5	76.85	1677.72	76.94	1696.75	76.82	1719.58	76.94	1731	76.88
1761.45	76.91	1803.31	76.87	1826.15	77.01	1837.57	76.95	1841.37	76.64
1847.36	75.4137	1848.99	75.08	1862.31	74.4	1875.63	74.32	1911.78	74.44
1972.68	74.34	1987.9	74.44	2018.35	74.29	2029.76	74.49	2060.21	74.38
2065.92	74.43	2084.95	74.26	2117.3	74.45	2123.01	73.83	2130.62	73.52
2153.46	73.43	2159.17	73.3	2170.58	73.39	2182	73.04	2192.15	72.98241
2201.01	73.01	2218.1	72.87	2229.49	73.1	2242.78	72.59	2248.48	72.69
2271.26	72.61	2286.46	73.16	2301.65	74.13	2308.75	74.14562	2322.54	74.32
2339.63	74.13	2347.23	74.51	2362.42	74.28	2371.91	74.39	2383.31	74.29
2389	73.97	2404.2	74.21	2413.69	74.86	2418.07	74.59	2429.02	72.39
2439.97	69.06	2446.14	68.1	2455.31	67.54	2463.68	65.95671	2475.02	63.76
2481.59	63.84	2492.53	63.27	2504.55	61.07	2510.05	60.49	2511.04	59.42
2521.01	57.35	2530.83	56.75	2542.91	56.77	2549.48	55.86	2553.86	55.57
2562.62	56.13	2567	55.94	2573.57	53.33	2578.25	52.75	2590.19	51.64
2606.35	49.52	2613.71	49.5	2629.77	48.52	2634.67	48.62254	2638.64	48.78689
2649.85	49.09	2656.55	49.62	2676.63	50.55	2683.33	52.16	2690.02	53.25
2692.81	56.01	2695.01	56.58	2698.9	58.41	2701.6	59.12	2708.18	58.94
2714.77	60.59	2723.56	60.24	2732.34	61.08	2740.13	61.43	2746.55	61.32
2751.196	2.83026	2756.49	65.1	2760.88	67.7	2767.47	70.61	2772.23	73.72
2778.65	76.2	2785.04	76.97	2798.47	76.5	2806.53	75.99	2811.9	76.32
2822.64	76.21	2830.69	76.31	2838.75	76.11	2862.91	76.17	2885.24	76.84
2906.11	76.01	2921.98	76.25	2931.16	76.5	2943.68	76.54	2952.03	76.71
2964.95	76.55	2977.08	76.64	3006.3	76.68	3029.39	77.03	3052.43	76.89
3060.86	76.65	3090.34	76.68	3102.97	77.81	3111.4	77.78	3124.03	77.13
3145.1	77.7	3183	76.42	3203.93	76.04	3220.04	75.97	3241.96	76.07

3276.42	76.02	3288.29	76.18	3311.34	76.12	3321.98	76.21	3330.4	76.11
3359.88	76.28	3416.05	76.22	3429.48	76.24	3448.33	76.44	3461.7	76.33
3482.01	76.5	3503.07	76.43	3519.92	76.64	3532.55	76.49	3545.19	76.72
3553	76.68	3587.9	76.9	3595.73	76.86	3604.15	77.04	3621	76.91
3636.24	77.11	3671.15	77.1	3700.68	77.29	3716.79	77.56	3724.85	78.41
3730.22	78.07	3732.9	78.59	3738.27	78.17	3751.7	77.9	3776.83	77.8
3789.46	77.93	3806.3	77.83	3848.42	78.01	3882.11	77.81	3894.01	77.9
3911.59	77.73	3920.02	77.9	3936.86	77.71	3958.45	77.79	3970.56	77.71
3983.19	77.86	3991.61	77.73	4012.67	77.79	4029.52	77.55	4047.06	77.66
4084.65	77.69	4090.02	78	4095.39	77.46	4100.77	77.69	4111.51	77.31
4127.62	77.39	4151.79	77.22	4214.82	77.29	4237.71	77.07	4245.76	77.13
4261.87	77.04	4286.42	77.09	4299.06	76.97	4311.69	77.05	4332.76	76.86
4363.91	76.82	4379.08	76.66	4406.87	76.77	4446.46	76.57	4476.68	76.52
4487.42	76.43	4518.06	76.45	4546.49	76.22	4554.55	76.33	4576.04	76.34
4602.29	76.23	4631.77	76.43	4648.62	76.24	4682.31	76.28	4707.6	76.2
4747.88	76.28	4800.23	76.22	4825.5	76.4	4833.81	76.33	4887.51	76.27
4919.73	76.39	4973.43	76.45	4978.8	76.34	5016.39	76.51	5024.45	76.62
5057.14	76.66	5080.84	76.6	5116.1	76.82	5124.52	77.14	5154	76.94
5183.48	76.06	5193.61	76.05	5207.04	75.87	5223.15	75.81	5239.26	75.92
5306.39	75.95	5322.5	75.85	5352.04	75.96	5384.26	76	5419.17	75.92
5435.28	75.98	5456.76	75.94	5497.04	76.06	5515.84	75.93	5564.17	75.96
5604.45	76.1	5620.56	76.05	5644.73	76.09	5663.6	76.05	5676.96	76.13
5709.18	76.04	5735.2	76.03	5747.84	75.89	5768.25	76.1	5815.22	76.12
5864.92	76.09	5867.6	76.17	5894.46	76.11	5910.57	76.33	5934.74	76.18
5953.53	76.34	5975.02	77.37	5991.13	77.35	6007.24	77.44	6017.98	77.09
6023.35	76.49	6047.52	75.88	6058.26	75.78	6063.63	75.92	6079.75	76.03
6095.86	75.91	6103.91	76.43	6114.65	76.63	6130.76	76.27	6133.45	76.07
6144.19	76.41	6190.04	76.4	6230.12	76.21	6267.71	76.17	6283.83	76.06
6334.84	75.98	6359.01	76.03	6375.36	75.84	6393.92	75.87	6417.47	75.63
6442.25	75.53	6455.68	75.67	6474.48	75.52	6514.75	75.4	6536.23	75.09
6549.66	75.15	6557.72	76.03	6568.46	77.68	6584.57	76.86	6595.31	77.3
6624.85	77.38	6643.64	77.29	6654.38	77.37	6678.59	77.22	6724.91	77.43
6741.75	77.28	6750.18	77.53	6754.4	77.02	6762.81	77.55	6799.39	77.32
6812.82	77.42	6842.35	77.43	6853.09	77.3	6874.58	77.31	6906.8	77.1
6918.64	77.2	6935.5	77.01	6952.34	76.61	6981.82	76.88	6994.45	76.67
7011.3	76.78	7019.58	76.68	7043.75	76.63	7065.24	76.73	7078.66	76.48
7112.38	76.28	7120.79	75.98	7137.73	76.01	7161.91	75.8	7178.02	75.48
7188.76	75.12	7202.18	74.95	7212.92	75.02	7234.4	74.78	7242.46	74.56
7250.52	74.65	7277.37	74.22	7293.48	74.37	7301.89	74.93	7327.16	72.58
7335.59	71.58	7349.87	70.52	7357.93	70.46	7377.7	69.86	7394.54	69.95
7407.18	69.76	7422.37	70	7440.88	69.75	7462.65	69.25	7481.45	69.49
7502.93	69.31	7510.98	69.45	7529.78	69.29	7543.21	68.9	7553.95	69.04
7564.69	69.49	7575.64	69.71	7583.49	70.07	7613.55	70.24	7626.18	70.48
7642.57	70.39	7655.67	70.85	7672.51	70.47	7693.58	70.43	7710.42	72.64
7723.04	75.69	7727.26	75.93	7739.9	75.74	7752.53	74.79	7771.46	74.86
7779.51	75.08	7803.68	74.88	7854.7	74.87	7876.18	74.99	7878.88	75.13
7887.3	76.23	7895.73	77.93	7905.72	78.39	7908.4	78.68	7916.34	80.6
7924.89	81.15	7937.36	82.24	7942.74	81.53	7948.12	79.02	7953.49	77.23
7956.18	77.17	7961.57	77.76	7966.94	77.66	7980.39	76.06	7985.76	75.85

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	1826.15	.085	2413.69	.07	2542.91	.025	2692.81	.07
2785.04	.066								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2413.69	2785.04	1216.82	1719 1770.81	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2413.69	74.86	T
2785.04	7985.76	76.97	T

Left Levee Station= 75.44 Elevation= 87.685
Right Levee Station=7937.365 Elevation=82.24001
Blocked Obstructions num= 1

Sta L	Sta R	Elev
7302.35	7729.2	75.13

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 123.15

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.21	22.96	76.22	49.2	76.78	59.04	78.46	85.28	85.51
91.84	86.88	104.96	87.62	118.08	87.64	141.04	86.43	150.88	85.67
170.56	82.73	183.68	79.85	196.8	79.69	206.64	79.95	216.48	79.85
229.6	78.96	255.84	76.79	272.24	75.86	308.32	75.45	341.12	75.48
364.08	75.29	383.76	75.49	393.6	75.32	416.56	75.59	439.52	75.15
472.32	74.77	478.88	74.92	508.4	74.7	524.8	75.14	534.64	75
551.04	75.36	567.44	75.5	574	76.41	587.12	77.13	593.68	76.59
613.36	76.35	619.92	76.96	646.16	76.95	652.72	77.2	675.68	77.1
698.64	77.39	708.48	77.23	760.96	77.19	770.8	77.33	800.32	77.2
816.72	77.33	833.11	77.19	859.35	77.21	865.91	77.4	882.31	77.12
888.87	77.32	911.83	77.2	967.59	77.23	983.99	77.49	997.11	77.46
1003.67	77.17	1023.35	77.41	1049.59	77.28	1092.23	77.46	1102.07	77.3
1125.03	77.27	1154.55	77.38	1170.95	77.14	1190.63	77.58	1200.47	77.18
1223.43	77.32	1236.55	77.19	1252.95	77.28	1266.07	77.1	1285.75	77.37
1292.31	77.23	1318.55	77.4	1331.67	77.22	1364.47	77.14	1384.15	77.25
1416.95	77.23	1426.79	77.6	1449.75	77.28	1469.43	77.29	1475.99	77.46
1498.95	77.29	1505.51	77.46	1617.03	77.45	1623.59	77.59	1656.39	77.74
1676.08	77.71	1682.64	77.92	1702.31	77.78	1708.88	77.46	1718.72	77.76
1741.68	77.69	1787.6	77.81	1826.96	77.76	1833.52	77.84	1882.72	77.74
1899.12	77.85	1948.32	77.63	1961.44	77.8	1974.56	77.71	2007.36	77.81
2059.84	77.76	2082.8	77.86	2109.04	77.83	2125.44	77.69	2138.56	77.91
2161.52	77.75	2210.72	77.85	2220.56	77.74	2259.92	77.86	2266.48	77.73
2292.72	77.72	2302.56	77.86	2335.36	77.79	2341.92	77.68	2368.16	77.83
2397.68	77.64	2450.16	77.84	2489.52	77.71	2522.32	77.73	2535.44	77.84
2564.96	77.78	2594.48	77.92	2610.88	77.75	2679.76	78	2689.6	77.88
2715.84	78.05	2735.52	77.75	2745.36	77.94	2771.6	77.95	2791.28	77.73
2797.84	77.93	2810.96	77.83	2827.36	78	2853.6	77.87	2879.84	78.04
2912.64	77.77	2932.32	77.8	2952	78	2971.68	77.9	3024.16	77.98
3060.24	77.87	3073.36	78.01	3096.32	77.89	3135.68	78.15	3155.36	78.03
3161.92	77.41	3175.04	74.29	3188.16	73.29	3198	72.92	3220.96	72.79
3247.2	73	3257.04	72.91	3283.28	73.07	3345.6	72.92	3358.72	73
3388.24	72.81	3398.08	73.01	3414.48	72.99	3434.16	72.77	3453.84	72.81
3466.96	72.67	3486.64	73.05	3539.12	72.82	3548.96	72.93	3581.76	72.61
3598.16	72.69	3608	72.95	3621.12	72.96	3630.96	73.25	3637.52	73.03
3647.36	71.8	3660.48	71.2	3670.32	71.28	3680.16	71.02	3699.84	71.04

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 3709.68   70.79 3729.36   70.97 3749.04    70.3 3775.25   70.11  3781.8   70.21
 3811.26   69.88  3817.8   70.24 3830.89   70.31 3853.81   69.26 3863.63   69.45
 3886.54   69.21  3902.9   69.23 3929.09    70.4 3935.64   71.04 3955.27    72.4
 3961.82   72.55 3974.91   72.29 3991.28   72.67 4020.74   72.14 4033.83   72.83
  4050.2   72.63 4060.02   72.25 4076.38   72.38 4089.47   71.98 4096.02   72.07
 4105.84   71.39 4115.66   71.72 4132.03   71.71 4148.39   72.82 4154.94   72.72
 4161.49   71.66 4171.31   71.62 4187.67   68.79 4194.22   68.45 4210.59   68.69
 4213.86   68.32 4240.05    63.2 4249.87   63.98 4266.23    63.8 4276.05   61.96
 4292.42   61.33 4308.79   59.87 4312.06   60.03 4325.16   61.66 4341.52   62.17
 4351.34   60.71 4357.89   60.25 4370.98   61.47 4377.53   61.15 4387.35   59.15
 4387.35      56 4394.35    54.9 4413.35    52.7 4420.35    51.7 4436.35      49
 4447.35    49.1 4459.35      48 4471.35    47.3 4484.35    47.6 4495.35    49.4
 4506.35    53.9 4513.35      54 4527.22   59.12 4530.47   59.24 4533.72   61.67
 4536.97   65.34 4543.47   75.92 4546.72   78.75 4549.96   79.06 4559.71   78.45
 4575.96   77.88 4598.71    77.7 4614.95   78.32 4627.95   79.64  4644.2   77.66
  4663.7   78.16 4673.44   77.91 4679.94   78.22 4686.44   77.99 4699.44   78.16
 4722.19   77.82 4738.43   78.46  4758.1   78.14 4764.66   77.71 4787.61   77.76
 4797.44   79.94    4804   79.81 4813.83    78.5 4830.23   79.53 4859.73    76.8
  4879.4   75.96 4899.07   75.74 4905.63   75.85 4931.85   75.72 4941.69   75.88
  4954.8   75.61 4967.92   75.77 4974.47   75.51 4997.42   75.81  5030.2   75.49
 5056.43   75.56 5066.27    75.8 5079.38   75.51 5092.49   75.75 5108.88   75.49
    5122   75.82 5131.83   75.49 5141.67   75.89 5154.78   75.66 5171.17   75.95
 5181.01   75.86 5187.56   76.23 5200.68   75.93 5210.51   76.18 5246.57   76.02
 5253.13   76.21 5282.64   76.11 5295.75    76.3 5305.58   76.03 5321.98   76.03
 5331.81   76.25 5344.92   75.99 5377.71    76.3 5403.93   75.87 5417.05   76.09
 5426.88   75.82 5433.44   76.19 5446.55   75.82 5462.94   75.94 5472.78   75.81
 5482.61   76.15 5489.17   75.92 5505.56   76.06 5518.68   75.66 5551.46   76.07
 5577.69   75.74 5597.36   75.95  5636.7   75.92 5646.53   75.76 5662.92   76.06
 5676.04   75.78 5695.71   75.73 5718.65   75.88 5728.49   75.71 5738.32   75.89
 5754.72   75.69 5774.39   75.87 5790.78   75.65 5810.45   75.85 5843.23   75.59
 5856.34    75.8 5872.74   75.67 5898.96   75.89  5908.8   75.63 5948.14   75.73
 5964.53   75.66 5987.48      76 6000.59   75.69 6026.82   75.82 6036.65   75.69
 6089.11   75.81 6118.61   75.68 6138.28   75.95 6174.34   75.76 6197.29    75.9
 6207.13   76.16 6275.97   76.27 6285.81   76.51 6318.59    76.8 6348.09   76.63
 6364.49   77.11 6371.04   77.65 6393.99   77.26 6416.94   75.45 6443.17    75.1
 6479.23   75.25  6528.4   75.02 6571.02   75.22 6623.47   75.14 6652.98   75.29
 6675.93   75.25 6711.99   75.37 6744.77   75.57 6751.33   75.41 6790.67   75.43
 6797.23   75.55  6846.4    75.6 6856.24   75.31 6872.63   75.61 6908.69   75.71
 6984.09   75.65 6993.93   75.79 7010.32   75.67 7052.94   75.79 7075.88   75.94
 7115.22   75.99 7138.17   76.21 7151.29   76.12 7200.46   76.34  7239.8   76.31
 7262.75   76.47 7295.53   76.52 7338.15   76.95 7344.71   76.75 7370.93   76.97
 7377.49   76.83    7407   77.06 7452.89   77.14 7475.84   76.98 7492.23   77.12
 7534.85      77 7567.63   77.12 7580.75   77.04 7606.97   77.17 7616.81   77.36
 7629.92   77.04 7636.48   77.81 7639.76   76.71 7646.31   77.67 7659.43   77.49
 7702.05   77.58 7761.06   77.29 7767.61   77.39 7780.73   77.08 7793.84   76.38
 7816.79   76.94 7826.62   76.63 7839.74   76.79 7862.68   76.65 7902.02   76.19
 7918.42    76.2 7924.97    75.6 7944.64   75.34 7967.59   74.35 8006.93   73.21
 8033.16   72.76 8042.99   72.17 8056.11    72.5 8065.94   73.46 8085.61   68.94
 8092.17   67.06    8102    65.4 8124.95   63.85 8138.06   64.07  8147.9   63.77
 8154.46   63.92 8174.13   63.21 8180.68   63.68 8190.52   63.78 8220.02   63.39
 8229.86   63.54 8236.42   63.29 8252.81   63.19 8265.92   63.55 8279.03   63.29
 8288.87   63.55 8308.54   63.26 8318.37   63.64 8334.76   63.47 8341.32    63.9
 8354.43    63.3 8370.83   63.41 8383.94   67.84 8393.77   74.13 8397.05   74.85
 8406.89   75.99 8416.72   75.35 8439.67   75.84 8449.51    75.6 8475.73   75.72
 8515.07   76.39 8521.63   77.84 8528.19   80.32 8547.65   80.72 8550.89   80.95
  8560.6   82.83 8567.07   82.34 8573.55   78.84 8580.02   76.78 8583.26   76.98
 8589.74    78.8 8596.21   79.13 8605.92   77.39  8612.4   76.79 8618.87   76.88

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3175.04    .085 4148.39     .07 4387.35    .025 4513.35     .07
 4549.96    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4148.39 4549.96          1667.19 1702.07 1720.26             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4148.39   72.82       T
 4549.96 8618.87   79.06       T
Left Levee      Station=  118.08      Elevation=   87.64
Right Levee     Station=  8560.6      Elevation=   82.83
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 7837.11  8407.1   75.95

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             79.05    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.079      0.058
  W.S. Elev (ft)             79.01    Reach Len. (ft)          1667.19    1702.07    1720.26
  Crit W.S. (ft)             59.92    Flow Area (sq ft)       10863.25    7609.05
  E.G. Slope (ft/ft)      0.000116    Area (sq ft)            11746.61    7609.05   11083.23
  Q Total (cfs)           20000.00    Flow (cfs)               5435.33   14564.67
  Top Width (ft)           8252.70    Top Width (ft)           3919.55     401.07    3932.08
  Vel Total (ft/s)            1.08    Avg. Vel. (ft/s)            0.50       1.91
  Max Chl Dpth (ft)          31.71    Hydr. Depth (ft)            2.77      18.97
  Conv. Total (cfs)       1853477.0     Conv. (cfs)             503712.7   1349764.0
  Length Wtd. (ft)         1694.01    Wetted Per. (ft)         3920.79     417.84
  Min Ch El (ft)             47.30    Shear (lb/sq ft)            0.02       0.13
  Alpha                       2.33    Stream Power (lb/ft s)      0.01       0.25
  Frctn Loss (ft)             0.19    Cum Volume (acre-ft)    10938.87    8962.37    3626.87
  C & E Loss (ft)             0.00    Cum SA (acres)           2965.00     487.17    1304.61


Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 122.83*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   80.96    16.9   80.96   36.22   81.25   43.46   82.09   62.78   85.62
   67.61    86.3   71.59   86.46   81.81   87.64   86.93   87.84  102.94   87.21
   114.7   86.23  131.36   84.17  142.47   82.53  153.58   82.29  170.24   82.44
  179.05   82.21  195.07      82  215.09    81.3   219.1   81.05  223.11   78.32
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  227.12   76.15  231.12   75.75  255.15   75.54  287.19   75.11  299.21   75.13
  311.89   75.54  347.28   75.35  359.29   75.41  383.33   75.13  403.36   75.25
  417.43   75.12  431.31   75.39  439.65   75.31  455.42   75.55  467.42   75.54
  472.97   75.96  484.08   76.35  489.64   76.15  499.49    76.2   506.3   76.05
  511.86   76.27  534.07   76.24  578.51   76.49  591.61   76.31  615.64   76.36
  623.66   76.47  651.69   76.31  679.73   76.44  691.74    76.3  714.59   76.31
  720.15   76.44  734.03    76.3  743.82   76.48  763.84    76.3  787.88   76.21
  831.24   76.52  836.79   76.35  855.97    76.5  867.99   76.43  884.01   76.57
  920.11    76.4  932.07   76.46  940.08   76.33  956.11   76.41  978.44   76.29
   995.1   76.49 1003.43   76.28 1012.18   76.43 1033.98   76.33 1047.87   76.39
 1058.98   76.26 1075.64   76.39 1120.34   76.31 1128.34   76.49 1148.37   76.36
 1168.39   76.39  1176.4   76.26 1186.74   76.31 1196.44   76.65 1214.51   75.94
 1220.47   75.81  1244.5   75.88 1256.17   75.19 1280.55   74.12 1284.56   74.02
 1332.62    73.8 1356.15   73.87 1380.69   74.06 1396.71   74.01 1411.71   74.14
 1433.93   73.93 1442.26   74.05  1460.8   73.91 1480.82   74.08 1504.85   74.06
 1516.88   74.19 1533.91   73.99 1556.92   74.12 1568.94   74.04 1596.99    74.2
    1613   74.03 1647.78   74.07 1653.05      74 1689.11   74.12 1713.14   74.11
 1737.17   74.28 1749.18   74.15 1765.21   74.25 1786.65   74.18 1821.28   74.23
 1833.31   74.35 1841.32   74.27 1867.19   74.38 1881.37   74.52 1889.38   74.77
 1906.07   74.76 1929.44   75.06 1945.46    75.6 1969.95   75.71  1981.5   75.94
 1992.17   75.95 2017.16   75.79 2025.57   75.92 2041.58   75.86  2053.6   76.03
 2065.61   75.94 2081.65   76.09 2097.67   75.91 2117.69   76.04 2149.74   76.11
 2165.76   75.99 2193.79   75.98 2225.84   76.17 2233.85   76.13 2253.88   76.32
  2269.9   76.34 2303.23   76.15 2313.96   76.29 2350.44   76.16 2367.11   76.19
 2380.99   76.32 2398.08   76.24 2410.09   76.32 2462.16   76.28 2470.18   76.16
 2478.19   76.34  2503.2   76.28 2526.25   76.44 2530.25   76.34 2554.29   76.37
  2562.3   76.16 2570.31   76.37 2582.33   76.46 2608.73   76.29 2626.38   76.45
 2658.73   76.38 2664.28   76.03 2675.39   74.46 2678.4574.33606 2694.83   73.88
 2702.48   74.01 2714.27   73.87 2744.82   73.79 2766.57   73.98 2778.59   73.88
 2830.92   73.92 2842.68   73.81 2866.71   73.95 2878.72   73.84 2911.46      74
 2926.79   73.96 2950.82   74.22 2958.83   74.05 2970.86   74.01 2992.01   74.09
 3018.92   73.97 3026.92   73.86 3040.4773.91731 3053.11   73.94 3066.99   74.23
    3075    74.1    3079   74.47 3087.01    75.9 3091.01   76.19 3100.8876.05425
 3111.04    76.2 3115.04   76.02 3123.05   74.93 3135.08   74.07 3144.76   73.77
 3161.42   73.07 3189.16   72.53 3203.16   72.07 3219.64   71.99 3230.73   71.82
 3250.14   71.21 3263.25   71.12 3271.26   71.34 3283.27   71.11  3291.7   71.19
 3303.31   71.76 3313.88   71.91 3336.05   72.62 3352.68    72.3 3363.38    72.4
  3371.4   72.68 3379.41   72.63 3391.48   72.08 3402.57   72.32 3415.46   72.29
 3423.47   72.42 3443.49   71.82 3455.23      72 3463.54   71.53 3479.55   71.27
 3491.56   71.56 3499.57   72.21 3505.31   72.05 3511.05    71.4 3519.66   69.99
 3530.13   67.76 3539.74   66.71 3556.95   65.85 3564.49   64.81 3568.31   63.93
 3575.94   61.68 3578.9661.21596 3588.51   60.63 3596.39   59.51 3602.85   59.33
 3611.46   58.34 3625.81   58.06 3640.16   57.17  3654.5    57.9 3668.84   58.14
 3683.19   57.29 3694.66   57.84 3701.15   57.51 3709.01   54.95 3718.6154.09272
  3731.8   53.01 3751.96   50.69  3761.6   50.67 3772.12   50.05 3782.64   49.62
 3791.93   50.22  3796.7   50.27 3808.59   51.25 3810.53   51.64 3823.55   56.28
 3828.01   56.41  3834.158.23349 3835.1958.58248 3843.06   60.88 3846.58   61.18
 3850.09    62.7 3853.61   65.24 3860.64   72.99 3864.16   75.81 3867.66   77.35
 3871.88   78.11 3876.09   78.05 3888.93   77.19 3897.19   76.78 3907.55   76.49
 3920.83    76.7 3931.47   77.39 3944.77   76.34 3960.72   76.56 3968.69   76.48
 3974.01   76.66 4008.57   76.47 4021.86   76.76 4037.96   76.61 4043.32   76.38
  4062.1   76.33 4070.12   77.39 4075.51   77.33 4083.55   76.67 4096.97   77.17
 4121.11   75.79  4137.2   75.32 4180.11   75.15 4188.16   75.22 4198.89   75.07
 4209.63   75.13 4214.98   74.98 4233.76   75.06 4260.58   74.88 4282.04   74.91
 4290.09      75 4300.82   74.81 4311.55   74.96 4324.96   74.83 4335.69   74.96
 4343.73   74.79 4351.78   74.98 4362.51   74.82 4383.97   74.86 4389.33   75.07
 4400.06   74.87 4408.11   74.95 4437.61   74.89 4467.12      75 4491.91   75.32
 4500.34   75.25 4507.35   75.47 4517.21   75.53 4534.08   74.96 4544.91   74.87
 4559.38   74.42 4577.09   74.39 4585.14   74.13  4590.5   74.26 4601.56   73.97
 4614.64   74.37 4630.73   74.63  4636.1   74.48 4649.51   74.49 4660.25   74.31
 4687.06   74.51 4702.79   74.29 4728.09   74.27 4744.96   74.34 4764.85   74.16
 4778.26   74.31 4788.99   74.14 4823.86   74.01 4853.37    73.9 4869.46   73.95
 4882.87    73.8 4898.96   73.82 4925.78   73.66 4936.51   73.73 4949.93   73.64
 4971.38   73.69 4985.38   73.48 5002.25   73.54 5025.03    73.4 5043.81   73.54
 5054.53   73.34 5084.04   73.21 5120.34   73.26 5151.09   73.05 5167.19   73.11
  5204.7   72.95 5223.52    73.1 5263.75   73.02 5305.92    73.2 5338.85   73.08
 5352.27   73.36 5357.63   73.61  5376.4   73.34 5395.18   72.35 5402.93   72.25
 5445.12   72.15 5457.77   72.27 5499.94   72.18 5537.91   72.25 5564.16   72.16
 5607.08   72.19  5663.4   72.34 5693.96    72.2 5715.04   72.32 5723.48   72.24
 5746.56   72.26 5754.61    72.1 5768.02   72.21 5803.61    72.3 5820.48    72.4
 5833.15   72.32 5867.26   72.48 5909.06   72.57 5938.59   72.88  5966.5   72.92
 5985.27    73.2 5996.01   73.22  6014.5   73.43 6036.24   73.56 6052.47   73.55
 6073.55   73.79 6090.42   73.86 6132.59   74.18 6148.89   74.42 6154.26   74.34
 6175.71   74.59  6204.3   74.73 6233.83   74.98 6261.55      75 6271.79   75.09
 6318.17    75.1 6330.84   75.23 6356.14   75.23 6376.89   75.39 6387.61   75.19
 6392.98   75.55 6395.66      75 6401.02   75.49 6411.76   75.42 6427.83   75.55
  6491.1   75.59 6503.76   75.51 6512.19   74.99 6521.73   75.05 6529.06   75.32
 6541.72   76.11 6548.55   75.81 6558.59   75.65 6567.03   75.72 6592.33   75.49
 6600.76   75.02 6623.66   74.62 6629.02   74.27 6645.11   74.02 6676.69   73.13
 6701.99   72.75 6710.42   72.75 6718.86    72.2 6725.58   72.05 6736.31    72.2
 6744.36   72.51 6760.45   70.04 6765.82   68.99 6773.86   68.08 6792.64   67.13
 6803.36   67.12 6811.41   66.88 6816.78   66.94 6832.75   66.38 6846.28   66.58
 6870.42   66.27 6897.25    66.2 6912.87   66.62 6925.53   68.19 6938.19    68.4
 6950.89   68.89 6969.67   68.76 6980.39   68.17 6993.81   68.11 7004.54   70.29
 7012.58   73.36 7023.31   73.99 7031.36   73.59 7050.13   73.98 7079.64   73.98
 7094.24   74.14 7111.82   74.53 7117.19   75.37 7122.56   76.83 7132.19   77.47
 7141.13   79.15 7149.07   81.26 7153.95   81.15 7158.83   79.39  7163.7   78.34
 7166.14   78.43 7171.03   79.32  7175.9   79.46  7188.1   78.01 7192.97    77.8

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2678.45    .085 3499.57     .07 3709.01    .025 3823.55     .07
 3867.66    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3499.57 3867.66          1667.19 1702.07 1720.26             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 3499.57   72.21       T
Left Levee      Station=  86.925      Elevation=   87.84
Right Levee     Station= 7149.07      Elevation=   81.26
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   224.9 3084.34    76.2 3878.37  7146.3   77.46

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 122.5

INPUT
```

Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85.7	45.93	85.73	52.49	87.65	55.77	88.04	68.89	87.78
88.57	85.76	108.26	84.92	118.1	84.82	131.22	85.28	144.34	86.37
154.18	86.66	160.74	86.58	164.02	86.26	167.31	80.85	170.59	76.56
173.87	75.82	193.55	75.62	219.79	74.85	229.63	74.93	236.2	75.57
249.32	75.62	262.44	75.28	269	75.28	278.84	75.67	285.4	75.5
298.53	75.44	314.93	75.68	324.77	75.52	334.61	75.66	351.01	75.6
357.57	75.73	377.26	75.44	393.66	75.96	403.5	75.59	423.18	75.52
429.75	75.39	449.43	75.75	469.11	75.4	488.79	75.52	495.36	75.75
505.2	75.49	518.32	75.35	541.28	75.56	551.12	75.41	557.68	75.55
570.81	75.4	580.65	75.62	587.21	75.44	593.77	75.67	610.17	75.39
629.86	75.21	642.98	75.48	649.54	75.42	662.66	75.62	679.06	75.42
685.62	75.61	695.47	75.53	708.59	75.82	721.71	75.57	734.83	75.45
747.95	75.63	754.51	75.39	767.64	75.48	777.48	75.33	784.04	75.44
807	75.37	813.56	75.61	829.97	75.46	839.81	75.53	859.49	75.36
869.33	75.43	892.29	75.32	902.14	75.41	908.7	75.79	918.54	75.83
925.1	75.53	941.5	75.53	948.06	75.29	954.62	75.32	964.47	75.73
980.87	74.47	984.15	74.33	1003.83	74.37	1020.23	72.18	1033.36	70.78
1036.64	70.58	1062.88	70.23	1076	70.14	1085.84	70.28	1108.81	70.32
1115.37	70.43	1128.49	70.3	1138.33	70.39	1151.45	70.23	1161.3	70.45
1171.14	70.2	1180.98	70.13	1197.38	70.42	1217.06	70.32	1226.91	70.59
1233.47	70.31	1243.31	70.2	1259.71	70.44	1269.55	70.31	1282.67	70.6
1292.52	70.56	1305.64	70.31	1328.6	70.45	1338.44	70.25	1348.28	70.41
1354.85	70.3	1367.97	70.43	1387.65	70.43	1407.33	70.77	1417.17	70.44
1430.3	70.65	1453.26	70.68	1459.82	70.58	1476.22	70.71	1486.07	70.91
1492.63	70.74	1509.03	70.92	1525.43	71.24	1531.99	71.72	1541.83	71.66
1564.8	72.38	1577.92	73.36	1594.32	73.59	1607.44	74.13	1636.97	73.94
1643.53	74.16	1656.65	73.97	1666.49	74.26	1676.33	74.06	1689.46	74.42
1702.58	74.1	1718.98	74.36	1738.66	74.27	1745.23	74.41	1758.35	74.16
1781.31	74.16	1787.87	74.42	1794.43	74.32	1807.56	74.46	1814.12	74.35
1830.52	74.65	1837.08	74.57	1843.64	74.75	1853.48	74.41	1879.73	74.63
1902.69	74.45	1909.25	74.6	1925.65	74.54	1932.21	74.65	1948.62	74.57
1958.46	74.71	1968.3	74.56	1987.98	74.78	2001.1	74.78	2007.67	74.51
2014.23	74.78	2024.07	74.64	2040.47	74.68	2053.59	74.94	2056.87	74.73
2076.56	74.79	2083.12	74.4	2089.68	74.84	2099.52	74.99	2106.08	74.66
2109.36	74.79	2129.04	74.63	2135.6	74.87	2148.73	74.64	2158.57	74.8
2171.69	74.57	2191.37	74.82	2197.93	75.15	2217.62	74.74	2230.74	74.65
2250.42	74.9	2260.26	74.72	2273.38	74.82	2276.67	75.02	2283.23	74.8
2302.91	74.84	2312.75	74.7	2319.31	74.92	2332.43	74.89	2342.27	74.7
2361.96	75.12	2375.08	75.25	2381.64	75.16	2398.04	75.29	2401.32	75.44
2407.88	75.15	2417.73	75.14	2427.57	75.36	2440.69	75.15	2457.09	75.32
2463.65	75.07	2470.21	75.23	2476.77	74.81	2489.9	74.97	2496.46	75.43
2503.02	76.35	2506.3	77.33	2512.86	80.59	2516.14	81.13	2525.98	81
2532.54	81.38	2535.82	81.01	2542.38	78.92	2552.23	77.28	2565.35	76.11
2581.75	75.6	2594.87	75.01	2601.43	74.39	2607.99	74.12	2617.84	73.98
2627.68	73.32	2640.8	73.33	2657.2	72.85	2663.76	73.38	2673.6	73.01
2683.45	73.22	2690.01	73.68	2696.57	73.53	2706.41	72.99	2709.69	73.08
2719.53	72.76	2726.09	72.34	2739.21	72.22	2745.78	72.79	2752.34	72.87
2765.46	71.75	2781.86	71.93	2788.42	72.54	2794.98	72.21	2801.54	71.47
2804.82	71.43	2811.39	71.96	2817.95	71.88	2834.35	70.83	2844.19	70.94
2850.75	71.61	2860.59	71.15	2870.44	67.45	2877	65.97	2896.68	63.58
2906.52	62.99	2909.8	62.08	2916.36	59.28	2922.92	58.62	2933.92	55.14
2943.92	54.64	2953.92	54.94	2983.92	54.14	2993.92	54.04	3003.92	54.34
3013.92	54.34	3023.92	54.04	3043.92	53.64	3053.92	53.14	3063.92	52.44
3093.92	51.94	3103.92	52.94	3113.92	52.94	3123.92	53.14	3133.92	56.24
3137.92	58.62	3142.72	58.83	3146	59.5	3155.84	62.24	3165.68	63.5
3168.96	64.48	3172.24	66.14	3175.52	68.37	3185.36	75.65	3188.64	77.49
3191.92	77.66	3208.33	75.76	3218.17	75.18	3231.29	75.03	3234.57	75.14
3254.25	74.91	3273.94	75.19	3280.5	75.05	3293.62	75.14	3300.18	75.01
3313.3	75.12	3342.83	74.85	3362.51	74.83	3375.63	74.71	3385.47	74.8
3392.03	74.69	3447.8	74.52	3470.77	74.31	3487.17	74.25	3503.57	74.31
3523.25	74.1	3536.38	74.22	3552.78	74.06	3559.34	74.11	3582.3	73.83
3592.14	73.91	3605.27	73.72	3628.23	73.76	3641.35	73.68	3657.75	74
3670.88	74.6	3677.44	74.44	3690.56	75.05	3697.12	74.27	3703.68	73.75
3710.24	73.54	3723.36	72.84	3733.2	72.84	3743.05	72.44	3756.17	72.11
3766.01	72.79	3775.85	73.15	3792.25	72.91	3808.66	73.01	3828.34	72.92
3834.9	72.76	3844.74	72.8	3854.58	72.59	3867.7	72.74	3874.26	72.52
3890.67	72.59	3913.63	72.4	3933.31	72.08	3946.43	72.14	3972.68	71.97
3985.8	71.8	4008.76	71.72	4048.13	71.47	4054.69	71.32	4067.81	71.37
4080.93	71.15	4103.9	71.06	4123.58	70.73	4159.66	70.72	4199.03	70.24
4215.43	70.27	4225.27	70.08	4235.11	70.15	4241.67	69.99	4271.2	69.8
4287.6	69.83	4304	69.7	4313.84	69.51	4326.97	69.5	4340.09	69.62
4379.45	69.18	4389.29	69.3	4412.26	69.05	4422.1	69.35	4448.34	69.39
4454.9	69.26	4477.86	69.24	4484.43	69.32	4513.95	69.12	4553.31	69.15
4573	69.07	4595.96	69.15	4605.8	68.98	4622.2	69.08	4628.76	68.91
4648.45	68.92	4661.57	68.81	4691.09	68.9	4704.21	69.12	4714.06	68.97
4720.62	69.11	4746.86	69.18	4753.42	69.33	4773.1	69.37	4796.07	69.82
4819.03	69.85	4825.59	70.08	4848.55	70.44	4855.11	70.64	4868.23	70.77
4884.64	70.78	4901.04	71.22	4914.16	71.24	4933.84	71.58	4946.96	71.62
4953.53	71.85	4963.37	71.92	4986.33	72.32	5002.73	72.4	5025.7	72.83
5055.22	73.09	5061.78	73.05	5078.18	73.21	5091.3	73.16	5101.15	73.37
5120.83	73.36	5130.67	73.49	5150.35	73.29	5170.03	73.39	5176.59	73.56
5189.72	73.52	5199.56	73.67	5212.68	73.66	5225.8	73.86	5235.64	73.74
5242.2	72.97	5248.76	73.67	5255.32	74.05	5265.17	75.32	5278.29	74.52
5284.85	74.7	5304.53	74.54	5311.09	73.72	5327.49	73.06	5343.9	72.71
5357.02	72.71	5370.14	72.36	5376.7	72.53	5389.82	72.41	5396.38	72.6
5402.94	71.73	5412.78	72.11	5422.63	71.57	5429.19	71.47	5442.31	70.77
5448.87	70.75	5475.11	69.98	5481.67	69.95	5491.52	69.55	5514.48	69.16
5537.44	69.1	5550.56	69.45	5553.84	69.81	5560.4	72.02	5563.68	72.87
5573.53	73.46	5580.09	74.06	5586.65	74.23	5593.21	74.08	5603.05	73.12
5619.45	72.74	5629.29	72.74	5642.41	71.81	5652.26	71.85	5668.66	72.39
5688.34	72.19	5694.9	72.25	5711.3	72.75	5721.14	73.79	5724.42	74.38
5734.27	78.6	5737.55	79.68	5740.83	79.97	5760.51	79.74	5767.07	78.72

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.099	2476.77	.099	2525.98	.066	2922.92	.025	3155.84	.066

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2850.75	3185.36	1373.09	1755.19	2222.98	.1	.3

Left Levee Station= 55.77 Elevation= 88.04
Right Levee Station= 5740.83 Elevation= 79.97
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
21.51	2534.52	81.35	3190.79	5900.24	77.64

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	78.69	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.10	Wt. n-Val.	0.066	0.040	0.066	

W.S. Elev (ft)	78.59	Reach Len. (ft)	1373.09	1755.19	2222.98	
Crit W.S. (ft)	60.45	Flow Area (sq ft)	1634.00	6946.89	2413.41	
E.G. Slope (ft/ft)	0.000092	Area (sq ft)	1634.00	6946.89	2413.41	
Q Total (cfs)	20000.00	Flow (cfs)	1077.94	18418.62	503.44	
Top Width (ft)	3189.85	Top Width (ft)	306.36	334.61	2548.88	
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)	0.66	2.65	0.21	
Max Chl Dpth (ft)	26.65	Hydr. Depth (ft)	5.33	20.76	0.95	
Conv. Total (cfs)	2081003.0	Conv. (cfs)	112160.2	1916459.0	52383.0	
Length Wtd. (ft)	1780.69	Wetted Per. (ft)	306.94	342.30	2549.60	
Min Ch El (ft)	51.94	Shear (lb/sq ft)	0.03	0.12	0.01	
Alpha	1.96	Stream Power (lb/ft s)	0.02	0.31	0.00	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	10302.44	8390.25	3184.98	
C & E Loss (ft)	0.00	Cum SA (acres)	2758.70	458.41	1047.43	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 121.98*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.13	11.36	84.23	18.93	84.14	26.5	83.95	40.52	83.88
46.31	84.83	49.2	85.01	56.05	84.87	66.33	83.85	76.62	83.42
81.75	83.36	88.61	83.58	95.46	84.12	100.6	84.25	104.03	84.21
105.74	84.04	107.46	81.33	109.17	79.19	110.88	78.81	121.16	78.69
134.87	78.29	140.01	78.32	143.44	78.63	150.29	78.65	157.14	78.47
160.57	78.46	165.71	78.65	175.99	78.52	184.56	78.62	189.7	78.53
194.84	78.59	203.4	78.55	206.83	78.61	217.11	78.44	225.68	78.69
230.82	78.49	241.1	78.44	244.53	78.36	254.81	78.52	265.09	78.32
275.36	78.36	278.8	78.47	283.94	78.32	290.79	78.23	302.78	78.3
307.92	78.21	311.35	78.27	318.2	78.18	323.34	78.27	326.77	78.17
330.19	78.27	338.76	78.1	349.04	77.98	355.9	78.09	366.18	78.12
374.74	78	378.17	78.08	383.31	78.02	390.16	78.15	403.87	77.92
410.72	77.99	414.15	77.86	421.01	77.89	441.56	77.77	444.99	77.88
453.56	77.77	458.7	77.79	468.98	77.67	474.12	77.7	486.11	77.62
491.26	77.65	494.68	77.84	499.82	77.85	503.25	77.69	511.81	77.67
518.67	77.55	523.81	77.74	534.09	77.02	544.37	77.01	552.93	75.89
561.5	75.07	575.21	74.86	582.06	74.8	587.07	74.86	599.2	74.85
602.62	74.9	609.48	74.82	614.62	74.85	621.47	74.76	626.61	74.86
636.89	74.69	645.46	74.83	655.74	74.77	660.88	74.9	664.31	74.75
669.45	74.7	678.01	74.81	683.15	74.74	690	74.88	695.15	74.86
702	74.73	713.99	74.79	719.13	74.68	724.27	74.76	727.7	74.7
734.56	74.76	744.83	74.75	755.11	74.91	760.25	74.74	767.11	74.84
779.16	74.85	782.53	74.79	796.24	74.93	799.67	74.84	816.8	75.06
820.22	75.3	825.36	75.27	837.36	75.62	844.21	76.11	852.78	76.23
859.63	76.49	875.05	76.39	878.48	76.5	885.33	76.4	890.47	76.54
895.61	76.43	902.47	76.6	909.32	76.44	917.89	76.55	928.17	76.5
931.6	76.56	938.45	76.43	950.44	76.43	953.87	76.56	957.29	76.51
964.15	76.58	967.58	76.52	976.14	76.67	983	76.72	988.14	76.55
1001.85	76.65	1013.84	76.56	1017.26	76.64	1025.83	76.61	1029.26	76.67
1037.83	76.63	1042.97	76.7	1048.11	76.63	1058.38	76.75	1065.24	76.75
1068.67	76.62	1072.09	76.75	1077.23	76.69	1085.8	76.71	1092.65	76.84
1094.37	76.74	1104.65	76.78	1108.08	76.58	1111.5	76.81	1116.64	76.88
1132.06	76.71	1135.49	76.83	1142.34	76.71	1147.48	76.79	1154.34	76.67
1164.61	76.79	1168.04	76.95	1178.32	76.73	1185.18	76.67	1195.46	76.78
1200.59	76.68	1207.45	76.73	1209.17	76.83	1212.59	76.71	1222.87	76.73
1228.01	76.65	1231.44	76.76	1243.43	76.65	1253.71	76.86	1272.56	76.96
1274.27	77.04	1277.7	76.89	1282.84	76.89	1287.98	77	1294.83	76.9
1303.4	76.99	1306.82	76.86	1311.0476	.89163	1313.68	76.73	1320.53	76.8
1323.96	77.01	1327.39	77.46	1329.1	77.94	1332.53	79.56	1334.24	79.82
1337.09	79.7701	1339.38	79.73	1342.81	79.91	1344.52	79.72	1347.94	78.66
1353.09	77.81	1359.94	77.18	1368.51	76.86	1375.36	76.51	1378.79	76.18
1387.36	75.9	1392.5	75.53	1399.35	75.41	1407.91	74.99	1411.34	75.19
1416.48	74.89	1421.62	74.89	1425.05	75.05	1428.48	74.9	1433.62	74.51
1440.47	74.16	1443.9	73.83	1450.75	73.54	1454.18	73.71	1457.61	73.63
1464.46	72.84	1473.02	72.63	1476.45	72.81	1479.88	72.52	1483.3	72.02
1485.02	71.93	1488.45	72.07	1491.87	71.9	1500.44	71.06	1505.58	70.92
1509.01	71.12	1514.86	69.97	1520.6267	.23315	1524.63	65.76	1536.35	62.56
1539.71	61.82	1542.21	61.49	1544.16	60.88	1548.07	59.17	1551.98	58.67
1560.18	56.37	1564.48	55.76	1571.6155	.15474	1588.3	53.1	1594.25	52.56
1600.2	52.34	1606.16	51.97	1612.11	51.44	1622.59	50.61	1629.97	50.09
1635.93	49.54	1653.79	48.69	1661.08	49.57	1668.37	50.7	1675.67	50.84
1683.251	.15811	1690.25	51.72	1701.51	52.28	1712.12	53.72	1717.42	54.6
1723.79	56.31	1725.17	58.61	1727.56	58.83	1732.34	60.53	1734.73	60.97
1737.12	61.17	1744.29	62.27	1752.29	62.64	1756.23	62.6	1761.02	62.97
1765.79	63.82	1770.58	65.15	1773.6565	.74551	1778.38	66.95	1782.52	68.45
1787.3	69.78	1792.08	71.48	1799.26	73.43	1801.43	74.39	1803.61	74.5
1814.51	73.56	1821.04	73.28	1829.76	73.13	1831.94	73.16	1839.04	73.01
1845	72.98	1858.08	73.18	1862.44	73.11	1871.15	73.12	1875.51	73.06
1892.09	73.26	1903.83	73.36	1916.9	73.52	1938.51	73.52	1951.77	73.72
1965.04	73.71	1973.54	73.76	1988.79	73.74	1998.2	73.82	2018.1	73.72
2024.73	73.77	2031.35	73.99	2047.61	74.07	2062.86	73.94	2071.15	74.09
2077.77	73.88	2084.41	73.59	2091.02	73.45	2102.08	73.38	2110.91	73.52
2121.69	73.45	2126.04	73.17	2134.76	73.14	2139.11	72.66	2143.47	72.39
2147.83	72.33	2156.54	72.06	2163.07	72.07	2170.59	71.86	2178.33	71.76
2184.86	72.17	2191.4	72.38	2202.29	72.34	2213.19	72.47	2226.26	72.46
2230.61	72.39	2237.15	72.42	2243.68	72.33	2252.4	72.48	2256.75	72.36
2276.64	72.34	2289.89	72.12	2303.14	72.14	2309.78	72.08	2323.04	72.13
2330.82	72.01	2356.18	71.93	2376.57	71.61	2385.29	71.63	2395.96	71.52
2409.25	71.52	2422.32	71.33	2429.11	71.35	2442.36	71.27	2448.98	71.27
2462.25	71.08	2472.43	71.02	2483.32	71.04	2489.86	70.93	2496.39	70.96
2500.75	70.89	2521.9	70.82	2542.14	70.67	2548.68	70.54	2555.05	70.53
2566.11	70.66	2592.25	70.47	2598.78	70.5	2614.04	70.36	2620.57	70.48
2634.59	70.35	2642.35	70.32	2661.96	70.43	2680.99	70.27	2707.71	70.26
2720.77	70.12	2736.03	70.18	2742.56	70.09	2753.92	70.16	2757.81	70.07
2770.89	70.02	2779.6	69.93	2793.68	69.93	2807.92	70.08	2814.46	69.98
2818.82	70.04	2833.46	70.02	2840.6	70.14	2853.67	70.12	2868.92	70.38
2879.86	70.28	2884.17	70.29	2888.53	70.43	2899.75	70.6	2919.62	70.77
2927.74	70.75	2938.63	70.99	2947.35	71.02	2959.4	71.18	2969.13	71.19
2980.03	71.26	2995.27	71.44	3006.17	71.51	3019.05	71.64	3032.31	71.84
3045.58	71.86	3056.27	71.94	3064.98	71.92	3071.53	72	3084.59	71.94
3091.98	72.03	3105.24	71.87	3121.62	72.06	3131.74	71.98	3136.88	72.06
3154.3	72.2	3160.84	72.15	3165.2	71.78	3169.55	72.13	3173.91	72.32
3180.45	72.96	3189.16	72.52	3193.52	72.57	3206.59	72.49	3210.95	72.1
3221.84	71.76	3232.73	71.59	3241.45	71.62	3250.16	71.43	3254.52	71.52

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 3263.23   71.49 3267.59   71.58 3271.94   71.14 3278.48   71.33 3285.02   71.06
 3289.38      71 3298.09   70.65 3302.45   70.61 3319.87   70.28 3323.99    70.3
 3330.61    70.1 3346.02   69.87 3361.26   69.89 3369.98   70.04 3372.16   70.21
 3376.51   71.32 3378.69   71.75 3385.23   72.05 3389.59   72.37 3393.94   72.55
  3398.3   72.59 3404.84   72.26 3410.15   72.26 3415.73   72.16 3422.26   72.14
 3430.97   71.85 3436.68   72.14  3443.3   72.82 3448.41   73.45 3456.55   74.22
 3463.19    75.1 3469.83   75.82 3476.72   76.27 3483.08   76.85 3485.44   77.15
 3491.98    79.3 3494.16   79.88 3496.33   80.07 3508.63   80.03 3512.73   79.52

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .111 1509.01    .066 1520.62    .025 1773.65    .066 1799.26    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1509.01 1799.26          1373.09 1755.19 2222.98            .1       .3
Left Levee      Station=    49.2      Elevation=   85.01
Right Levee     Station= 3496.33      Elevation=   80.07
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   54.95 1342.71   79.82 1803.79 3472.17   74.52

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 121.46

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     357
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.57    3.28   82.65    6.56   82.69    9.84   82.75   13.12   82.69
    16.4   82.57   19.68   82.38   22.96   82.19   26.24   82.09   29.52   82.04
    32.8   82.02   36.08   82.02   39.36   82.03   42.63   81.97   45.91   81.89
   49.19   81.75   52.47   81.63   55.75    81.5   59.03   81.35   62.31   81.18
   65.59   80.96   68.87   80.69   72.15   80.44   75.43   80.22   78.71   79.97
   81.99   79.82   85.27   79.63   88.55   79.44   91.83   79.27   95.11    79.2
   98.39   79.15  101.67   79.07  104.95   79.02  108.23   78.88  111.51   78.86
  114.79   78.81  118.07   78.71  121.35   78.69  124.62   78.67   127.9    78.7
  131.18   78.74  134.46   78.79  137.74   78.76  141.02   78.64   144.3   78.59
  147.58   78.64  150.86   78.66  154.14   78.33  157.42   77.73   160.7   76.12
  163.98   73.52  167.26   70.64  170.54   67.42  173.82   63.88   177.1   60.39
  180.38   58.75  183.66   57.74  193.66   51.44  203.66   47.54  213.66   45.44
  223.66   46.74  233.66   48.54  243.66   48.74  253.66   49.34  263.66   50.44
  273.66   51.04  283.66   51.74  293.66   52.24  303.66   53.24  311.55   58.56
  314.83   58.94   318.1   60.52  321.38   62.11  324.66   62.69  327.94   62.75
  331.21   63.11  334.49    63.5  337.77   63.71  341.04   63.45  344.32   63.23
   347.6   63.15  350.88   62.85  354.15   62.64  357.43   62.69  360.71      63
  363.99   63.56  367.26   64.31  370.54   65.36  373.82    66.3   377.1   66.72
  380.37    67.2  383.65    67.6  386.93   68.21   390.2   68.99  393.48   69.42
  396.76   69.47  400.04    70.1  403.31   70.65  406.59   70.94  409.87   71.04
  413.15   71.22  416.42   71.41   419.7   71.36  422.98   71.38  426.26   71.36
  429.53   71.16  432.81      71  436.09   71.06  439.36   71.12  442.64   71.18
  445.92   71.17   449.2   71.09  452.47   71.12  455.75   71.21  459.03   71.51
  462.31   71.69  465.58   71.93  468.86   72.12  472.14   72.24  475.42   72.28
  478.69   72.25  481.97   72.36  485.25   72.63  488.52   72.82   491.8    72.9
  495.08   72.86  498.36   72.97  501.63   73.06  504.91   73.11  508.19   73.23
  511.47   73.38  514.74   73.31  518.02   73.18   521.3   73.25  524.58   73.42
  527.85   73.77  531.13   73.96  534.41   74.02  537.68   74.02  540.96   73.99
  544.24   74.06  547.52    74.3  550.79   74.03  554.07   73.45  557.34   73.14
  560.62   73.07   563.9    73.1  567.17   73.11  570.45    72.7  573.72   72.06
     577   71.49  580.28   71.05  583.55   71.03  586.83    71.2   590.1    71.3
  593.38   71.31  596.66   71.32  599.93   71.39  603.21   71.54  606.48    71.6
  609.76   71.66  613.03   71.81  616.31    71.9  619.59   71.97  622.86   71.99
  626.14   72.02  629.41   72.03  632.69   72.06  635.97   72.23  639.24    72.2
  642.52   72.11  645.79   72.11  649.07    72.2  652.35   72.11  655.62   72.02
   658.9   72.13  662.17   72.15  665.45   72.06  668.73   72.19     672    72.3
  675.28   72.23  678.55    72.2  681.83   72.18  685.11    72.2  688.38   72.24
  691.66   72.11  694.93   71.97  698.21    71.9  701.48   71.88  704.76   71.91
  708.04   71.91  711.31   71.94  714.59   71.98  717.86   72.01  721.14   71.93
  724.42   71.98  727.69   71.89  730.97   71.81  734.24   71.86  737.52   71.83
   740.8   71.74  744.07   71.78  747.35   71.83  750.62   71.82   753.9   71.79
  757.18   71.76  760.45    71.8  763.73   71.83     767   71.83  770.28   71.84
  773.55   71.73  776.83   71.65  780.11   71.64  783.38   71.58  786.66   71.55
  789.93   71.74  793.21   71.69  796.49   71.72  799.76   71.74  803.04   71.75
  806.31   71.77  809.59   71.65  812.87   71.67  816.14   71.68  819.42   71.61
  822.69   71.46  825.97   71.31  829.25   71.38  832.52   71.41   835.8   71.48
  839.07   71.55  842.35   71.48  845.63   71.45   848.9   71.41  852.18   71.38
  855.45   71.36  858.73   71.41     862   71.38  865.28   71.26  868.56   71.16
  871.83   71.18  875.11   71.21  878.38    71.2  881.66   71.21  884.94   71.25
  888.21    71.2  891.49   71.14  894.76   71.09  898.04   71.04  901.32      71
  904.59   70.99  907.87   71.04  911.14   71.04  914.42   70.99   917.7   70.96
  920.97   70.93  924.25   70.87  927.52   70.95   930.8   70.92  934.08   70.87
  937.35   70.94  940.63   70.96   943.9    70.9  947.18   70.71  950.45   70.74
  953.73   70.85  957.01   70.85  960.28   70.72  963.56   70.69  966.83   70.76
  970.11   70.72  973.39   70.68  976.66   70.77  979.94    70.8  983.21    70.8
  986.49   70.81  989.77   70.81  993.04   70.69  996.32    70.6  999.59   70.56
 1002.87   70.54 1006.15   70.57 1009.42   70.62  1012.7   70.58 1015.97   70.52
 1019.25    70.6 1022.52   70.71  1025.8   70.68 1029.08   70.66 1032.35   70.68
  1038.9   70.68 1042.18   70.62 1045.46   70.51 1048.73   70.53 1052.01   70.58
 1055.28   70.49 1058.56   70.45 1061.84   70.54 1065.11   70.59 1068.39   70.51
 1071.66   70.41 1074.94   70.46 1078.22   70.56 1081.49   70.54 1084.77   70.54
 1088.04   70.58 1091.32   70.59  1094.6   70.58 1097.87   70.62 1101.15   70.48
 1104.42   70.38  1107.7   70.43 1110.97   70.49 1114.25   70.48 1117.53   70.46
  1120.8   70.46 1124.08    70.5 1127.35   70.56 1130.63    70.5 1133.91   70.51
 1137.18   70.57 1140.46   70.54 1143.73   70.55 1147.01   70.55 1150.29   70.53
 1153.56   70.53 1156.84   70.44 1160.11   70.47 1163.39   70.55 1166.67   70.64
 1169.94   70.64 1173.22   70.66 1176.49   70.59 1179.77   70.58 1183.05   70.68
 1186.32   70.67  1189.6   70.62 1196.15   70.62 1199.42   70.68  1202.7   71.03
 1205.98   71.36 1209.25   71.59 1212.53   71.58  1215.8   71.52 1219.08   71.81
 1222.36   72.44 1225.63    73.5 1228.91    74.8 1232.18   76.18 1235.46   77.98
 1238.74    79.2 1242.01   79.79 1245.29   79.93 1248.56   79.91 1251.84   80.17
 1255.12   80.32 1258.39   80.32

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .111  167.26    .066  173.82    .025  321.38    .066  413.15    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       167.26  413.15          1874.31 1742.61 1664.76            .1       .3
Left Levee      Station=   39.36      Elevation=   82.03
Right Levee     Station= 1258.39      Elevation=   80.32
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Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
88.39	150.9	79.37	547.67	1268.48	74.29

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	78.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.111	0.044	0.071
W.S. Elev (ft)	78.21	Reach Len. (ft)	1874.31	1742.61	1664.76
Crit W.S. (ft)	59.55	Flow Area (sq ft)	36.07	5140.11	3463.00
E.G. Slope (ft/ft)	0.000183	Area (sq ft)	36.07	5140.11	3463.00
Q Total (cfs)	20000.00	Flow (cfs)	11.79	17434.35	2553.86
Top Width (ft)	1081.28	Top Width (ft)	12.46	245.89	822.93
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	0.33	3.39	0.74
Max Chl Dpth (ft)	32.77	Hydr. Depth (ft)	2.89	20.90	4.21
Conv. Total (cfs)	1478187.0	Conv. (cfs)	871.6	1288561.0	188753.8
Length Wtd. (ft)	1733.56	Wetted Per. (ft)	14.87	257.35	823.94
Min Ch El (ft)	45.44	Shear (lb/sq ft)	0.03	0.23	0.05
Alpha	1.88	Stream Power (lb/ft s)	0.01	0.77	0.04
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	10255.76	7898.94	2698.62
C & E Loss (ft)	0.01	Cum SA (acres)	2748.64	435.02	875.14

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 121.13*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.14	2.32	81.31	5.57	81.53	6.97	81.6	9.29	81.67
11.61	81.69	13.93	81.64	16.72	81.59	18.57	81.58	20.9	81.58
27.86	81.61	30.13	81.55	32.39	81.55	34.65	81.57	36.91	81.37
39.18	81.02	41.44	80.52	45.6	79.54	48.23	78.94	50.5	78.44
52.76	77.98	55.02	77.72	57.44	77.59	59.55	77.52	64.08	77.34
66.34	77.3	68.6	77.27	75.39	77.09	77.65	77.06	79.92	77.04
82.18	77	86.71	76.94	93.5	76.73	95.76	76.69	98.03	76.66
100.29	76.61	102.55	76.58	104.82	76.57	107.08	76.53	109.34	76.53
111.6	76.52	113.87	76.45	116.65	76.41	120.65	76.36	122.92	76.31
127.45	76.33	129.71	76.31	134.41	76.29	136.5	76.27	143.29	76.15
145.55	76.12	146.25	76.13	147.82	76.13	150.08	76.09	152.34	76.08
154.6	76.11	156.87	76.12	159.13	76.1	161.4	76.03	165.93	76.01
168.19	75.97	169.93	75.97	170.45	75.98	175.85	75.98	177.24	75.99
181.75	76.01	181.77	76.02	184.03	76.02	186.29	76.01	188.55	76.04
190.82	76.02	193.08	76.06	195.34	76.04	199.52	76.06	199.87	76.05
202.14	76.11	204.4	76.08	206.67	76.02	211.19	75.96	213.45	75.96
217.98	75.9	220.24	75.92	222.51	75.92	223.2	75.93	227.03	75.96
229.29	75.97	231.56	75.93	235.04	75.89	238.35	75.8	240.96	75.77
242.88	75.6	245.14	75.45	246.88	75.42	247.4	75.37	249.67	75.12
251.93	74.73	252.8	74.57	254.19	74.29	256.46	73.77	258.72	73.21
261.43	72.13	262.85	71.55	264.15	70.98	266.97	69.68	269.58	68.5
269.9968.27072		271.1	67.65	272.29	67.24	275.23	66.06	277.73	65.41
279.35	64.47	280.44	63.87	283.16	62.05	285.88	60.39	291.3	57.79
291.94	57.45	294.02	56.53	296.74	55.22	299.45	54.05	302.16	53.2
304.52	51.86	305.1851.53154		308.8	49.73	317.1	48.14	326.14	49.06
328.29	49.21	335.17	49.84	339.49	50.26	344.21	50.38	350.68	50.44
353.25	50.51	361.87	50.6	362.28	50.61	371.32	51.05	373.07	51.12
380.36	51.24	384.26	51.38	389.39	51.6	395.45	51.79	398.43	51.86
406.64	52.18	407.47	52.23	416.5	52.88	417.84	52.94	425.54	53.38
426.67	55.63	427.7655.71613		430.34	55.92	434	56.81	434.58	56.96
437.67	57.57	441.34	57.8	443.61	57.78	445.01	57.82	448.67	58.06
456.02	58.56	459.68	58.57	461.69	58.58	463.35	58.49	467.02	58.35
470.69	58.1	470.73	58.09	474.35	58.9	475.33	60.56	476.5160.72231	
478.02	60.93	478.28	60.98	481.24	61.85	481.69	61.95	484.2	62.61
485.36	62.74	487.15	62.98	489.03	63.17	492.7	63.68	493.07	63.72
496.37	64.19	498.98	64.44	501.94	64.89	503.7	65.2	504.9	65.4
507.37	65.88	507.86	65.99	510.81	66.62	513.77	67.42	514.7	67.61
516.73	67.92	518.37	68.09	522.04	68.26	525.61	68.66	528.56	68.96
529.38	69.09	531.52	69.34	533.05	69.56	534.47	69.73	537.43	70.06
540.39	70.36	542.6	70.46	544.82	70.44	546.67	70.45	549.25	70.4
551.47	70.26	552.94	70.18	553.68	70.15	555.9	70.16	559.24	70.19
560.33	70.21	562.55	70.21	564.77	70.18	566.98	70.2	569.19	70.26
571.41	70.41	573.63	70.5	575.84	70.62	578.06	70.71	580.28	70.76
582.5	70.77	584.71	70.75	586.92	70.8	589.14	70.94	591.35	71.03
593.57	71.07	595.79	71.05	600.22	71.13	602.44	71.14	604.65	71.2
606.87	71.28	609.48	71.23	611.3	71.23	613.52	71.32	615.75	71.47
617.95	71.78	620.16	72.01	622.03	72.15	624.59	72.35	626.81	72.5
629.03	72.71	631.25	73.01	633.46	73.05	635.68	72.95	637.89	72.98
640.1	73.13	640.87	73.2	644.53	73.4	646.75	73.31	647.15	73.27
648.96	72.99	651.18	72.69	653.4	72.46	655.61	72.43	657.83	72.5
660.04	72.54	662.26	72.55	664.47	72.55	666.68	72.59	668.9	72.67
671.11	72.69	673.33	72.73	675.54	72.81	677.76	72.86	679.98	72.9
684.41	72.92	684.84	72.93	686.62	72.92	688.84	72.93	691.05	73.01
691.12	73	693.27	72.99	695.48	72.95	697.69	72.96	699.91	73
702.13	72.96	704.34	72.91	706.56	72.97	708.77	72.98	710.99	72.94
713.21	73.02	715.42	73.08	717.63	73.05	719.85	73.05	722.53	73.06
726.49	73.13	730.92	73.03	733.14	73.02	735.08	73.03	735.35	73.02
737.57	73.04	739.79	73.03	746.43	73.09	748.64	73.05	750.86	73.08
753.93	73.01	755.29	73	757.5	73.03	760.2	73.03	761.94	72.99
766.37	73.03	768.58	73.02	770.79	72.99	772.77	72.97	773.01	72.96
775.22	72.98	777.44	72.99	779.65	72.99	781.87	72.98	784.08	72.92
786.3	72.87	788.52	72.86	790.73	72.83	792.95	72.81	795.16	72.9
797.37	72.87	797.89	72.87	801.8	72.91	806.23	72.93	808.45	72.88
810.67	72.89	812.88	72.91	815.1	72.9	816.74	72.85	819.53	72.78
821.74	72.83	823.95	72.85	828.38	72.93	830.6	72.9	832.82	72.91
837.25	72.89	839.46	72.87	841.68	72.89	843.89	72.88	848.14	72.79
850.54	72.8	852.75	72.82	857.18	72.82	859.4	72.84	861.61	72.81
863.83	72.77	866.04	72.74	868.26	72.7	870.48	72.65	872.69	72.63
874.9	72.63	877.12	72.62	879.33	72.58	881.55	72.57	885.98	72.53
888.19	72.57	890.41	72.56	892.63	72.54	894.84	72.58	897.06	72.59
899.27	72.57	901.48	72.47	903.7	72.49	905.91	72.54	908.13	72.55
910.34	72.49	912.56	72.47	914.77	72.49	917.22	72.46	919.21	72.42
921.42	72.44	925.85	72.42	928.06	72.42	930.28	72.41	932.49	72.37
934.71	72.34	936.92	72.33	939.14	72.34	941.36	72.37	942.34	72.39
943.57	72.4	948	72.34	950.22	72.38	952.43	72.43	954.64	72.42
954.89	72.41	956.86	72.4	959.07	72.41	961.19	72.4	963.5	72.42

965.72	72.4	967.94	72.36	970.15	72.36	972.37	72.37	974.58	72.32
976.8	72.3	979.01	72.35	981.23	72.37	983.44	72.33	985.65	72.28
987.87	72.3	990.09	72.34	992.3	72.33	992.59	72.32	994.52	72.33
996.73	72.35	998.86	72.36	1001.17	72.36	1003.38	72.38	1005.16	72.32
1007.81	72.26	1012.23	72.3	1014.45	72.3	1016.67	72.28	1018.88	72.27
1023.31	72.29	1025.53	72.25	1027.75	72.24	1030.28	72.26	1032.17	72.23
1034.39	72.23	1036.55	72.21	1036.6	72.22	1038.82	72.22	1041.03	72.23
1043.25	72.19	1045.46	72.18	1047.68	72.19	1049.9	72.21	1054.33	72.13
1055.4	72.1	1056.54	72.09	1058.75	72.1	1060.97	72.16	1063.18	72.21
1065.4	72.25	1067.95	72.32	1069.83	72.43	1072.04	72.6	1074.24	72.9
1076.48	73.3	1078.69	73.65	1080.52	73.84	1083.12	74.14	1085.33	74.57
1086.79	74.96	1087.55	75.15	1089.76	75.92	1091.98	76.81	1093.07	77.26
1094.19	77.68	1096.41	78.72	1098.63	79.47	1099.36	79.61	1100.84	79.84
1103.06	79.96	1105.27	79.99	1105.64	80.02	1107.49	80.13	1109.7	80.21
1111.92	80.21	1113.55	80.19	1115.19	80.12	1116.82	80	1118.46	79.85
1120.1	79.59	1121.73	79.19	1123.37	78.6	1125.01	78.18	1126.65	78.11

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.044	258.72	.066	291.3	.025	427.76	.066	540.39	.075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
258.72	540.39	1874.31	1742.61 1664.76	.1	.3

Left Levee Station= 27.86 Elevation= 81.61
Right Levee Station=1111.915 Elevation= 80.215

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.8

INPUT
Description: RGV-02, New Cross-section, Begin Wall, Bathymetric elevations
translated from IBWC 2008 120.7 Cross-section
Station Elevation Data num= 269

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	79.71	3.27	80.35	6.55	80.79	9.82	81.02	13.09	81.16
16.36	81.19	19.64	81.1	22.91	81.11	26.18	81.18	29.45	80.82
32.73	80.14	36	79.19	39.27	78.19	42.55	77.17	45.82	76.19
49.09	75.22	52.36	74.35	55.64	73.89	58.91	73.69	62.18	73.59
65.45	73.48	68.73	73.36	72	73.34	75.27	73.34	78.54	73.29
81.82	73.26	85.09	73.23	88.36	73.27	91.64	73.34	94.91	73.36
101.45	73.42	104.73	73.38	108	73.31	111.27	73.27	114.54	73.27
117.82	73.31	121.09	73.29	124.36	73.28	127.64	73.32	130.91	73.32
134.18	73.39	137.45	73.43	140.73	73.38	144	73.38	147.27	73.39
150.54	73.4	153.82	73.36	157.09	73.4	160.36	73.45	163.63	73.44
166.91	73.43	170.18	73.43	173.45	73.42	176.73	73.36	180	73.32
183.27	73.26	186.54	73.22	189.82	73.28	193.09	73.26	196.36	73.28
199.63	73.35	202.91	73.37	206.18	73.34	209.45	73.23	212.73	73.23
216	73.25	219.27	73.2	222.54	73.25	225.82	73.26	229.09	73.26
232.36	73.29	235.63	73.33	238.91	73.36	242.18	73.36	245.45	73.33
248.72	73.37	252	73.32	255.27	73.39	258.54	73.33	261.82	73.33
265.09	73.32	268.36	73.45	271.63	73.39	274.91	73.3	278.18	73.3
281.45	73.28	284.72	73.3	288	73.26	291.27	73.21	294.54	73.22
297.82	73.21	304.36	73.27	307.63	73.29	310.91	73.33	314.18	73.4
317.45	73.5	320.72	73.61	324	73.78	327.27	73.99	330.54	74.3
333.81	74.85	337.09	75.35	340.36	75.56	343.63	75.73	346.91	75.8
350.18	75.78	353.45	75.73	356.72	75.65	360	75.48	363.27	75.32
366.54	74.57	369.81	73.47	373.09	72.19	376.36	70.54	379.63	68.27
382.91	66.3	386.18	65.07	389.45	63.82	392.72	62.26	396	60.48
399.27	58.99	402.54	58.46	402.54	58.13	404.54	56.76	410.54	52.64
420.54	50.84	430.54	51.64	440.54	51.84	450.54	52.14	460.54	52.14
470.54	51.84	480.54	51.84	490.54	51.64	500.54	51.84	510.54	51.84
520.54	52.14	530.54	52.64	540.54	52.64	550.54	53.14	560.54	52.84
570.54	53.14	580.54	53.84	590.54	53.34	595.63	55.64	595.63	56.74
595.63	58.13	595.63	58.46	598.9	59.24	602.18	60.73	605.45	61.83
608.72	62.04	611.99	62.01	615.27	61.99	618.54	62.06	621.81	62.29
625.08	62.82	628.36	63.47	631.63	64.29	634.9	65.07	638.17	66.05
641.45	66.62	644.72	66.86	647.99	67.09	651.27	67.23	654.54	67.4
657.81	67.87	661.08	68.48	664.36	69.05	667.63	69.5	670.9	69.52
674.17	69.31	677.45	69.22	680.72	69.28	683.99	69.32	687.26	69.29
690.54	69.24	693.81	69.25	697.08	69.23	700.36	69.16	703.63	69.18
706.9	69.52	710.17	70.29	713.45	71.24	716.72	72.26	719.99	73.32
723.26	73.95	726.54	73.87	729.81	73.78	733.08	73.79	736.36	73.79
739.63	73.82	742.9	73.83	746.17	73.78	749.45	73.8	752.72	73.8
755.99	73.82	759.26	73.86	762.54	73.94	765.81	74.06	769.08	74.17
772.35	74.15	775.63	74.18	778.9	74.17	782.17	74.24	785.45	74.23
788.72	74.17	791.99	74.15	795.26	74.09	798.54	74.08	801.81	74.05
805.08	74.09	808.35	74.11	811.63	74.21	814.9	74.29	818.17	74.31
821.44	74.4	824.72	74.37	827.99	74.42	831.26	74.44	834.53	74.42
837.81	74.38	841.08	74.25	844.35	74.17	847.63	74.18	850.9	74.2
854.17	74.23	857.44	74.23	860.72	74.27	863.99	74.2	867.26	74.07
870.53	74.01	873.81	74.09	877.08	74.18	880.35	74.16	883.62	74.15
886.9	74.12	890.17	74.21	893.44	74.15	896.72	74.15	899.99	74.14
903.26	74.11	906.53	74.13	909.81	74.14	913.08	74.12	916.35	74.1
919.62	74.02	922.9	73.95	926.17	73.88	929.44	73.94	932.71	73.8
935.99	73.57	939.26	73.66	942.53	74.02	945.81	74.78	949.08	76.1
952.35	77.69	955.62	79.05	958.9	79.83	962.17	80.09	965.44	80.11
968.71	80.06	971.99	79.91	975.26	79.68	978.53	79.37	981.81	78.86
985.08	78.07	988.35	76.89	991.62	76.05	994.9	75.9		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.044	350.18	.066	402.54	.025	595.63	.066	667.63	.075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
350.18	667.63	249.26	264.4 279.46	.1	.3

Left Levee Station= 16.36 Elevation= 81.19
Right Levee Station= 965.44 Elevation= 80.11
Blocked Obstructions num= 1

Sta L	Sta R	Elev
14.13	347.28	75.81

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.75	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.13	Wt. n-Val.	0.044	0.044	0.075	
W.S. Elev (ft)	77.62	Reach Len. (ft)	249.26	264.40	279.46	
Crit W.S. (ft)	59.47	Flow Area (sq ft)	553.26	6250.21	1217.39	
E.G. Slope (ft/ft)	0.000154	Area (sq ft)	553.26	6250.21	1217.39	
Q Total (cfs)	20000.00	Flow (cfs)	341.45	18872.76	785.79	

Top Width (ft)	911.09	Top Width (ft)	309.07	317.45	284.57		
Vel Total (ft/s)	2.49	Avg. Vel. (ft/s)	0.62	3.02	0.65		
Max Chl Dpth (ft)	26.78	Hydr. Depth (ft)	1.79	19.69	4.28		
Conv. Total (cfs)	1612499.0	Conv. (cfs)	27529.2	1521615.0	63354.5		
Length Wtd. (ft)	264.63	Wetted Per. (ft)	309.35	328.17	285.96		
Min Ch El (ft)	50.84	Shear (lb/sq ft)	0.02	0.18	0.04		
Alpha	1.39	Stream Power (lb/ft s)	0.01	0.55	0.03		
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	10228.22	7440.97	2493.64		
C & E Loss (ft)	0.00	Cum SA (acres)	2732.88	412.48	832.80		

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.7

INPUT
Description: RGV-02, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 262

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	74.05	3.27	74.24	6.54	74.55	9.81	75.15	13.08	75.71
16.35	76.14	19.62	76.67	22.89	77.4	26.16	78.31	29.43	79.37
32.7	80.45	35.97	81.05	39.24	81.31	42.51	81.41	45.78	81.4
49.05	81.4	52.32	81.05	55.59	80.28	58.86	79.32	62.13	78.31
65.4	77.37	68.67	76.67	71.95	76.05	75.22	75.49	78.49	74.99
81.76	74.37	85.03	73.94	88.3	73.57	91.57	73.31	94.84	73.15
98.11	73.2	101.38	73.23	104.65	73.2	107.92	73.14	111.19	73.22
114.46	73.3	117.73	73.27	121	73.29	124.27	73.38	127.54	73.42
130.81	73.4	134.08	73.41	137.35	73.41	140.62	73.4	143.89	73.44
147.16	73.49	150.43	73.47	153.7	73.44	156.97	73.43	160.24	73.43
163.51	73.45	166.78	73.46	170.05	73.44	173.32	73.51	176.59	73.52
179.86	73.53	186.4	73.53	189.67	73.5	192.94	73.44	196.21	73.41
199.48	73.39	206.02	73.33	209.29	73.36	212.56	73.4	215.83	73.46
219.11	73.45	222.38	73.34	225.65	73.32	228.92	73.34	232.19	73.37
235.46	73.44	238.73	73.43	242	73.39	245.27	73.47	248.54	73.53
251.81	73.54	255.08	73.45	258.35	73.4	261.62	73.44	264.89	73.52
271.43	73.46	274.7	73.46	277.97	73.49	281.24	73.47	284.51	73.43
287.78	73.46	291.05	73.45	294.32	73.39	297.59	73.33	300.86	73.36
304.13	73.36	307.4	73.44	310.67	73.43	313.94	73.42	317.21	73.38
320.48	73.35	323.75	73.36	327.02	73.38	330.29	73.49	333.56	73.66
336.83	73.96	340.1	74.39	343.37	74.64	346.64	74.87	349.91	75.33
353.18	75.61	356.45	75.67	359.72	75.67	362.99	75.57	366.27	75.34
369.54	75.14	372.81	74.99	376.08	74.82	379.35	74.61	382.62	74.37
385.89	74.11	389.16	73.39	392.43	72.13	395.7	70.64	398.97	68.45
402.24	65.92	405.51	63.3	408.78	60.44	412.05	58.51	412.05	58.13
414.05	56.76	420.05	52.64	430.05	50.84	440.05	51.64	450.05	51.84
460.05	52.14	470.05	52.14	480.05	51.84	490.05	51.84	500.05	51.64
510.05	51.84	520.05	51.84	530.05	52.14	540.05	52.64	550.05	52.64
560.05	53.14	570.05	52.84	580.05	53.14	590.05	53.84	595.18	53.34
595.18	55.64	595.18	56.74	595.18	58.13	595.18	58.47	598.45	58.79
601.72	60.03	604.99	61.28	608.26	62.18	611.53	62.72	614.8	62.99
618.07	63.03	621.34	63.14	624.61	63.3	627.89	63.25	631.16	63.11
634.43	63.12	637.7	63.31	640.97	63.5	644.24	63.77	647.51	64.14
650.78	64.5	654.05	65.05	657.32	65.63	660.59	65.82	663.86	66.12
667.13	66.48	670.4	66.94	673.67	67.49	676.94	68.05	680.21	68.71
683.48	69.28	686.75	69.61	690.02	69.79	693.29	69.92	696.56	69.74
699.83	69.51	703.1	69.49	706.37	69.65	709.64	69.92	712.91	70.37
716.18	70.85	719.46	71.3	722.73	71.71	726	72.07	729.27	72.34
732.54	72.59	735.81	72.74	739.08	72.82	742.35	72.9	745.62	72.99
748.89	73.02	752.16	73.04	755.43	73.14	758.7	73.29	761.97	73.44
765.24	73.47	768.51	73.52	771.78	73.64	775.05	73.65	778.32	73.63
781.59	73.69	784.86	73.84	788.13	73.92	791.4	73.98	794.67	74.07
797.94	74.18	801.21	74.3	804.48	74.41	807.75	74.49	811.03	74.54
814.3	74.5	817.57	74.45	820.84	74.54	824.11	74.56	827.38	74.6
830.65	74.67	833.92	74.52	837.19	74.24	840.46	74.18	843.73	74.13
847	74.21	850.27	74.19	853.54	74.24	856.81	74.24	860.08	74.28
863.35	74.34	866.62	74.35	869.89	74.4	873.16	74.47	876.43	74.55
879.7	74.67	882.97	74.76	886.24	74.87	889.51	75	892.78	75.23
896.05	75.51	899.33	75.72	902.6	75.94	905.87	76.13	909.14	76.46
912.41	76.81	915.68	77.05	918.95	77.32	922.22	77.65	925.49	77.95
928.76	78.12	932.03	78.31	935.3	78.44	938.57	78.41	941.84	78.32
945.11	78.27	948.38	78.18	951.65	77.95	954.92	77.72	958.19	77.55
961.46	77.42	964.73	77.22						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.044	362.99	.066	412.05	.025	595.18	.066	693.29	.075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
362.99	693.29	517.73	423.08	373.07	.1	.3

Left Levee Station= 42.51 Elevation= 81.41
Right Levee Station= 935.3 Elevation= 78.44
Blocked Obstructions num= 1

Sta L	Sta R	Elev
44.74	356.73	75.66

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.71	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.14	Wt. n-Val.	0.044	0.046	0.075	
W.S. Elev (ft)	77.57	Reach Len. (ft)	517.73	423.08	373.07	
Crit W.S. (ft)	59.62	Flow Area (sq ft)	560.37	6203.93	871.60	
E.G. Slope (ft/ft)	0.000187	Area (sq ft)	560.37	6203.93	871.60	
Q Total (cfs)	20000.00	Flow (cfs)	394.08	19029.01	576.91	
Top Width (ft)	856.68	Top Width (ft)	298.27	330.30	228.10	
Vel Total (ft/s)	2.62	Avg. Vel. (ft/s)	0.70	3.07	0.66	
Max Chl Dpth (ft)	26.73	Hydr. Depth (ft)	1.88	18.78	3.82	
Conv. Total (cfs)	1461636.0	Conv. (cfs)	28800.2	1390675.0	42161.5	
Length Wtd. (ft)	423.45	Wetted Per. (ft)	298.47	343.67	228.47	
Min Ch El (ft)	50.84	Shear (lb/sq ft)	0.02	0.21	0.04	
Alpha	1.31	Stream Power (lb/ft s)	0.02	0.65	0.03	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	10225.03	7403.17	2486.94	
C & E Loss (ft)	0.00	Cum SA (acres)	2731.14	410.52	831.15	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.62

INPUT
Description: RGV-02, Original IBWC Cross-section data applied to this section
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.98	10.5	82.09	17	82.14	23	79.94	24	79.54
38	75.44	53.4	75.37	54.7	75.36	83.4	75.22	84.7	75.21
100	75.14	113.4	75.26	114.7	75.27	143.4	75.53	144.7	75.55
166	75.74	173.4	75.86	174.7	75.88	184	76.04	200	76.04
204	76.15	207	76.23	211	76.34	217	71.74	222	69.94
230	63.54	238	57.8	239.3	56.66	240	56.04	250	51.44
260	47.84	270	46.54	280	46.64	290	47.44	300	47.84
320	49.44	330	50.84	340	51.04	350	50.24	360	50.24
370	52.04	376	52.76	380	53.24	390	52.84	400	54.84
420	56.84	430	57.8	457	60.94	476	63.54	478	66.34
500	67.94	548	73.74	549	73.76	552	73.84	562	74.09
583.9	74.64	585.2	74.67	600	75.04	617.4	75.78	618.7	75.83
640	76.74	652	79.29	656	80.14	676	81.44		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.088	166	.088	211	.066	238	.025	430	.066
548	.08								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
211 548 119.42 110 109.64 .2 .5
Left Levee Station= 0 Elevation= 81.98
Right Levee Station= 676 Elevation= 81.44

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.63	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.13	Wt. n-Val.	0.088	0.045	0.080	
W.S. Elev (ft)	77.50	Reach Len. (ft)	2.00	2.00	2.00	
Crit W.S. (ft)	58.15	Flow Area (sq ft)	346.53	6684.64	227.21	
E.G. Slope (ft/ft)	0.000159	Area (sq ft)	346.53	6684.64	227.21	
Q Total (cfs)	20000.00	Flow (cfs)	115.24	19789.99	94.77	
Top Width (ft)	612.58	Top Width (ft)	180.02	337.00	95.56	
Vel Total (ft/s)	2.76	Avg. Vel. (ft/s)	0.33	2.96	0.42	
Max Chl Dpth (ft)	30.96	Hydr. Depth (ft)	1.92	19.84	2.38	
Conv. Total (cfs)	1585121.0	Conv. (cfs)	9133.8	1568477.0	7510.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)	180.33	348.38	95.69	
Min Ch El (ft)	46.54	Shear (lb/sq ft)	0.02	0.19	0.02	
Alpha	1.14	Stream Power (lb/ft s)	0.01	0.56	0.01	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	10219.64	7340.58	2482.24	
C & E Loss (ft)	0.00	Cum SA (acres)	2728.30	407.28	829.77	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE

RIVER: Rio Grande
REACH: Lower Reach RS: 120.605

INPUT
Description: Progreso

MARCH 2007 PROGRESO BRIDGE UPDATED TO
REFLECT FIELD CONDITIONS

Distance from Upstream XS = 2
Deck/Roadway Width = 106
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 27

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	81.98	81.98	24	82.54	79.54	53.4	83.52	80.52
54.7	83.57	80.57	83.4	84.53	81.53	84.7	84.58	81.58
113.4	85.54	82.54	114.7	85.58	82.58	143.4	86.54	83.54
144.7	86.59	83.59	173.4	87.55	84.55	174.7	87.6	84.6
194	88.24	85.24	194	88.24	83.29	207	88.61	83.29
376	90.11	84.76	380	90.11	84.76	549	88.61	83.33
562	88.02	83.33	562	88.02	85.02	583.9	86.8	83.8
585.2	86.73	83.73	617.4	84.93	81.93	618.7	84.86	81.86
652	83	80	656	82.78	80.14	676	81.66	81.44

Upstream Bridge Cross Section Data
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.98	10.5	82.09	17	82.14	23	79.94	24	79.54
38	75.44	53.4	75.37	54.7	75.36	83.4	75.22	84.7	75.21
100	75.14	113.4	75.26	114.7	75.27	143.4	75.53	144.7	75.55
166	75.74	173.4	75.86	174.7	75.88	184	76.04	200	76.04
204	76.15	207	76.23	211	76.34	217	71.74	222	69.94
230	63.54	238	57.8	239.3	56.66	240	56.04	250	51.44
260	47.84	270	46.54	280	46.64	290	47.44	300	47.84
320	49.44	330	50.84	340	51.04	350	50.24	360	50.24
370	52.04	376	52.76	380	53.24	390	52.84	400	54.84
420	56.84	430	57.8	457	60.94	476	63.54	478	66.34
500	67.94	548	73.74	549	73.76	552	73.84	562	74.09
583.9	74.64	585.2	74.67	600	75.04	617.4	75.78	618.7	75.83
640	76.74	652	79.29	656	80.14	676	81.44		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.088	166	.088	211	.066	238	.025	430	.066
548	.08								

Bank Sta: Left Right Coeff Contr. Expan.
211 548 .2 .5
Left Levee Station= 0 Elevation= 81.98
Right Levee Station= 676 Elevation= 81.44

```
Downstream  Deck/Roadway Coordinates
    num=      27
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   81.98   81.98      24   82.54   79.54    53.4   83.52   80.52
    54.7   83.57   80.57    83.4   84.53   81.53    84.7   84.58   81.58
   113.4   85.54   82.54   114.7   85.58   82.58   143.4   86.54   83.54
   144.7   86.59   83.59   173.4   87.55   84.55   174.7    87.6    84.6
     194   88.24   85.24     194   88.24   83.29     207   88.61   83.29
     376   90.11   84.76     380   90.11   84.76     549   88.61   83.33
     562   88.02   83.33     562   88.02   85.02   583.9    86.8    83.8
   585.2   86.73   83.73   617.4   84.93   81.93   618.7   84.86   81.86
     652      83      80     656   82.78   80.14     676   81.66   81.44

Downstream Bridge Cross Section Data
Station Elevation Data    num=      64
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.98    10.5   82.09      17   82.14      23   79.94      24   79.54
      38   75.44    53.4   75.37    54.7   75.36    83.4   75.22    84.7   75.21
     100   75.14   113.4   75.26   114.7   75.27   143.4   75.53   144.7   75.55
     166   75.74   173.4   75.86   174.7   75.88     184   76.04     200   76.04
     204   76.15     207   76.23     211   76.34     217   71.74     222   69.94
     230   63.54     238    57.8   239.3   56.66     240   56.04     250   51.44
     260   47.84     270   46.54     280   46.64     290   47.44     300   47.84
     320   49.44     330   50.84     340   51.04     350   50.24     360   50.24
     370   52.04     376   52.76     380   53.24     390   52.84     400   54.84
     420   56.84     430    57.8     457   60.94     476   63.54     478   66.34
     500   67.94     548   73.74     549   73.76     552   73.84     562   74.09
   583.9   74.64   585.2   74.67     600   75.04   617.4   75.78   618.7   75.83
     640   76.74     652   79.29     656   80.14     676   81.44

Manning's n Values        num=      6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .104     166    .104     211    .066     238    .025     430    .066
     548     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          211     548            .2       .5
Left Levee      Station=       0      Elevation=   81.98
Right Levee     Station=     676      Elevation=   81.44

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  10

Pier Data
Pier Station     Upstream=      43    Downstream=      43
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   80.93
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   80.93

Pier Data
Pier Station     Upstream=      90    Downstream=      90
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   81.94
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   81.94

Pier Data
Pier Station     Upstream=     139    Downstream=     139
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3      84
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3      84

Pier Data
Pier Station     Upstream=     191    Downstream=     191
Upstream     num=       2
    Width   Elev    Width   Elev
       4      40       4      86
Downstream     num=       2
    Width   Elev    Width   Elev
       4      40       4      86

Pier Data
Pier Station     Upstream=     301    Downstream=     301
Upstream     num=       2
    Width   Elev    Width   Elev
       4      40       4   84.96
Downstream     num=       2
    Width   Elev    Width   Elev
       4      40       4   84.96

Pier Data
Pier Station     Upstream=     412    Downstream=     412
Upstream     num=       2
    Width   Elev    Width   Elev
       4      40       4      85
Downstream     num=       2
    Width   Elev    Width   Elev
       4      40       4      85

Pier Data
Pier Station     Upstream=     462    Downstream=     462
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   85.12
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   85.12
```

Pier Data
Pier Station Upstream= 511 Downstream= 511
Upstream num= 2
Width Elev Width Elev
3 40 3 83.69
Downstream num= 2
Width Elev Width Elev
3 40 3 83.69

Pier Data
Pier Station Upstream= 557 Downstream= 557
Upstream num= 2
Width Elev Width Elev
3 40 3 84.16
Downstream num= 2
Width Elev Width Elev
3 40 3 84.16

Pier Data
Pier Station Upstream= 598 Downstream= 598
Upstream num= 2
Width Elev Width Elev
3 40 3 84
Downstream num= 2
Width Elev Width Elev
3 40 3 84

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.59

INPUT
Description: RGV-02, Original IBWC Cross-section data applied to this section
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.98	10.5	82.09	17	82.14	23	79.94	24	79.54
38	75.44	53.4	75.37	54.7	75.36	83.4	75.22	84.7	75.21
100	75.14	113.4	75.26	114.7	75.27	143.4	75.53	144.7	75.55
166	75.74	173.4	75.86	174.7	75.88	184	76.04	200	76.04
204	76.15	207	76.23	211	76.34	217	71.74	222	69.94
230	63.54	238	57.8	239.3	56.66	240	56.04	250	51.44
260	47.84	270	46.54	280	46.64	290	47.44	300	47.84
320	49.44	330	50.84	340	51.04	350	50.24	360	50.24
370	52.04	376	52.76	380	53.24	390	52.84	400	54.84
420	56.84	430	57.8	457	60.94	476	63.54	478	66.34
500	67.94	548	73.74	549	73.76	552	73.84	562	74.09
583.9	74.64	585.2	74.67	600	75.04	617.4	75.78	618.7	75.83
640	76.74	652	79.29	656	80.14	676	81.44		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.104	166	.104	211	.066	238	.025	430	.066
548	.06								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
211 548 604.8 598 590.27 .2 .5
Left Levee Station= 0 Elevation= 81.98
Right Levee Station= 676 Elevation= 81.44

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.104	0.045	0.060
W.S. Elev (ft)	77.46	Reach Len. (ft)	604.80	598.00	590.27
Crit W.S. (ft)	58.15	Flow Area (sq ft)	339.81	6672.06	223.64
E.G. Slope (ft/ft)	0.000160	Area (sq ft)	339.81	6672.06	223.64
Q Total (cfs)	20000.00	Flow (cfs)	94.73	19781.71	123.56
Top Width (ft)	612.28	Top Width (ft)	179.90	337.00	95.39
Vel Total (ft/s)	2.76	Avg. Vel. (ft/s)	0.28	2.96	0.55
Max Chl Dpth (ft)	30.92	Hydr. Depth (ft)	1.89	19.80	2.34
Conv. Total (cfs)	1580816.0	Conv. (cfs)	7487.7	1563562.0	9766.3
Length Wtd. (ft)	597.88	Wetted Per. (ft)	180.20	348.38	95.51
Min Ch El (ft)	46.54	Shear (lb/sq ft)	0.02	0.19	0.02
Alpha	1.14	Stream Power (lb/ft s)	0.01	0.57	0.01
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	10218.84	7324.41	2481.72
C & E Loss (ft)	0.00	Cum SA (acres)	2727.88	406.46	829.54

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.5

INPUT
Description: RGV-02, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 303

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.44	3.26	77.52	6.53	77.59	9.79	77.64	13.05	77.68

16.32	77.97	19.58	78.86	22.84	80.03	26.11	80.69	29.37	80.99
35.9	80.99	39.16	80.94	42.42	80.78	45.69	80.25	48.95	79.38
52.21	78.35	55.48	77.38	58.74	76.4	62	75.44	65.27	74.52
68.53	73.82	71.8	73.42	75.06	73.23	78.32	73.2	81.59	73.13
84.85	73.03	88.11	72.71	91.38	72.31	94.64	72.15	97.9	72.13
101.17	72.13	104.43	72.12	107.69	72.1	110.96	71.91	114.22	71.56
117.48	71.11	120.75	70.49	124.01	69.72	127.27	69.06	130.54	68.44
133.8	68.03	137.06	67.83	140.33	67.76	143.59	67.87	146.85	68.07
150.12	68.17	153.38	68.22	156.64	68.25	159.91	68.25	163.17	68.26
166.43	68.26	169.7	68.23	172.96	68.28	176.22	68.3	179.49	68.26
182.75	68.24	186.01	68.23	189.28	68.23	192.54	68.17	195.8	68.05
199.07	68.11	202.33	68.12	205.59	68.13	208.86	68.19	212.12	68.17
215.39	68.23	218.65	68.29	221.91	68.33	225.18	68.37	228.44	68.38
231.7	68.31	234.97	68.28	238.23	68.29	241.49	68.28	244.76	68.38
248.02	68.47	251.28	68.59	254.55	68.73	257.81	68.94	261.07	69.19
264.34	69.39	267.6	69.61	270.86	69.88	274.13	70.2	277.39	70.46
280.65	70.78	283.92	71.15	287.18	71.44	290.44	71.7	293.71	72.03
296.97	72.33	300.23	72.62	303.5	72.97	306.76	73.28	310.02	73.52
313.29	73.58	316.55	73.6	319.81	73.68	323.08	73.82	326.34	74.08
329.6	74.3	332.87	74.27	336.13	74.47	339.39	74.7	342.66	75.79
345.92	76.17	349.19	75.61	352.45	73.59	355.71	71.68	358.98	70.44
362.24	70.05	365.5	70.01	368.77	69.96	372.03	69.87	375.29	70.03
378.56	70.25	381.82	70.46	385.08	70.53	388.35	70.53	391.61	70.46
394.87	69.22	398.14	66.85	401.4	64.09	404.66	61.09	407.93	58.96
411.19	58.44	412.19	57.77	422.19	55.17	432.19	52.97	442.19	52.57
452.19	51.77	462.19	51.77	472.19	52.07	482.19	52.57	492.19	53.57
502.19	53.77	512.19	54.07	522.19	53.17	532.19	53.37	542.19	53.77
552.19	54.07	562.19	55.17	572.19	55.17	582.19	55.57	592.19	55.57
593.93	58.51	597.19	59.37	600.46	60.66	603.72	61.98	606.98	63.3
610.25	64.46	613.51	64.26	616.77	64.3	620.03	64.2	623.3	63.81
626.56	63.29	629.82	62.96	633.08	62.93	636.35	62.83	639.61	62.65
642.87	62.37	646.13	62.09	649.4	62.11	652.66	62.29	655.92	62.6
659.18	63.16	662.45	64.04	665.71	65.26	668.97	66.66	672.24	67.66
675.5	68.32	678.76	68.95	682.02	69.29	685.29	69.44	688.55	69.6
691.81	69.69	695.07	69.7	698.34	69.88	701.6	70.12	708.12	70.32
711.39	70.52	714.65	70.73	717.91	71.12	721.18	71.62	724.44	71.95
727.7	72.15	730.96	72.71	734.23	73.2	737.49	73.41	740.75	73.43
744.01	72.92	747.28	72.73	750.54	72.64	753.8	72.63	757.06	72.69
760.33	72.71	763.59	72.65	766.85	72.57	770.11	72.47	773.38	72.42
776.64	72.43	779.9	72.35	783.17	72.24	786.43	72.24	789.69	72.3
792.95	72.33	796.22	72.35	799.48	72.38	802.74	72.43	806	72.49
809.27	72.56	812.53	72.63	815.79	72.68	819.05	72.77	822.32	72.84
825.58	72.87	828.84	72.94	832.1	72.98	835.37	73.04	838.63	73.1
841.89	73.13	845.16	73.15	848.42	73.21	851.68	73.23	854.94	73.3
858.21	73.36	861.47	73.43	864.73	73.41	867.99	73.45	871.26	73.52
874.52	73.52	877.78	73.51	881.04	73.52	884.31	73.55	887.57	73.63
890.83	73.6	894.09	73.61	897.36	73.66	900.62	73.71	903.88	73.74
907.15	73.72	910.41	73.72	913.67	73.73	916.93	73.74	920.2	73.74
923.46	73.77	926.72	73.83	929.98	73.86	933.25	73.88	939.77	73.88
943.03	73.87	946.3	73.84	949.56	73.84	952.82	73.91	956.08	73.88
959.35	73.88	962.61	73.86	965.87	73.88	969.14	73.85	972.4	73.89
975.66	73.87	978.92	73.89	982.19	73.89	985.45	73.86	988.71	73.9
991.97	73.91	995.24	73.95	998.5	73.97	1001.76	73.95	1005.02	73.96
1008.29	73.96	1011.55	73.94	1014.81	73.85	1018.07	73.78	1021.34	73.71
1024.6	73.61	1027.86	73.54	1031.13	73.54	1034.39	73.58	1037.65	73.67
1040.91	73.77	1044.18	73.87	1047.44	74.03	1053.96	74.67	1057.23	75
1060.49	75.39	1063.75	75.9	1067.01	76.49	1070.28	76.99	1073.54	77.4
1076.8	78.01	1080.06	78.77	1083.33	79.71	1086.59	80.41	1089.85	80.95
1093.11	81.3	1096.38	81.42	1099.64	81.47	1102.9	81.54	1106.17	81.62
1109.43	81.69	1112.69	81.72	1115.95	81.72				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.159	345.92	.066	394.87	.025	593.93	.066	701.6	.076

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
391.61	701.6	318.1	268.58 237.07	.1	.3

Left Levee Station= 35.9 Elevation= 80.99
Right Levee Station= 1093.11 Elevation= 81.3
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
31.14	345.08	76.11	741.09	1167.3	73.43

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.080	0.042	0.076
W.S. Elev (ft)	77.35	Reach Len. (ft)	318.10	268.58	237.07
Crit W.S. (ft)	61.04	Flow Area (sq ft)	638.84	5914.36	1408.76
E.G. Slope (ft/ft)	0.000164	Area (sq ft)	638.84	5914.36	1408.76
Q Total (cfs)	20000.00	Flow (cfs)	317.56	18825.49	856.96
Top Width (ft)	1017.53	Top Width (ft)	336.02	309.99	371.52
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	0.50	3.18	0.61
Max Chl Dpth (ft)	25.58	Hydr. Depth (ft)	1.90	19.08	3.79
Conv. Total (cfs)	1561742.0	Conv. (cfs)	24797.0	1470027.0	66917.4
Length Wtd. (ft)	267.69	Wetted Per. (ft)	337.66	318.73	372.01
Min Ch El (ft)	51.77	Shear (lb/sq ft)	0.02	0.19	0.04
Alpha	1.51	Stream Power (lb/ft s)	0.01	0.60	0.02
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	10212.05	7238.02	2470.66
C & E Loss (ft)	0.00	Cum SA (acres)	2724.30	402.02	826.38

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.4

INPUT
Description: RGV-02, New Cross-section, End Wall, Bathymetric elevations
translated from IBWC 2008 120.5 Cross-section
Station Elevation Data num= 369

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.02	3.28	81.06	6.56	81.09	9.83	81.02	13.11	80.94
16.39	80.78	19.67	80.2	22.94	79.35	26.22	78.42	29.5	77.43
32.78	76.56	36.06	75.65	39.33	74.82	42.61	74.15	45.89	73.58
49.17	73.18	52.44	72.89	55.72	72.68	59	72.59	62.28	72.59
65.56	72.74	68.83	72.91	72.11	72.92	75.39	72.84	78.67	72.71
81.95	72.34	85.22	71.91	88.5	71.61	91.78	71.41	95.06	71.31

98.33	71.1	101.61	70.75	104.89	70.37	108.17	69.95	111.45	69.51
114.72	69.18	118	69	121.28	68.89	124.56	68.72	127.83	68.57
131.11	68.36	134.39	68.11	137.67	67.89	140.95	67.71	144.22	67.64
147.5	67.64	150.78	67.7	154.06	67.61	157.33	67.47	160.61	67.39
163.89	67.37	167.17	67.33	170.45	67.25	173.72	67.12	177	67.03
180.28	66.9	183.56	66.87	186.83	66.86	190.11	66.88	193.39	66.83
196.67	66.83	199.95	66.88	203.22	66.88	206.5	66.91	209.78	66.98
213.06	66.99	216.34	66.95	219.61	66.91	222.89	66.95	226.17	66.92
229.45	66.94	232.72	66.95	236	66.95	239.28	66.93	242.56	66.99
245.84	67.05	249.11	67.11	252.39	67.12	255.67	67.1	258.95	67.07
262.22	67.03	265.5	66.97	268.78	66.98	272.06	67.02	275.34	67.04
278.61	67.05	281.89	67.03	285.17	67.01	288.45	67.03	291.72	67.08
295	67.1	298.28	67.15	301.56	67.25	304.84	67.34	308.11	67.36
311.39	67.38	314.67	67.38	317.95	67.43	321.22	67.55	324.5	67.67
327.78	67.69	331.06	67.73	334.34	67.68	337.61	67.64	340.89	67.59
344.17	67.65	347.45	67.72	350.73	67.81	354	67.92	357.28	68.02
360.56	67.98	363.84	67.92	367.11	67.95	370.39	67.99	373.67	68.03
376.95	68.04	380.23	68.02	383.5	68.02	386.78	68.08	390.06	68.18
393.34	68.35	396.61	68.47	399.89	68.56	403.17	68.72	406.45	68.82
409.73	68.88	413	69.05	416.28	69.27	419.56	69.6	422.84	70.09
426.11	70.99	429.39	71.92	432.67	72.77	435.95	73.42	439.23	73.54
442.5	73.54	445.78	73.65	449.06	73.86	452.34	74.28	455.61	74.92
458.89	75.58	462.17	75.89	465.45	75.95	468.73	75.77	472	75.11
475.28	74.13	478.56	73.15	481.84	72.26	485.11	71.42	488.39	70.7
491.67	70	494.95	69.43	498.23	69.08	501.5	68.92	504.78	69.26
508.06	69.45	511.34	69.23	514.62	68.77	517.89	68.96	521.17	68.68
524.45	66.53	527.73	62.65	531	59.33	534.28	58.4	535.28	57.55
545.28	54.95	555.28	52.75	565.28	52.35	575.28	51.55	585.28	51.55
595.28	51.85	605.28	52.35	615.28	53.35	625.28	53.55	635.28	53.85
645.28	52.95	655.28	53.15	665.28	53.55	675.28	53.85	685.28	54.95
691.62	54.95	691.62	55.35	691.62	55.55	691.62	55.85	691.62	58.05
691.62	58.4	694.89	58.71	698.17	59.48	701.45	60.46	704.73	61.58
708.01	62.56	711.28	63.51	714.56	64.34	717.84	64.61	721.12	64.1
724.39	63.59	727.67	63.16	730.95	62.73	734.23	62.58	737.51	62.8
740.78	63	744.06	62.96	747.34	62.63	750.62	62.2	753.89	61.65
757.17	61.13	760.45	61.19	763.73	61.79	767.01	62.92	770.28	64.52
773.56	65.56	776.84	66.29	780.12	66.8	783.4	67.27	786.67	67.58
789.95	67.83	793.23	68.71	796.51	69.54	799.78	70.16	803.06	70.6
806.34	71.1	809.62	71.67	812.9	72.04	816.17	72.16	819.45	72.32
822.73	72.73	826.01	73.17	829.28	73.29	832.56	73.13	835.84	73.11
839.12	72.77	842.4	72.36	845.67	72.13	848.95	72.15	852.23	72.1
855.51	72	858.78	71.86	862.06	71.78	865.34	71.78	868.62	71.77
871.9	71.7	875.17	71.74	878.45	71.74	881.73	71.72	885.01	71.75
888.29	71.78	891.56	71.84	894.84	71.89	898.12	71.87	901.4	71.8
904.67	71.76	907.95	71.78	911.23	71.75	914.51	71.77	917.79	71.82
921.06	71.85	924.34	71.85	927.62	71.81	930.9	71.85	934.17	71.88
937.45	71.89	940.73	71.95	944.01	71.96	947.29	72	950.56	72.11
953.84	72.09	957.12	72.1	960.4	72.13	963.67	72.15	966.95	72.18
970.23	72.17	973.51	72.15	976.79	72.21	980.06	72.22	983.34	72.21
986.62	72.28	989.9	72.31	993.17	72.3	996.45	72.28	1003.01	72.28
1006.29	72.33	1009.56	72.3	1012.84	72.33	1016.12	72.36	1019.4	72.34
1022.68	72.35	1025.95	72.38	1029.23	72.4	1032.51	72.44	1035.79	72.45
1039.06	72.43	1042.34	72.39	1045.62	72.43	1048.9	72.44	1052.18	72.41
1055.45	72.42	1058.73	72.46	1062.01	72.44	1075.12	72.44	1078.4	72.46
1081.68	72.48	1084.95	72.48	1088.23	72.47	1091.51	72.47	1094.79	72.44
1098.06	72.44	1101.34	72.48	1104.62	72.49	1107.9	72.44	1111.18	72.45
1114.45	72.47	1117.73	72.5	1121.01	72.55	1124.29	72.54	1127.56	72.51
1130.84	72.55	1134.12	72.56	1137.4	72.54	1143.95	72.54	1147.23	72.57
1150.51	72.56	1153.79	72.55	1157.06	72.64	1160.34	72.67	1163.62	72.67
1166.9	72.73	1170.18	72.8	1173.45	72.81	1176.73	72.81	1180.01	72.85
1183.29	72.9	1186.56	72.95	1189.84	73	1196.4	73.08	1199.68	73.1
1202.95	73.14	1206.23	73.21	1212.79	73.29	1216.06	73.41	1219.34	73.6
1222.62	73.91	1225.9	74.18	1229.18	74.56	1232.45	75.09	1235.73	75.77
1239.01	76.53	1242.29	77.27	1245.57	77.93	1248.84	78.54	1252.12	79.33
1255.4	79.58	1258.68	79.6	1261.95	79.73	1265.23	79.78	1268.51	79.87
1271.79	79.99	1275.07	80.01	1278.34	80.08	1281.62	80.15	1284.9	80.17
1288.18	80.15	1291.45	80.18	1294.73	80	1298.01	79.11	1301.29	77.62
1304.57	76.12	1307.84	74.86	1311.12	74.07	1314.4	73.78		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.159	462.17	.066	535.28	.025	691.62	.066	793.23	.076

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
508.06	793.23	1776.6	1865.74 1849.12	.1	.3

Left Levee Station= 6.56 Elevation= 81.09
Right Levee Station= 1291.45 Elevation= 80.18
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
3.37	462.48	75.88	829.92	1233.28	73.31

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.44	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.16	Wt. n-Val.	0.094	0.046	0.076	
W.S. Elev (ft)	77.28	Reach Len. (ft)	1776.60	1865.74	1849.12	
Crit W.S. (ft)	61.40	Flow Area (sq ft)	846.07	5488.97	1808.83	
E.G. Slope (ft/ft)	0.000219	Area (sq ft)	846.07	5488.97	1808.83	
Q Total (cfs)	20000.00	Flow (cfs)	346.90	18330.75	1322.35	
Top Width (ft)	1212.31	Top Width (ft)	478.01	285.17	449.13	
Vel Total (ft/s)	2.46	Avg. Vel. (ft/s)	0.41	3.34	0.73	
Max Chl Dpth (ft)	25.73	Hydr. Depth (ft)	1.77	19.25	4.03	
Conv. Total (cfs)	1352470.0	Conv. (cfs)	23458.4	1239590.0	89422.2	
Length Wtd. (ft)	1859.24	Wetted Per. (ft)	479.03	295.93	449.88	
Min Ch El (ft)	51.55	Shear (lb/sq ft)	0.02	0.25	0.05	
Alpha	1.70	Stream Power (lb/ft s)	0.01	0.85	0.04	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	10206.62	7202.86	2461.90	
C & E Loss (ft)	0.02	Cum SA (acres)	2721.32	400.18	824.14	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.39*

INPUT

Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.42	7.29	76.54	9.11	76.77	14.58	77.88	23.69	80.16
27.33	80.78	32.79	81.04	40.11	80.95	41.94	79.41	43.77	76.63
45.6	75.79	58.4	75.34	67.54	74.65	69.37	74.69	74.86	75.54
80.34	76.74	82.16	76.97	96.79	76.81	105.94	76.4	113.25	76.22
126.05	75.75	138.85	75.39	159.84	74.85	168.11	74.62	173.59	74.41
180.91	74.25	184.56	74.1	191.58	73.93	197.36	73.87	206.5	73.65
210.16	73.61	215.65	73.45	222.96	73.44	226.62	73.3	235.76	73.15
237.59	73.17	255.11	73.02	274.16	72.9	283.3	72.94	307.07	72.92
310.73	73.03	314.39	73	332.67	73.14	345.47	73.07	350.96	73.12
361.93	73.08	367.41	73.01	372.9	73.06	380.21	73.04	387.53	72.93
402.15	72.81	409.47	72.67	411.3	72.71	422.27	72.55	431.41	72.52
438.73	72.41	458.84	72.38	466.15	72.31	471.64	72.33	475.3	72.25
482.61	72.19	486.27	72.24	495.41	72.07	502.73	72.02	521.01	71.76
522.84	71.71	537.47	71.55	548.44	71.4	553.92	71.42	564.89	71.3
568.55	71.32	574.04	71.24	586.84	71.3	597.81	71.17	610.6	71.18
616.09	71.09	627.06	71.11	630.72	71.03	639.86	70.99	643.52	71.04
647.18	70.93	652.66	70.93	665.46	70.81	672.77	70.86	676.43	70.76
681.92	70.81	689.23	70.72	698.38	70.71	703.86	70.62	709.34	70.65
718.49	70.83	720.31	71	727.63	71.37	731.29	71.77	736.77	71.89
738.6	71.84	740.43	71.53	744.09	69.93	745.92	69.58	753.23	69.17
758.71	69.01	762.37	68.82	769.68	69.02	773.34	69.19	782.48	69.13
787.97	69.22	795.29	69.12	808.08	69.23	811.74	69.16	822.71	69.15
828.2	69.18	833.68	69.13	837.34	69.19	842.76	69.11	846.48	69.14
853.79	69.06	868.42	69.08	870.25	69.12	875.74	69.04	879.39	69.09
884.88	69.01	897.68	69.04	904.99	69.02	908.65	69.08	914.13	68.96
922.18	69	932.42	68.98	936.08	69.06	941.57	69.01	956.19	68.95
970.82	69.13	979.96	69.01	987.28	69.07	990.93	69.04	1001.6	69.1
1003.73	69.16	1011.04	69.11	1022.02	69.13	1031.16	69.22	1043.96	69.11
1054.93	69.22	1060.41	69.23	1064.07	69.16	1087.84	69.23	1102.47	69.18
1122.58	69.3	1129.9	69.24	1151.84	69.28	1160.43	69.27	1171.95	69.35
1175.61	69.31	1179.27	69.44	1182.93	69.32	1192.22	69.33	1195.73	69.4
1201.21	69.34	1212.18	69.43	1217.67	69.4	1223.15	69.44	1228.64	69.41
1234.12	69.46	1254.24	69.39	1257.9	69.48	1263.38	69.41	1276.18	69.39
1278.01	69.43	1287.48	69.38	1303.61	69.42	1314.58	69.4	1318.24	69.45
1325.55	69.42	1329.21	69.49	1334.69	69.44	1340.18	69.49	1356.64	69.5
1360.29	69.44	1369.44	69.52	1373.09	69.46	1384.06	69.5	1391.38	69.47
1406.01	69.52	1407.83	69.49	1415.15	69.57	1420.64	69.52	1426.12	69.6
1433.44	69.54	1437.09	69.65	1440.75	69.6	1453.55	69.64	1457.2	69.68
1462.69	69.63	1470	69.75	1473.66	69.69	1484.63	69.7	1493.95	69.84
1502.92	69.74	1506.58	69.82	1512.06	69.74	1519.37	69.73	1523.03	69.79
1530.35	69.78	1543.15	69.82	1546.8	69.92	1550.46	69.87	1557.78	69.94
1561.43	69.86	1565.09	69.95	1572.4	69.93	1576.06	70.06	1583.37	69.97
1590.69	69.98	1594.34	70.04	1601.66	70	1607.15	70.07	1610.8	70.03
1614.46	70.14	1621.78	70.02	1629.09	70.01	1636.4	70.12	1640.06	69.98
1649.2	69.99	1651.03	69.94	1660.17	70.01	1663.83	69.97	1671.14	70.09
1674.8	69.98	1680.29	70.07	1685.77	70.04	1689.43	70.12	1698.57	70.08
1707.71	70.2	1711.37	70.16	1731.49	70.31	1736.97	70.24	1744.29	70.28
1751.6	70.22	1755.25	70.25	1758.91	70.18	1762.57	70.23	1775.37	70.24
1780.86	70.28	1799.14	70.33	1806.46	70.31	1821.08	70.4	1830.23	70.39
1833.88	70.34	1844.85	70.37	1848.51	70.34	1859.25	70.41	1863.14	70.48
1866.8	70.41	1877.77	70.39	1881.42	70.49	1886.91	70.54	1891.03	70.49
1903.37	70.56	1907.03	70.69	1912.51	70.6	1919.83	70.62	1925.31	70.73
1938.67	70.69	1947.25	70.76	1952.74	70.87	1965.54	70.85	1972.85	70.92
1976.51	70.88	1998.45	70.99	2007.59	71.09	2018.08	71.11	2029.54	71.27
2033.19	71.38	2044.17	71.45	2053.31	71.65	2058.8	71.86	2067.93	72.06
2082.56	72.6	2086.22	72.64	2089.88	72.79	2097.5	73	2102.68	73.06
2113.39	73.27	2124.62	73.29	2128.28	73.37	2135.59	73.4	2139.25	73.47
2148.39	73.43	2153.88	73.5	2161.19	73.43	2166.68	73.51	2181.31	73.64
2186.79	73.81	2199.59	73.93	2203.25	74.05	2214.22	74.28	2221.53	74.38
2228.85	74.64	2232.51	74.62	2240.44	74.8	2258.1	74.83	2265.42	74.95
2269.07	74.76	2276.39	74.69	2280.05	74.53	2288.07	74.38	2294.68	74.19
2307.47	73.65	2312.96	73.49	2316.62	73.46	2325.76	73.18	2331.25	73.07
2340.39	72.7	2364.16	72.21	2373.3	71.94	2383.35	71.75	2389.76	71.56
2400.73	71.47	2404.39	71.38	2422.67	71.24	2428.16	71.34	2431.81	71.25
2440.94	71.28	2444.59	71.43	2450.05	71.38	2462.8	71.64	2471.01	71.35
2477.16	70.67	2481.26	70.39	2486.91	70.23	2494.96	69.62	2499.35	68.74
2503	68.35	2507.94	67.51	2512.04	67.01	2518.2	65.85	2519.07	65.61
2527.12	64.64	2529.57	64.11	2534.61	63.73	2542.81	63.44	2546.92	63.22
2553.08	62.6	2557.18	62.48	2561.28	62.64	2563.33	62.61	2567.44	62.01
2569.49	61.36	2573.59	59.06	2575.65	58.3	2579.75	57.06	2585.9	55.7
2587.96	55.45	2590.01	55.4	2596.29	54.9	2602.57	53.4	2608.85	53.1
2615.13	53	2618.97	52.84	2627.69	52.49	2637.69	52.49	2647.69	52.72
2657.69	53.04	2667.69	53.57	2677.68	53.69	2687.7	53.94	2697.68	53.4
2709.25	53.71	2717.7	53.85	2727.7	54.19	2737.68	54.74	2744.05	56.66
2747.32	56.91	2750.6	57.52	2757.16	59.05	2763.71	60.49	2766.99	61.14
2770.27	61.35	2780.27	60.7	2783.38	61.02	2786.81	61.53	2796.49	61.37
2798.77	61.22	2809.6	60.5	2812.89	60.75	2816.17	61.26	2819.5	62.06
2826	64.31	2832.56	66.21	2835.84	67.3	2842.39	69.29	2845.67	70.59
2849.12	71.4	2856.02	72.5	2859.46	72.72	2862.92	73.23	2864.64	73.33
2868.09	73.32	2873.26	72.95	2876.71	73.02	2881.88	72.98	2887.06	73.06
2899.13	73.44	2904.3	73.5	2916.37	73.81	2926.72	74.15	2928.44	74.25
2940.51	74.55	2949.14	74.84	2952.58	74.9	2964.66	75.22	2973.28	75.48
2976.72	75.53	2997.42	76.1	3018.11	76.6	3035.36	76.9	3047.43	77.24
3066.4	77.81	3069.84	78.02	3075.02	78.6	3078.47	79.25	3081.92	80.04
3087.09	81.12	3088.81	81.27	3102.61	81.71	3107.78	81.78	3111.25	81.52
3114.73	80.48	3118.21	78.7	3119.96	77.95	3121.7	77.48	3125.18	76.92
3132.15	76.75	3135.64	76.72	3139.12	76.35	3144.35	76.12	3153.06	75.9
3163.51	75.47	3167	75.45	3182.67	74.87	3184.42	74.72	3191.39	74.83
3194.87	74.7	3203.58	74.17	3205.32	73.84	3208.81	72.44	3210.56	72.16
3217.52	71.55	3221.01	71.57	3222.75	71.87	3224.49	72.4	3226.23	73.16
3227.97	73.69	3233.2	74.47	3238.43	75.85	3240.17	75.94	3241.91	75.73
3245.4	75.55	3250.62	75.4	3255.85	75.09	3261.08	74.46	3269.79	73.79

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.164	2462.8	.066	2569.49	.025	2757.16	.066	2845.67	.073

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2462.8 2845.67 1776.6 1865.74 1849.12 .1 .3
Left Levee Station= 32.795 Elevation= 81.035
Right Levee Station=3107.865 Elevation= 81.8
Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	2462.8	71.64

CROSS SECTION

RIVER: Rio Grande

REACH: Lower Reach RS: 120.38

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.82	6.56	71.85	13.12	72.04	16.4	72.49	26.24	74.7
42.64	79.25	49.19	80.49	52.47	80.78	59.03	80.98	72.15	80.85
75.43	77.77	78.71	72.21	81.99	70.54	95.11	70.12	104.95	69.7
121.35	68.39	124.63	68.48	134.47	70.25	144.3	72.69	147.58	73.22
173.82	73.45	190.22	73.11	203.34	73.16	226.3	72.96	232.86	73.03
249.25	73.03	262.37	73.1	301.73	73.15	311.57	73.04	324.69	73.13
331.24	73.01	350.92	73.06	354.2	73.16	370.6	73.11	377.16	73.16
387	73.04	400.12	73.29	406.68	73.1	423.07	73.03	426.35	73.11
442.75	73.16	491.95	73.13	508.35	73.26	521.46	73.29	550.98	73.2
557.54	73.39	564.1	73.31	596.9	73.39	606.74	73.26	619.85	73.23
629.69	73.33	642.81	73.25	649.37	73.3	659.21	73.18	669.05	73.33
678.89	73.26	682.17	73.35	695.29	73.28	714.96	73.31	721.52	73.39
734.64	73.3	737.92	73.44	757.6	73.35	774	73.44	787.12	73.33
806.79	73.42	816.63	73.37	823.19	73.44	836.31	73.37	846.15	73.48
852.71	73.37	865.83	73.4	872.39	73.58	888.79	73.43	901.91	73.52
908.46	73.46	934.7	73.47	937.98	73.41	964.22	73.49	983.9	73.44
993.74	73.6	1013.41	73.52	1019.97	73.59	1029.81	73.48	1052.77	73.69
1072.45	73.54	1095.4	73.7	1105.24	73.56	1115.08	73.71	1124.92	73.74
1131.48	73.62	1138.04	73.72	1147.88	73.67	1154.44	73.83	1161	73.67
1170.84	73.76	1193.79	73.69	1206.91	73.88	1213.47	73.73	1223.31	73.88
1236.43	73.75	1252.83	73.77	1262.67	73.61	1272.5	73.66	1288.9	74
1292.18	74.34	1305.3	75.06	1311.86	75.84	1321.7	76.11	1324.98	76.01
1328.26	75.4	1334.82	72.23	1338.1	71.54	1341.38	71.26	1351.21	70.79
1361.05	70.5	1367.61	70.17	1380.73	70.61	1387.29	70.97	1403.69	70.88
1413.53	71.07	1426.65	70.88	1436.48	70.93	1449.6	71.12	1456.16	70.99
1475.84	71.02	1479.12	70.95	1485.68	71.12	1495.52	71.06	1502.08	71.21
1511.92	71.09	1518.48	71.19	1531.59	71.07	1557.83	71.2	1561.11	71.31
1570.95	71.18	1577.51	71.28	1587.35	71.14	1600.47	71.14	1610.3	71.22
1623.42	71.18	1629.98	71.3	1639.82	71.06	1646.38	71.11	1672.62	71.12
1679.18	71.29	1689.02	71.19	1715.25	71.07	1741.49	71.39	1757.89	71.14
1771.01	71.26	1777.57	71.19	1797.24	71.3	1800.52	71.4	1813.64	71.27
1833.32	71.27	1849.72	71.45	1872.67	71.26	1879.23	71.28	1892.35	71.5
1902.19	71.54	1908.75	71.41	1925.15	71.44	1951.39	71.52	1977.62	71.44
1994.02	71.5	2013.7	71.66	2026.82	71.52	2066.17	71.61	2076.01	71.59
2102.25	71.72	2108.81	71.63	2115.37	71.87	2121.93	71.63	2138.33	71.61
2144.89	71.73	2154.72	71.59	2174.4	71.74	2184.24	71.68	2194.08	71.76
2203.92	71.71	2213.76	71.81	2236.72	71.71	2249.84	71.7	2256.4	71.89
2266.23	71.76	2289.19	71.77	2292.47	71.85	2315.43	71.78	2328.55	71.85
2335.11	71.75	2338.39	71.86	2358.07	71.79	2364.63	71.88	2377.74	71.82
2384.3	71.95	2394.14	71.85	2403.98	71.94	2417.1	71.91	2433.5	71.96
2440.06	71.85	2456.46	72.02	2463.02	71.9	2482.69	71.98	2495.81	71.92
2522.05	71.98	2525.33	71.93	2538.45	72.05	2548.29	71.95	2558.13	72.1
2571.25	71.98	2577.81	72.17	2584.37	72.07	2607.32	72.09	2613.88	72.15
2623.72	72.01	2636.84	72.2	2643.4	72.06	2663.08	72.05	2672.92	72.15
2679.48	72.33	2695.88	72.1	2702.44	72.27	2712.27	72.11	2718.83	72.18
2725.39	72.08	2731.95	72.19	2745.07	72.16	2758.19	72.24	2768.03	72.2
2774.59	72.37	2781.15	72.24	2794.27	72.32	2800.83	72.15	2807.39	72.29
2820.5	72.2	2827.06	72.44	2840.18	72.26	2853.3	72.26	2859.86	72.38
2872.98	72.27	2882.82	72.41	2889.38	72.34	2895.94	72.58	2909.06	72.36
2922.18	72.36	2935.29	72.6	2941.85	72.33	2958.25	72.38	2961.53	72.29
2977.93	72.41	2984.49	72.31	2997.61	72.51	3004.17	72.29	3014.01	72.43
3023.85	72.36	3030.41	72.49	3040.24	72.49	3046.8	72.36	3063.2	72.54
3069.76	72.44	3105.84	72.61	3115.68	72.47	3128.8	72.58	3141.92	72.48
3148.47	72.54	3155.03	72.43	3161.59	72.54	3184.55	72.53	3194.39	72.6
3227.19	72.66	3240.31	72.61	3266.54	72.77	3273.1	72.69	3282.94	72.74
3289.5	72.65	3309.18	72.72	3315.74	72.66	3335.42	72.8	3341.98	72.92
3348.54	72.78	3368.21	72.68	3374.77	72.87	3384.61	72.93	3391.17	72.8
3401.01	72.85	3414.13	72.81	3420.69	73.02	3430.53	72.8	3443.65	72.8
3453.49	72.97	3476.44	72.82	3492.84	72.87	3502.68	73.03	3505.96	72.95
3525.64	72.91	3538.76	73.01	3545.32	72.92	3558.44	72.98	3584.68	72.97
3601.07	73.05	3617.47	72.95	3640.43	73.03	3646.99	73.18	3666.67	72.99
3673.23	73.1	3683.07	73.02	3692.91	73.13	3709.3	73	3735.54	73.22
3742.1	73.12	3748.66	73.21	3765.06	73.23	3771.62	73.13	3781.46	73.18
3797.86	73.06	3810.97	73.08	3817.53	73.21	3830.65	73.26	3837.21	73.4
3853.61	73.29	3863.45	73.4	3876.57	73.21	3886.41	73.3	3912.65	73.3
3922.48	73.5	3932.32	73.48	3945.44	73.3	3952	73.39	3971.68	73.41
3984.8	73.31	3997.92	73.61	4004.48	73.5	4017.6	73.71	4024.16	73.68
4050.39	73.73	4063.51	74.05	4070.07	73.72	4076.63	73.62	4083.19	73.78
4089.75	73.62	4115.99	73.68	4138.94	73.39	4148.78	73.41	4155.34	73.57
4171.74	73.55	4181.58	73.62	4197.98	73.38	4211.1	73.52	4240.62	73.56
4257.01	73.43	4263.57	73.51	4279.97	73.49	4286.53	73.35	4306.21	73.55
4312.77	73.44	4322.61	73.5	4345.57	73.47	4355.41	73.74	4361.96	73.56
4378.34	73.43	4384.87	73.64	4394.67	73.47	4417.54	73.84	4430.61	73.47
4440.41	72.48	4446.94	71.96	4453.48	71.66	4463.28	71.02	4476.35	69.94
4479.61	70	4489.42	70.87	4495.95	71.78	4505.75	72	4522.08	70.71
4531.89	70.45	4544.95	70.73	4551.49	70.72	4561.29	70.14	4567.82	70.28
4574.36	70.98	4577.62	71.09	4580.89	70.85	4584.16	70.26	4587.42	69.15
4593.96	64.92	4597.23	63.59	4603.76	61.38	4613.56	58.76	4616.83	58.3
4620.1	58.24	4630.1	57.34	4640.1	54.44	4650.1	54.04	4660.1	54.04
4680.1	53.44	4690.1	53.44	4710.1	53.74	4730.1	53.84	4740.1	54.04
4750.1	53.84	4760.1	54.24	4770.1	54.14	4780.1	54.54	4790.1	54.54
4800.1	55.14	4820.1	58.04	4832.7	58.26	4839.24	60.47	4845.78	59.88
4852.32	59.68	4862.13	59.88	4871.94	61.18	4875.22	61.9	4881.76	64.28
4885.03	65.63	4898.11	72.47	4911.19	78.71	4914.46	80.38	4921	82.68
4924.28	83.42	4927.55	83.1	4934.09	81.14	4940.63	77.7	4943.9	76.24
4947.17	75.36	4953.71	74.36	4966.79	74.25	4973.34	74.31	4979.88	73.76
4989.69	73.59	5006.04	73.63	5025.67	73.35	5032.21	73.5	5061.64	73.22
5064.92	73.03	5071.46	73.24	5078	73.62	5084.54	73.52	5100.89	72.88
5104.16	72.29	5107.43	70.79	5110.7	69.66	5113.98	69.19	5127.06	68.28
5133.6	68.42	5136.87	69.06	5140.14	70.18	5143.41	71.75	5146.68	72.87
5156.49	74.58	5166.31	77.5	5169.58	77.72	5172.85	77.35	5179.39	77.06
5189.2	76.82	5199.01	76.24	5208.83	75.04	5218.64	74.23	5225.18	73.8

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.164	4417.54	.066	4574.36	.025	4839.24	.066	4898.11	.073

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4417.54 4898.11 821.82 1653.32 845.1 .1 .3
Left Levee Station= 59.03 Elevation= 80.98
Right Levee Station= 4924.28 Elevation= 83.42
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
52.34	1320.73	76.11	1320.73	4417.79	73.81	4928.9	5166.32	77.54

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.164	0.046	0.073
W.S. Elev (ft)	76.99	Reach Len. (ft)	821.82	1653.32	845.10
Crit W.S. (ft)	61.37	Flow Area (sq ft)	10905.62	7144.80	21.38
E.G. Slope (ft/ft)	0.000162	Area (sq ft)	10905.62	7144.80	21.38
Q Total (cfs)	20000.00	Flow (cfs)	2320.43	17670.68	8.89
Top Width (ft)	4831.68	Top Width (ft)	4341.65	480.57	9.47
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)	0.21	2.47	0.42
Max Chl Dpth (ft)	23.55	Hydr. Depth (ft)	2.51	14.87	2.26
Conv. Total (cfs)	1573488.0	Conv. (cfs)	182558.4	1390230.0	699.4
Length Wtd. (ft)	1573.60	Wetted Per. (ft)	4342.61	487.08	10.49
Min Ch El (ft)	53.44	Shear (lb/sq ft)	0.03	0.15	0.02
Alpha	4.42	Stream Power (lb/ft s)	0.01	0.37	0.01
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	9487.67	6644.77	2402.21
C & E Loss (ft)	0.00	Cum SA (acres)	2524.36	367.39	805.99

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.07*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.51	10.5	73.69	13.12	74.05	20.99	75.82	34.11	79.46
39.35	80.45	47.22	80.84	58.25	80.64	61	78.14	63.76	73.54
66.51	72.05	74.65	71.34	85.81	70.01	88.36	69.61	99.58	68.74
102.34	68.81	110.61	70.22	118.87	72.17	121.62	72.6	143.67	72.78
157.45	72.51	168.47	72.55	187.76	72.35	193.27	72.39	218.07	72.36
251.14	72.28	259.41	72.2	270.43	72.3	275.93	72.22	292.47	72.37
295.22	72.48	314.51	72.65	322.78	72.62	333.8	72.92	339.32	72.8
353.09	72.78	369.62	72.89	410.96	72.87	435.75	72.97	460.56	72.84
466.07	72.98	471.58	72.9	499.14	72.93	518.42	72.78	526.69	72.85
543.22	72.84	551.49	72.76	559.76	72.87	581.8	72.81	603.84	72.88
614.87	72.8	617.62	72.91	634.16	72.84	647.94	72.91	658.96	72.81
689.26	72.87	700.29	72.81	708.56	72.9	714.07	72.81	725.09	72.83
730.6	72.97	744.38	72.85	782.95	72.86	785.71	72.81	807.76	72.87
824.29	72.83	832.56	72.96	862.87	72.85	882.16	73.01	898.69	72.88
917.97	73	926.24	72.89	942.78	73.03	948.29	72.93	953.8	73.01
962.07	72.96	967.58	73.09	973.09	72.96	981.36	73.03	1000.64	72.97
1011.66	73.13	1017.17	73	1025.44	73.12	1036.47	73.02	1050.24	73.03
1058.51	72.9	1066.77	72.94	1080.55	73.21	1083.31	73.48	1094.33	74.05
1099.84	74.67	1108.11	74.89	1110.86	74.8	1113.62	74.32	1119.13	71.78
1121.89	71.22	1132.9	70.62	1146.68	70.13	1157.71	70.48	1163.22	70.77
1177	70.71	1185.6	70.86	1196.29	70.7	1215.57	70.88	1221.08	70.78
1237.62	70.81	1245.88	70.89	1254.17	70.85	1259.66	70.97	1267.93	70.87
1273.44	70.95	1284.46	70.85	1306.5	70.94	1309.26	71.02	1317.53	70.91
1323.04	70.98	1331.31	70.87	1350.59	70.93	1361.61	70.9	1367.12	70.99
1375.39	70.8	1402.95	70.85	1408.46	70.98	1438.77	70.8	1460.81	71.06
1474.59	70.86	1485.62	70.96	1491.13	70.91	1507.65	71	1510.41	71.09
1521.43	70.98	1537.97	70.96	1551.75	71.11	1571.03	70.98	1587.56	71.19
1595.83	71.23	1601.34	71.13	1637.17	71.3	1659.21	71.32	1689.52	71.66
1700.54	71.57	1733.61	71.65	1741.87	71.64	1763.92	71.75	1769.43	71.67
1774.94	71.86	1780.46	71.67	1794.23	71.65	1799.75	71.75	1808.01	71.63
1824.54	71.75	1832.81	71.7	1849.34	71.73	1857.61	71.81	1887.92	71.72
1893.44	71.88	1901.7	71.77	1920.99	71.77	1923.74	71.83	1943.03	71.77
1962.32	71.85	1978.86	71.8	1984.37	71.88	1995.38	71.84	2000.9	71.94
2009.16	71.86	2017.43	71.93	2042.23	71.93	2047.75	71.84	2061.52	71.97
2067.04	71.87	2083.56	71.95	2094.59	71.91	2130.41	72	2138.68	71.92
2146.95	72.04	2157.97	71.94	2163.48	72.09	2168.99	72.01	2186.81	72.01
2193.79	72.07	2202.06	71.97	2213.08	72.13	2218.59	72.02	2235.13	72.01
2248.9	72.24	2262.68	72.05	2268.2	72.19	2276.45	72.06	2287.48	72.04
2292.99	72.13	2323.3	72.12	2328.82	72.26	2334.33	72.16	2345.35	72.22
2350.86	72.09	2356.37	72.2	2367.39	72.13	2372.9	72.32	2383.92	72.18
2394.95	72.18	2400.46	72.28	2411.48	72.19	2419.75	72.31	2425.26	72.25
2430.77	72.45	2441.8	72.26	2452.82	72.25	2463.83	72.44	2469.35	72.23
2483.12	72.28	2485.88	72.21	2499.66	72.31	2505.17	72.23	2516.19	72.4
2521.71	72.23	2529.97	72.35	2538.24	72.29	2552.01	72.4	2557.52	72.29
2571.3	72.44	2576.81	72.36	2607.13	72.49	2615.4	72.38	2626.42	72.47
2648.46	72.35	2653.97	72.44	2673.26	72.42	2681.53	72.47	2708	72.5
2720.11	72.47	2742.15	72.61	2761.44	72.52	2776.57	72.58	2783.48	72.53
2800.02	72.62	2805.53	72.72	2811.04	72.61	2827.57	72.54	2833.08	72.7
2841.35	72.75	2846.86	72.64	2866.15	72.65	2871.66	72.81	2879.93	72.64
2890.95	72.64	2899.22	72.78	2918.5	72.66	2932.28	72.71	2940.55	72.84
2943.31	72.77	2959.84	72.75	2970.86	72.83	2976.38	72.76	3009.45	72.8
3023.22	72.86	3037	72.78	3056.29	72.84	3061.8	72.96	3078.31	72.81
3083.84	72.9	3092.11	72.83	3100.38	72.91	3114.15	72.81	3136.2	72.99
3161	73.01	3166.51	72.92	3174.78	72.96	3188.56	72.85	3199.57	72.87
3205.08	72.98	3216.11	73.02	3221.62	73.13	3235.4	73.05	3243.67	73.14
3254.69	72.99	3262.96	73.06	3285	73.06	3293.26	73.21	3301.53	73.2
3312.55	73.05	3318.07	73.12	3334.6	73.14	3345.62	73.06	3356.65	73.3
3362.16	73.22	3373.18	73.39	3400.73	73.4	3411.75	73.66	3417.27	73.39
3422.78	73.31	3428.29	73.44	3433.8	73.31	3455.85	73.35	3475.13	73.12
3483.4	73.14	3488.91	73.27	3510.96	73.32	3524.74	73.14	3535.76	73.25
3560.56	73.27	3574.33	73.16	3593.62	73.22	3599.13	73.11	3615.67	73.27
3621.18	73.18	3629.45	73.23	3648.74	73.19	3657.01	73.41	3662.51	73.27
3676.27	73.19	3681.76	73.36	3689.99	73.24	3709.21	73.65	3720.56	73.29
3731.3672	18997	3740.42	71.54	3750.84	70.6	3760.28	69.36	3763.11	69.22
3771.63	69.34	3777.3	69.7	3785.81	69.41	3792.51	67.93	3799.99	67.32
3808.51	67.03	3819.85	67.16	3825.53	67.1	3834.04	66.42	3839.71	66.39
3848.22	66.94	3853.9	66.27	3856.73	65.37	3862.41	61.98	3865.25	60.91
3870.92	59.14	3879.43	57.05	3893.8	55.89	3902.48	53.55	3903.0253	.53011
3911.17	53.23	3914.7253	.22591	3919.85	53.22	3937.22	52.73	3950.5	52.8
3970.97	53.32	3976.38	53.37	3989.05	53.69	3994.81	54.67	4000.01	55.29
4005.2	55.68	4015.6	55.59	4022.52	55.27	4034.66	56.01	4038.12	55.94
4041.58	55.56	4048.51	55.48	4053.71	56.01	4065.84	56.39	4086.86	57.3
4103.95	59.33	4107.42	59.64	4112.61	59.75	4116.08	59.63	4121.28	60.21
4128.83	60.52	4137.25	62.19	4145.67	61.67	4151.3361	.57626	4154.1	61.56
4166.73	61.95	4179.36	63.18	4183.58	63.78	4190.55	65.36	4196.21	66.89
4213.06	72.65	4219.78	72.67	4229.86	72.87	4237.93	72.51	4246.66	72.71
4255.4	72.5	4271.53	73.11	4284.3	72.73	4308.5	73.03	4315.22	73.3
4321.27	73.89	4332.7	73.97	4345.47	74.2	4349.5	74.19	4384.2374	.70435
4437.55	75.24	4462.42	75.55	4486.62	75.81	4494.68	75.95	4550.47	76.48

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 4573.99   76.77 4625.08   77.25 4634.49   77.38 4640.53   77.35 4660.03   77.53
 4686.24   77.83 4721.19   78.41 4744.04   78.72 4787.06   79.02 4838.81   79.21
 4848.22   79.36 4855.62   79.34  4882.5    79.5  4894.6   79.41 4918.12    79.6
 4940.98   79.98 4955.76   80.27 4970.55   80.34 4980.63   80.54 4984.66   80.51
 5008.19   80.87 5010.87   81.52 5018.27   80.93 5035.07   81.17 5052.55   81.18
 5055.23    80.2 5059.27   80.29 5061.96   81.24 5065.32   81.89 5071.37   82.02
    5074   81.76 5079.28   80.19 5084.55   77.43 5087.19   76.26 5089.83   75.55
  5095.1   74.74 5105.65   74.64 5110.93   74.68 5116.21   74.23 5124.12   74.09
 5137.31    74.1 5153.14   73.86 5158.42   73.96 5182.15   73.67  5184.8   73.51
 5195.35   73.95 5200.62   73.86 5213.81   73.31 5216.45   72.83 5221.72   70.71
 5224.37   70.33 5234.92   69.57 5240.19   69.67 5242.83   70.17 5245.46   71.06
  5248.1   72.31 5250.74    73.2 5258.65   74.54 5266.57   76.86 5269.21   77.03
 5271.85   76.72 5285.03   76.26 5292.94   75.78 5300.87   74.79 5314.05   73.76

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .164 3709.21    .066 3862.41    .025 4137.25    .066 4213.06    .073

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3709.21 4213.06           821.82 1653.32   845.1            .1       .3
Left Levee      Station=  47.224      Elevation=  80.842
Right Levee     Station=5071.366      Elevation=   82.02
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   41.31  1104.5   74.71 1104.99  3707.4   73.58

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 119.75*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.21    7.87   75.34    9.84   75.61   15.74   76.94   25.58   79.67
   29.51   80.41   35.42    80.7   44.34   80.42   46.58   78.52   48.81   74.87
   51.04   73.55   57.63   72.44   68.73   69.75   77.82   69.08   80.05   69.13
   86.75   70.19   93.43   71.66   95.67   71.97  113.52   72.11  124.68    71.9
  135.36   71.92  149.23   71.73  153.69   71.75  207.24   71.36  216.17   71.47
  224.24   71.45  236.25    71.8  251.87   72.14  258.56   72.21  267.49   72.55
  271.95   72.49  296.49   72.62  341.13   72.66   357.5   72.61  370.13   72.48
  401.38   72.47  416.99   72.34  437.08   72.39  443.77   72.33  450.47   72.42
  468.32   72.34  497.32   72.38  510.71   72.33  521.87   72.38   530.8   72.29
  570.96   72.32  584.35   72.26  588.81   72.36  599.97   72.26  631.21   72.24
  633.44    72.2  671.38   72.31  695.92   72.22  711.54   72.33  724.93   72.23
  740.55   72.31  747.24   72.22  760.63   72.31   765.1   72.24  791.88   72.31
  807.49   72.26  816.42   72.37  820.88   72.28  827.57   72.37   836.5   72.29
  861.04   72.22   872.2   72.42  883.36   73.04  887.82   73.51  894.52   73.66
  898.98   73.23  903.44   71.32  905.68   70.91   914.6   70.45  925.75   70.09
  939.14   70.58   950.3   70.53  957.27   70.65  965.92   70.53  981.54   70.65
     986   70.56  999.39   70.59 1017.25   70.73 1037.32   70.63 1068.57   70.68
 1075.26   70.59 1104.27   70.69 1110.96   70.54 1133.28   70.57 1137.74   70.67
 1162.28   70.54 1180.14   70.73 1191.29   70.58 1204.68   70.62  1220.3   70.77
 1242.62   70.65 1253.77   70.77 1269.39    70.7 1282.78   70.88 1301.56   70.89
 1322.95   71.07 1334.88   71.11 1365.34   71.67 1374.27   71.61 1425.59   71.77
 1434.52   71.86 1438.98   71.71 1461.29   71.68 1474.68   71.76 1481.38   71.72
 1501.46   71.81 1526.01   71.75 1530.47   71.86 1537.16   71.78 1555.01   71.82
 1570.64   71.76 1586.26   71.84 1599.65   71.82 1617.49   71.93 1650.97    71.9
 1655.43   71.83 1666.59   71.92 1671.05   71.85 1684.44   71.92 1693.36   71.89
 1722.37   71.95 1729.07   71.89 1735.76   71.97 1744.69   71.89 1753.62   71.94
 1780.39   71.92 1789.32   72.05 1793.78   71.97 1807.17   71.97 1818.33   72.14
 1829.49   72.01 1833.95   72.11 1849.57      72 1854.03   72.07 1878.58   72.04
 1896.43   72.12 1914.28   72.06 1918.74   72.21 1927.67    72.1 1941.06   72.18
 1949.98   72.12 1961.14   72.16  1965.6   72.31 1974.53   72.17 1983.46   72.15
 1992.38   72.28 1996.84   72.13 2010.23   72.12 2021.39   72.21 2025.85   72.16
 2034.78   72.29 2039.24   72.17 2063.78    72.3 2068.25   72.22 2079.41   72.33
 2083.87   72.27 2108.42   72.38 2115.11   72.29 2124.04   72.36 2141.89   72.27
 2146.35   72.34 2199.91   72.33 2217.75   72.45 2233.38   72.39 2251.23   72.39
 2269.08   72.51 2286.93   72.41 2291.39   72.53 2318.17   72.48 2322.64    72.6
 2329.33   72.48 2338.26   72.48 2344.95   72.59 2360.57   72.51 2380.65    72.6
 2394.04   72.58 2402.97   72.65 2434.21   72.62 2445.36   72.67 2456.52   72.61
 2472.14   72.66 2476.61   72.75 2489.98   72.63 2507.85   72.69    2519   72.61
 2536.85   72.76 2541.32   72.71 2556.94   72.79 2579.26   72.64 2588.18   72.66
 2606.03   72.87 2617.19   72.81 2623.88   72.88 2632.81   72.77  2639.5   72.82
 2657.36   72.81 2664.05   72.93 2679.67    72.8 2697.52   72.87 2706.45   72.81
 2715.37   72.99 2719.84   72.93 2728.76   73.06 2751.07   73.08    2760   73.27
 2768.93      73 2795.71   73.02 2811.32   72.86 2822.48   72.98 2840.33   73.03
 2851.49    72.9 2860.42   72.98  2880.5   72.97 2891.65   72.88 2907.28   72.94
 2911.74   72.86 2925.13      73 2929.59   72.93 2951.91   72.92  2958.6   73.08
  2974.2   72.94 2978.65   73.08 2985.32      73 3000.88   73.46 3010.51    73.1
3024.0571.68469 3029.14   71.24  3036.2   70.36 3046.61   68.44 3053.84   67.82
 3058.65   67.62 3065.87   66.81 3071.55   64.47  3077.9   63.93 3085.13   63.62
 3099.57   63.47 3106.79    62.7 3111.61    62.5 3118.83   62.79 3123.65   62.27
 3126.05    61.6 3130.87   59.04 3138.09   56.91 3145.31   55.34 3157.49   54.43
 3164.86   52.66 3172.23   52.41  3179.6    52.4 3194.34   52.02 3203.6452.06086
3215.8952.45766  3230.7   52.88 3238.46   52.98 3246.21   53.31 3250.09   53.32
 3253.96   53.57    3261   55.52 3263.12   55.57 3267.36   56.68  3271.6    57.3
  3282.2   57.35 3286.43   57.22 3290.67   56.77 3294.91   56.69 3303.39   57.24
 3309.75   57.81 3313.99   57.67 3318.23   56.93 3322.47   56.66 3326.71   56.81
 3333.06    57.7 3341.54   57.94  3347.9   58.24 3360.62   59.12 3371.21   59.31
 3386.05   60.65 3394.53   61.59 3400.88   61.77 3407.25   61.21 3409.37   61.17
 3415.72   62.27 3422.08   62.83 3424.97   62.79 3435.27   63.91 3445.57   63.46
 3455.87   63.44 3463.4363.73187 3471.32   64.02 3477.17   64.42 3491.95   65.66
 3500.47   66.85  3507.4   68.14    3528   72.83 3534.62   72.74 3538.59   72.92
 3541.24   72.78  3561.1   73.03 3576.98   72.18 3582.28   72.32 3587.58   72.23
 3594.19   72.47  3611.4   71.91 3631.26   72.42 3637.88   72.78 3643.17    72.9
 3651.11   72.52 3663.03   72.19 3668.33   71.96 3678.92   72.04 3690.83   72.03
 3702.74   72.17 3708.04    72.1 3715.98    72.2 3729.22   72.65 3741.13   73.74
 3746.43   73.67 3751.72   73.79 3763.63   73.73 3791.44   74.09 3796.73   73.93
 3807.32   74.04 3812.62   74.19  3819.574.13801  3861.6   74.46  3878.8   74.46
 3903.96   74.53 3923.81   74.68 3929.11   74.62 3959.55   74.72 3975.44   74.83
 4008.54   74.94 4019.13   75.01 4029.72   74.99 4037.66   75.06 4066.78   75.17
 4082.67   75.33 4107.82   75.37 4113.11   75.48 4130.32   75.45 4150.18   75.58
 4158.12   75.52 4168.71   75.58 4192.54   75.59 4219.02   75.69 4238.87   75.82
 4275.94   75.86 4302.42   75.96 4306.39    75.9 4315.65      76 4328.89      76
 4358.02   76.15 4369.93   76.01 4380.52   76.07 4408.32   76.07 4418.91   76.15
 4453.33   76.23 4466.56   76.36  4485.1   76.46  4502.3   76.66 4516.87   76.73
 4523.48   76.84 4538.05   76.86 4549.96   77.01 4573.79   77.15 4605.56   77.17
 4612.18   77.11 4636.01   77.22 4643.95    77.1 4658.51   77.25 4692.93   77.27
 4707.49   77.18 4760.44   77.08 4778.97   77.28 4793.53   77.17  4797.5    77.3
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4806.77	77.32	4810.74	77.15	4826.62	77.24	4839.86	77.13	4846.48	77.2
4850.45	77.06	4865.01	77.01	4870.31	76.87	4874.28	77	4879.57	76.87
4884.87	77.02	4890.16	76.89	4900.75	76.93	4911.34	77.12	4916.64	77.01
4927.23	77.17	4929.88	77.11	4939.14	77.34	4952.38	77.4	4961.65	77.52
4966.94	77.74	4976.21	77.73	4981.5	77.91	4988.12	77.83	4990.77	77.95
5001.36	77.85	5014.59	78.07	5019.89	77.95	5033.13	78.08	5039.74	78.29
5047.69	78.19	5059.6	78.3	5067.55	78.47	5083.43	78.54	5094.02	78.75
5099.31	80.03	5101.96	79.36	5105.93	79.5	5113.88	78.8	5121.82	79.11
5127.11	79.01	5137.7	79.03	5146.97	79.18	5158.88	79.16	5164.18	79.03
5181.39	79.08	5186.68	77.08	5190.65	76.81	5194.62	77.25	5199.92	79.12
5206.54	80.4	5215.8	80.5	5220.46	80.42	5224.47	79.23	5230.48	76.27
5236.49	75.12	5248.53	75.05	5252.54	74.71	5258.55	74.58	5268.58	74.57
5280.61	74.36	5284.62	74.42	5302.66	74.12	5304.67	73.99	5312.69	74.29
5316.7	74.2	5326.73	73.74	5328.73	73.37	5332.74	71.76	5334.75	71.47
5342.77	70.86	5346.78	70.91	5348.78	71.28	5354.8	73.53	5360.81	74.51
5366.83	76.21	5380.87	75.7	5386.88	75.31	5392.9	74.55	5402.92	73.73

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.164	3000.88	.066	3138.09	.025	3267.36	.066	3528	.073

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3000.88	3528	821.82	1653.32	845.1	.1	.3

Left Levee Station= 35.42 Elevation= 80.7
Right Levee Station= 5215.8 Elevation= 80.5
Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	3000.88	73.46

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 119.44*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.9	5.25	76.99	10.5	78.05	17.06	79.87	19.68	80.37
23.61	80.57	30.44	80.21	32.15	78.89	33.86	76.2	35.56	75.06
40.61	73.55	49.1	69.9	56.05	69.43	57.76	69.46	62.88	70.16
69.71	71.35	83.37	71.44	91.91	71.3	100.08	71.31	129.47	70.88
149.96	70.53	168.08	70.67	201.17	72.18	223.37	72.35	244.55	72.39
270.04	72.28	287.04	72.06	303.61	72.01	315.56	71.89	341.17	71.96
354.83	71.87	387.27	71.82	395.81	71.85	418	71.71	447.03	71.75
490.98	71.58	510.2	71.67	528.98	71.59	540.93	71.65	551.17	71.57
563.12	71.61	568.24	71.54	578.49	71.6	590.44	71.55	593.86	71.62
614.34	71.54	621.17	71.62	655.31	71.5	663.85	71.63	672.39	72.04
675.8	72.34	680.93	72.44	684.34	72.15	687.76	70.87	689.46	70.59
696.29	70.28	704.83	70.05	715.07	70.38	728.73	70.45	735.56	70.35
747.51	70.41	762.88	70.36	774.83	70.49	790.19	70.41	803.85	70.41
819.22	70.32	841.41	70.38	846.53	70.28	863.61	70.3	867.02	70.37
885.8	70.27	899.46	70.4	907.4	70.3	930.19	70.46	947.26	70.35
955.8	70.44	967.75	70.42	983.12	70.62	992.37	70.62	1017.86	70.93
1034.85	71.54	1047.99	71.66	1073.6	71.73	1094.09	71.85	1097.51	71.75
1114.58	71.72	1145.31	71.81	1196.31	71.75	1220.44	71.83	1234.09	71.92
1275.07	71.82	1285.31	71.89	1324.58	71.91	1331.41	71.85	1358.73	71.88
1365.56	71.98	1379.22	71.93	1387.75	72.05	1434.25	71.97	1447.51	72.03
1461.16	71.99	1497.02	72.08	1500.44	72.18	1514.1	72.04	1546.53	72.08
1575.56	72.21	1578.97	72.15	1609.71	72.26	1635.31	72.2	1638.73	72.24
1679.71	72.19	1693.36	72.28	1746.29	72.27	1749.7	72.36	1778.73	72.31
1790.68	72.4	1802.63	72.35	1818	72.42	1876.05	72.44	1891.41	72.53
1901.64	72.46	1923.85	72.42	1937.51	72.53	1952.88	72.56	1969.62	72.44
1990.44	72.6	2004.1	72.62	2010.93	72.55	2029.71	72.57	2034.83	72.64
2046.78	72.55	2067.27	72.56	2074.1	72.69	2101.42	72.75	2108.24	72.87
2115.07	72.69	2135.56	72.69	2147.51	72.59	2169.71	72.73	2185.08	72.71
2207.58	72.61	2233.07	72.72	2255.08	72.64	2260.2	72.75	2272.14	72.7
2284.05	72.83	2292.54	73.26	2300.45	72.92	2304.15	72.58	2316.7470.94557	
2321.56	70.12	2330.11	67.66	2336.05	66.29	2345.93	64.22	2350.6	61.02
2355.82	60.54	2361.75	60.2	2373.62	59.85	2379.55	58.98	2385.99	58.53
2389.43	58.65	2393.39	58.28	2395.36	57.82	2399.32	56.09	2405.25	54.67
2411.18	53.62	2421.19	52.98	2427.24	51.77	2451.45	51.32	2463.09	51.4
2472.26	51.85	2481.43	52.06	2491.37	52.45	2500.53	52.58	2504.2752.77985	
2517.0553.29694		2518.87	53.44	2527.2	56.36	2529.71	56.43	2534.72	58.08
2539.73	58.98	2542.24	59.09	2547.25	58.88	2552.26	59.02	2557.27	58.86
2562.29	58.21	2567.3	58.11	2577.33	58.83	2584.85	59.61	2589.86	59.39
2594.87	58.31	2599.88	57.91	2604.9	58.14	2612.42	59.4	2622.44	59.65
2629.96	60.08	2634.97	60.62	2645	61.35	2657.53	61.43	2675.08	62.83
2685.1	63.85	2690.11	64	2692.62	63.83	2700.15	62.78	2702.65	62.71
2705.16	63.11	2710.17	64.32	2717.69	65.13	2721.1	65.05	2733.28	65.63
2750.26	65.17	2762.79	65.47	2770.3	65.95	2775.5266.08003		2782.83	66.44
2800.31	67.54	2810.38	68.33	2820.41	69.65	2842.95	73.01	2852.83	72.86
2858.75	73.11	2862.7	72.89	2868.63	73.04	2872.58	72.95	2892.33	73.19
2898.26	72.66	2902.22	72.59	2916.04	71.86	2923.94	72.04	2931.85	71.88
2941.72	72.22	2955.55	71.76	2961.48	71.67	2967.4	71.32	2979.25	71.65
2983.2	71.87	2987.16	71.81	2993.09	72.04	2997.03	72.01	3006.91	72.53
3014.81	72.7	3020.74	72.49	3026.66	72.08	3044.44	71.55	3056.29	71.13
3068.15	71.27	3081.98	71.28	3085.93	71.21	3095.81	71.34	3099.76	71.23
3103.7	71.38	3111.61	71.25	3117.53	71.47	3123.46	71.37	3143.22	71.99
3155.07	72.97	3161	73.59	3168.89	73.47	3176.8	73.63	3194.57	73.5
3206.43	73.67	3220.26	73.78	3232.11	73.8	3236.06	73.92	3243.96	73.67
3254.7773.80517		3259.76	73.79	3267.67	73.99	3279.52	73.89	3326.93	74.14
3332.85	74.09	3340.76	74.22	3374.34	74.16	3392.12	74.19	3396.07	74.27
3403.97	74.17	3433.6	74.32	3441.5	74.21	3469.16	74.21	3479.04	74.14
3486.94	74.25	3502.74	74.26	3524.47	74.42	3530.4	74.37	3560.03	74.39
3575.84	74.46	3591.64	74.39	3603.49	74.48	3627.19	74.48	3631.14	74.55
3646.95	74.54	3670.65	74.71	3692.38	74.69	3696.34	74.78	3708.19	74.67
3716.09	74.83	3741.77	74.71	3755.6	74.77	3759.55	74.87	3765.47	74.76
3771.4	74.84	3783.25	74.72	3799.06	74.76	3816.84	74.71	3824.73	74.77
3834.61	74.7	3864.25	74.76	3870.17	74.86	3887.95	74.81	3903.75	74.87
3927.46	74.81	3947.21	74.85	3959.07	74.79	3980.79	74.85	3998.57	74.85
4004.5	74.74	4018.33	74.86	4038.08	74.81	4053.88	74.83	4081.54	74.93
4099.32	74.67	4111.17	74.78	4115.12	74.71	4156.61	74.62	4172.41	74.69
4196.12	74.62	4198.09	74.67	4233.65	74.7	4243.53	74.82	4271.18	74.89
4296.86	75.13	4318.59	75.18	4336.37	75.34	4350.2	75.28	4367.98	75.47
4377.85	75.44	4385.76	75.55	4393.66	75.5	4403.53	75.58	4450.94	75.5
4460.82	75.4	4496.38	75.49	4508.23	75.3	4529.96	75.48	4563.54	75.47
4569.47	75.34	4581.32	75.41	4583.29	75.55	4589.22	75.34	4603.05	75.25
4626.75	75.19	4632.67	75.06	4636.63	75.14	4644.53	75.03	4650.45	75.08
4682.06	74.94	4697.87	75.15	4709.72	75.19	4715.65	74.95	4717.62	75.06
4731.44	74.99	4737.37	75.17	4743.3	75.09	4751.2	75.18	4757.13	74.92

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  4774.9   74.92 4780.83   75.01 4792.68   74.87 4796.63   74.97 4800.59    74.8
 4810.46   74.89 4816.38   74.68 4822.31   74.71 4834.16   74.52 4838.12   74.56
 4846.01   74.34 4851.94   74.51 4859.84   74.32 4867.75   74.52 4875.65   74.31
  4887.5   74.42 4891.45   74.34 4907.25   74.59 4915.15   74.41 4930.95   74.63
 4934.91   74.54 4948.73   74.85 4952.69   74.75 4968.49   74.91 4972.44   75.07
 4982.32   75.06 4990.22   75.38 4998.12   75.45 5004.04   75.34 5011.95   75.59
 5013.92   75.45 5021.82   75.45 5025.78   75.63 5037.63   75.58 5041.58   75.46
 5051.45   75.68 5055.41   75.61 5061.33   75.76 5069.23   75.56 5083.06   75.77
 5088.98   75.73 5098.86   76.03 5110.72   75.88 5120.59   76.04 5128.49   76.02
 5140.35   76.26 5144.29   76.22 5164.05   76.34 5169.97   76.53 5177.88   76.47
 5179.85   76.63 5187.75   78.54  5191.7   77.54 5193.68   77.41 5197.63   77.73
 5201.58   77.24 5209.48   76.67 5221.34   77.13 5229.23   76.97 5237.14   77.04
 5245.04   76.98 5258.87   77.18 5276.65   77.14 5284.54   76.94 5300.35   76.88
 5310.23   76.97 5318.13   73.97 5324.06   73.55    5328   73.74 5329.98   74.21
 5337.88      77 5347.76    78.9 5355.66   79.06 5361.59   79.04 5365.54   79.22
 5369.65   78.28 5373.77   76.29 5377.89    75.5 5386.12   75.42 5388.87   75.18
 5410.83   74.88 5423.17   74.57 5430.04   74.62 5439.64   74.17 5443.76   72.81
 5450.62   72.15 5453.37   72.16 5456.11   72.82 5458.86   73.85 5462.97   74.47
 5467.09   75.57  5476.7   75.14 5480.81   74.85 5484.94    74.3  5491.8   73.69

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2292.54     .07 2379.55    .025 2539.73     .07 2842.95    .085
    3161    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2292.54 2842.95          821.82 1653.32   845.1             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2292.54   73.26       T
 2842.95  5491.8   73.01       T
Left Levee      Station=  23.612      Elevation=  80.566
Right Levee     Station=5365.538      Elevation=   79.22

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 119.12*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    78.6    2.62   78.64    8.53   80.08   11.81   80.43   16.54      80
   17.72   79.27   20.09   76.57   23.58   74.65   29.47   70.05   35.47   69.78
   43.75   70.73   53.22   70.77    64.8    70.7   76.58   70.42  100.15   69.63
  111.93   69.88  134.86   71.82  141.37   72.01  164.92   72.14  182.59   71.96
  194.36   71.65  217.93   71.43  231.88    71.5  255.54    71.3  269.74   71.32
  285.12   71.16  305.24   71.15   335.7   70.96  349.02   71.03  398.71   70.85
  425.92   70.86  446.04   70.78   455.5   70.84  463.79   71.17  468.52   71.19
  472.07   70.42  474.44   70.21   483.9   70.01     491   70.19  500.61   70.24
  518.28   70.12  532.41   70.25  553.71   70.16  563.17   70.05   582.1   70.02
   596.3   70.06   624.7   70.01  641.95   70.14  653.73   70.03  683.17   70.35
  700.83   70.76  712.61   71.53  721.72   71.71  753.67   71.84  767.86   71.77
  808.09    71.8  824.51   71.74  850.69   71.91  879.09    71.8   889.3   71.88
  930.52   71.79  941.79   71.91  957.18   71.95   989.4   71.89  1032.9   71.99
 1035.27   72.04 1051.83   71.93 1083.78   72.11 1110.99   72.15 1154.31   72.04
 1183.75   72.17 1198.55    72.1 1208.02   72.19 1228.13   72.15  1266.2   72.28
 1295.57   72.27 1306.22   72.32  1328.7   72.23 1348.82   72.34 1360.42   72.23
 1384.31   72.35 1413.89    72.3 1451.76   72.43  1483.7   72.33 1499.09   72.44
 1509.74   72.44 1525.33   72.33 1542.99   72.45 1558.25   72.36 1578.32   72.59
 1584.21   73.07  1593.3   72.49 1602.38   70.98 1606.92   69.88 1609.4368.81295
 1618.26   64.76  1625.1   61.81 1625.99   61.62 1629.64   57.56 1638.37   56.79
 1647.66   56.22  1652.3   55.26 1657.34   54.46 1660.03    54.5 1664.67   54.04
 1667.77   53.15 1677.06   51.91 1684.89   51.52 1689.63   50.88 1708.57   50.61
 1719.39    50.7 1729.98   51.28 1740.56   51.53 1752.03   52.03 1762.61   52.19
  1773.2   52.84 1778.49   52.84 1783.78   53.32 1793.39    57.2 1796.29    57.3
 1802.07   59.47 1804.8960.04959 1807.86   60.66 1810.75    60.8 1818.21 60.5539
 1822.33    60.7 1828.11    60.5  1833.9   59.65 1839.68   59.54 1851.26   60.43
 1859.94    61.4 1865.73   61.12 1871.52   59.68  1877.3   59.15 1883.09   59.47
 1891.77   61.09 1894.66    61.3 1903.34   61.36 1912.02   61.93 1917.81   62.64
 1929.39   63.59 1943.85   63.56  1964.1   65.02 1975.68   66.11 1981.46   66.19
 1984.35   65.89 1993.04   64.35 1995.94   64.25 1998.83   64.78 2004.61   66.38
 2013.29   67.43 2017.23   67.32  2031.3   67.35  2050.9   66.96 2065.36   67.39
 2074.03   67.99 2087.6268.43692 2100.06   69.14 2114.52   69.69  2120.3   69.82
 2126.09   70.42 2131.87   70.82 2157.89   73.19 2163.15    73.2 2171.03   72.97
 2178.91   73.29 2184.17   72.99 2192.05   73.19  2197.3   73.07 2207.81   73.28
 2210.44   73.17 2223.57   73.34 2231.46   72.63 2236.71   72.53  2255.1   71.53
 2265.61   71.77 2276.12   71.54 2289.25   71.98 2307.64   71.34 2315.52    71.2
  2323.4   70.74 2339.16   71.16 2344.42   71.43 2349.67   71.36 2357.56   71.65
 2362.81   71.61 2375.95   72.28 2386.45   72.49 2394.33   72.21 2402.21   71.65
 2412.72   71.38 2425.86   70.92 2436.37   70.41 2441.62   70.34 2457.39   70.49
 2475.77   70.48 2481.03   70.39 2494.16   70.55 2499.42   70.39 2504.67   70.58
 2515.18    70.4 2523.06   70.68 2530.94   70.54  2536.2   70.78 2544.07   70.89
 2557.21   71.34 2572.97   72.62 2580.86   73.43 2591.36   73.26 2601.87   73.46
 2612.38   73.43 2617.64   73.28 2625.51   73.26 2641.28   73.47 2659.67    73.6
 2675.43   73.61 2680.69   73.76 2690.0473.43943 2699.07   73.59 2712.21   73.55
 2722.72    73.8 2738.48   73.64 2748.98   73.75  2759.5   73.71 2791.02   73.86
 2796.27   73.73 2801.53    73.9 2809.41   73.82 2819.92   73.98 2864.58   73.84
 2888.23   73.86 2893.47   73.95 2903.99   73.82 2927.63   73.95 2932.88   73.85
 2943.39   73.97  2953.9   73.81 2990.68   73.76  2993.3   73.84 3003.81   73.65
 3014.32   73.79 3035.33   73.76 3045.85   73.88 3064.24   73.94 3072.12   73.87
 3093.14   73.86 3098.39   73.92 3111.53   73.85 3132.54   73.92 3153.56    73.8
 3169.32   73.89 3200.84   73.86  3206.1   73.95 3227.11    73.9 3242.87   74.02
 3256.02      74 3258.64   74.09 3287.54   74.03 3292.79   74.15 3308.55   73.98
 3319.06   74.17 3329.57   74.17 3334.83   74.04 3345.33   74.07 3353.21   73.98
  3371.6   74.04 3376.86   74.15 3384.74   74.01 3392.62    74.1 3408.38   73.91
  3429.4   73.95 3453.04   73.85 3463.55   73.91 3476.69    73.8 3484.56   73.86
 3495.08   73.79 3500.33   73.88 3516.09   73.83 3523.97   73.96 3529.23   73.81
 3534.48   73.89 3547.61   73.86 3552.87   73.96 3600.16   73.81 3626.43   73.83
 3642.19   73.72 3671.09   73.76 3673.71    73.7 3694.73   73.73 3702.62   73.58
 3707.86    73.7 3715.75   73.61    3721   73.71 3747.27   73.61 3752.53   73.69
 3768.29   73.62 3791.93    73.7 3805.07    73.7 3828.71   73.33 3844.48   73.46
 3849.73   73.36 3883.88   73.24 3899.64   73.23  3904.9   73.16 3925.92   73.23
 3957.44    73.1 3960.07   73.16 3994.22   73.12 4007.36   73.14 4020.49   73.27
 4033.62   73.24 4057.27   73.32 4062.52   73.44 4075.65   73.46 4091.41   73.59
 4120.32   73.62 4133.45   73.78 4143.96    73.8 4162.35   73.71 4185.99   73.92
 4199.13   73.87 4209.64   73.99 4220.14   73.91 4233.28      74 4249.04    73.9
 4256.92   73.93 4296.33   73.84 4301.58   73.89 4309.47   73.68 4356.75   73.77
 4367.25   73.67 4372.51   73.49 4401.41   73.71 4409.29   73.67 4446.06   73.65
 4453.95   73.48 4469.71   73.56 4472.34   73.74 4480.21   73.45 4498.61   73.31
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4517	73.25	4524.88	73.13	4530.13	73.2	4538.01	73.03	4543.26	73.13
4553.78	72.97	4561.65	73.04	4580.04	72.89	4585.3	72.95	4603.69	72.81
4619.45	72.93	4624.7	73.06	4640.46	73.11	4648.35	72.78	4650.97	72.93
4669.36	72.82	4677.24	73.05	4685.12	72.94	4695.63	73.05	4703.51	72.69
4719.27	72.73	4727.15	72.66	4735.04	72.78	4750.8	72.57	4756.05	72.7
4761.31	72.48	4774.44	72.59	4782.32	72.29	4790.2	72.33	4805.96	72.07
4811.22	72.11	4816.47	71.86	4821.72	71.81	4829.61	72.03	4840.11	71.76
4850.62	72.03	4861.13	71.73	4876.89	71.86	4882.14	71.76	4900.53	71.95
4903.16	72.07	4913.67	71.82	4924.18	72.01	4934.68	72.09	4939.94	71.96
4945.19	72.17	4958.33	72.37	4963.58	72.23	4968.83	72.33	4984.6	72.41
4989.85	72.63	4997.73	72.7	5002.99	72.61	5013.49	73.02	5018.75	72.9
5024.01	73.1	5031.88	72.94	5042.39	73.27	5045.01	73.08	5055.53	73.08
5060.78	73.3	5076.54	73.22	5081.8	73.06	5094.93	73.34	5100.19	73.24
5108.06	73.44	5118.58	73.17	5136.97	73.44	5144.84	73.39	5157.97	73.78
5163.23	73.62	5173.74	73.56	5186.88	73.78	5197.38	73.74	5213.15	74.04
5218.4	74	5244.67	74.13	5252.55	74.39	5263.06	74.3	5265.69	74.52
5276.19	77.05	5281.45	75.71	5284.08	75.54	5289.33	75.97	5294.58	75.3
5302.46	74.63	5305.09	74.54	5312.97	74.94	5320.85	75.14	5331.36	74.92
5341.87	75.02	5352.37	74.93	5370.76	75.19	5383.9	75.09	5394.41	75.11
5404.91	74.84	5425.93	74.75	5439.07	74.87	5444.32	72.7	5449.57	70.85
5457.46	70.29	5462.71	70.55	5465.33	71.16	5475.85	74.89	5488.98	77.41
5499.48	77.62	5507.37	77.59	5512.62	77.82	5514.84	77.32	5517.06	76.3
5519.28	75.88	5537.03	75.34	5547.39	74.95	5552.56	74.6	5554.78	73.86
5559.96	73.41	5562.92	74.18	5567.36	74.93	5574.75	74.38	5580.67	73.66

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	1584.21	.07	1625.99	.025	1810.75	.07	2157.89	.085
2690.04	.066								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1584.21	2157.89	821.82	1653.32	845.1	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1584.21	73.07	T
2157.89	5580.67	73.19	T

Left Levee Station= 11.806 Elevation= 80.428
Right Levee Station=5512.624 Elevation= 77.82

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 118.81

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 458

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.29	3.28	79.66	6.56	75.76	9.84	70.2	13.12	70.11
29.52	70.09	36.08	69.77	49.21	68.75	55.77	69.1	68.89	71.51
72.17	71.75	85.29	71.89	95.13	71.63	101.69	71.23	114.82	70.95
121.38	71.07	134.5	70.8	144.34	70.79	150.9	70.62	170.58	70.49
180.42	70.33	183.71	70.42	216.51	70.15	246.03	70.06	259.16	69.94
272.28	70.03	282.12	69.9	288.68	70.02	298.52	69.96	305.08	69.78
341.17	69.73	351.01	69.84	357.57	69.71	373.97	70.08	383.81	70.58
390.37	71.52	393.65	71.74	410.06	71.85	426.46	71.79	442.86	71.82
452.7	71.73	465.82	71.92	482.23	71.76	488.79	71.86	511.75	71.72
518.31	71.84	537.99	71.89	544.55	71.81	570.8	71.91	577.36	71.8
593.76	72.01	623.29	72.04	636.41	71.89	652.81	72.03	659.37	71.9
665.93	72.02	675.77	71.98	698.74	72.1	724.98	72.1	731.54	72.02
744.66	72.12	751.22	72.02	767.63	72.11	784.03	72.04	800.43	72.11
816.83	72.03	833.24	72.19	843.08	72.05	852.92	72.18	862.76	72.07
872.6	72.34	875.88	72.88	882.44	72.4	889	70.85	892.28	69.64
895.56	67.43	902.12	61.82	905.41	59.27	908.69	54.1	921.69	52.6
928.69	50.4	936.69	50.2	944.69	50.2	950.69	50	965.69	49.9
975.69	50	987.69	50.7	999.69	51	1012.69	51.6	1024.69	51.8
1036.69	52.6	1042.69	52.6	1048.69	53.2	1059.59	58.04	1062.87	58.16
1069.43	60.87	1075.99	62.34	1079.27	62.51	1085.83	62.11	1092.39	62.37
1098.95	62.14	1105.51	61.09	1112.07	60.96	1125.2	62.02	1135.04	63.2
1141.6	62.84	1148.16	61.05	1154.72	60.4	1161.28	60.8	1171.12	62.79
1174.4	63.03	1184.24	63.07	1194.08	63.78	1200.64	64.67	1213.77	65.82
1230.17	65.69	1243.29	66.62	1253.13	67.2	1266.25	68.37	1272.81	68.37
1276.09	67.95	1285.94	65.92	1289.22	65.79	1292.5	66.45	1299.06	68.43
1308.9	69.73	1328.58	69.08	1351.53	68.75	1367.93	69.3	1377.76	70.03
1394.16	70.49	1407.27	71.15	1423.66	71.39	1430.22	71.31	1436.78	71.79
1443.34	71.99	1463.01	72.96	1472.84	73.37	1479.4	73.38	1489.24	73.08
1499.07	73.48	1505.63	73.1	1515.47	73.34	1522.02	73.18	1535.14	73.44
1538.42	73.3	1554.81	73.5	1558.09	73.35	1564.65	72.6	1571.21	72.47
1581.04	71.86	1594.16	71.21	1607.27	71.49	1620.39	71.2	1636.78	71.73
1643.34	71.44	1653.17	71.22	1659.73	70.92	1669.57	70.74	1679.4	70.15
1685.96	70.25	1699.07	70.66	1705.63	71	1712.19	70.9	1722.03	71.26
1728.58	71.2	1744.98	72.03	1758.09	72.28	1767.93	71.92	1777.76	71.22
1790.88	70.87	1807.27	70.28	1820.39	69.64	1826.94	69.54	1840.06	69.59
1846.62	69.72	1869.57	69.69	1876.13	69.57	1892.52	69.76	1899.08	69.55
1905.63	69.79	1918.75	69.55	1928.58	69.89	1938.42	69.71	1944.98	70
1954.81	70.14	1964.65	70.56	1971.21	70.68	1990.88	72.27	1997.44	73.08
2000.72	73.28	2013.83	73.06	2026.95	73.3	2040.06	73.25	2046.62	73.06
2056.45	73.02	2076.13	73.27	2099.08	73.41	2105.64	73.33	2118.75	73.41
2125.31	73.59	2138.42	73.14	2148.26	73.37	2164.65	73.3	2177.77	73.61
2197.44	73.39	2210.55	73.52	2223.67	73.46	2243.34	73.56	2249.9	73.5
2263.01	73.62	2269.57	73.45	2276.13	73.66	2285.96	73.55	2299.08	73.74
2341.7	73.57	2344.98	73.67	2354.82	73.53	2384.33	73.53	2390.88	73.64
2404	73.46	2433.51	73.6	2440.06	73.47	2453.18	73.61	2466.29	73.4
2512.2	73.31	2515.47	73.4	2528.59	73.16	2541.7	73.32	2567.93	73.27
2581.05	73.41	2590.88	73.36	2604	73.47	2613.84	73.37	2640.07	73.34
2646.62	73.41	2663.02	73.31	2689.25	73.37	2715.48	73.2	2735.15	73.31
2774.49	73.24	2781.05	73.34	2807.28	73.26	2826.95	73.4	2843.35	73.36
2846.62	73.47	2882.69	73.37	2889.25	73.51	2908.92	73.29	2922.03	73.52
2935.15	73.5	2941.71	73.34	2954.82	73.37	2964.66	73.24	2971.21	73.32
2987.61	73.3	2994.17	73.44	3004	73.25	3013.84	73.36	3033.51	73.11
3046.63	73.15	3053.18	73.04	3059.74	73.14	3089.25	72.99	3102.36	73.06
3118.76	72.91	3128.59	72.97	3141.71	72.88	3148.27	72.98	3167.94	72.91
3177.77	73.06	3184.33	72.87	3190.89	72.97	3207.28	72.92	3213.84	73.04
3220.4	72.94	3233.51	72.97	3259.74	72.86	3263.02	72.95	3272.86	72.8
3305.64	72.8	3325.32	72.65	3331.87	72.7	3361.38	72.68	3364.66	72.6
3390.89	72.62	3400.73	72.42	3407.28	72.56	3417.12	72.44	3423.68	72.57
3456.46	72.42	3463.02	72.51	3482.69	72.41	3512.2	72.49	3528.6	72.48
3558.1	71.99	3577.78	72.14	3584.33	72.01	3626.96	71.82	3646.63	71.8
3653.19	71.7	3679.42	71.77	3718.76	71.57	3722.04	71.65	3764.66	71.56
3777.78	71.66	3781.06	71.57	3797.45	71.73	3810.56	71.6	3813.84	71.68
3843.35	71.75	3849.91	71.89	3866.3	71.91	3885.97	72.06	3912.2	72.1

3922.04	72.06	3938.43	72.25	3951.55	72.27	3974.5	72.13	4004.01	72.37		
4020.4	72.3	4033.52	72.44	4046.63	72.33	4063.02	72.43	4082.7	72.28		
4092.53	72.32	4141.71	72.17	4148.27	72.23	4158.11	71.97	4194.17	72.03		
4207.28	71.98	4217.12	72.05	4230.23	71.92	4236.79	71.69	4272.86	71.94		
4282.69	71.89	4328.59	71.84	4338.43	71.62	4358.1	71.71	4361.38	71.93		
4371.21	71.56	4394.17	71.38	4417.12	71.29	4426.95	71.13	4433.51	71.22		
4443.34	71	4449.9	71.12	4463.02	70.91	4472.85	70.99	4495.8	70.8		
4502.36	70.86	4525.31	70.68	4544.98	70.82	4551.54	70.98	4571.21	71.03		
4581.05	70.61	4584.32	70.79	4607.27	70.64	4617.11	70.93	4626.95	70.78		
4640.06	70.91	4649.9	70.46	4669.57	70.5	4679.4	70.41	4689.24	70.55		
4708.91	70.28	4715.47	70.44	4722.03	70.16	4738.42	70.28	4748.25	69.91		
4758.09	69.95	4777.76	69.61	4784.32	69.66	4790.88	69.35	4797.43	69.28		
4807.27	69.55	4820.38	69.2	4833.5	69.53	4846.61	69.15	4866.28	69.3		
4872.84	69.17	4895.79	69.4	4899.07	69.55	4912.18	69.23	4925.3	69.46		
4938.41	69.55	4944.97	69.39	4951.53	69.64	4967.92	69.88	4974.48	69.7		
4981.03	69.83	5000.71	69.92	5007.26	70.19	5017.1	70.27	5023.66	70.15		
5036.77	70.66	5043.33	70.51	5049.89	70.75	5059.72	70.55	5072.84	70.95		
5076.11	70.71	5089.23	70.7	5095.79	70.98	5115.46	70.87	5122.02	70.66		
5128.57	70.71	5138.41	71.01	5144.97	70.88	5154.8	71.12	5167.92	70.78		
5190.87	71.11	5200.7	71.04	5217.09	71.52	5223.65	71.32	5236.77	71.25		
5253.16	71.51	5266.27	71.46	5285.95	71.83	5292.5	71.77	5325.29	71.93		
5335.12	72.25	5348.24	72.13	5351.52	72.4	5364.63	75.56	5371.19	73.89		
5374.47	73.67	5381.03	74.2	5387.58	73.37	5397.42	72.52	5400.7	72.41		
5410.53	72.91	5420.37	73.16	5433.48	72.88	5446.6	72.99	5459.71	72.88		
5482.66	73.19	5499.06	73.07	5512.17	73.09	5525.28	72.74	5538.4	72.66		
5541.68	72.76	5551.51	72.62	5561.35	72.76	5564.63	72.98	5567.91	72.76		
5574.46	70.05	5581.02	67.74	5584.3	67.35	5590.86	67.03	5597.41	67.35		
5600.69	68.12	5613.81	72.77	5630.2	75.92	5643.31	76.17	5653.15	76.13		
5659.71	76.42	5662.99	75.89	5669.54	73.62						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	875.88	.07	902.12	.025	1105.51	.07	1472.84	.085
2125.31	.066								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
875.88 1472.84 1046.54 1661.33 748.7 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	875.88	72.88	T
1472.84	5669.54	73.37	T

Left Levee Station= 0 Elevation= 80.29
Right Levee Station= 5659.71 Elevation= 76.42

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	76.54	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.02	Wt. n-Val.	0.066	0.057	0.068	
W.S. Elev (ft)	76.52	Reach Len. (ft)	1046.54	1661.33	748.70	
Crit W.S. (ft)	59.77	Flow Area (sq ft)	3162.39	8150.89	13001.24	
E.G. Slope (ft/ft)	0.000103	Area (sq ft)	4591.03	8150.89	18682.76	
Q Total (cfs)	20000.00	Flow (cfs)	1701.28	12223.61	6075.11	
Top Width (ft)	5663.62	Top Width (ft)	869.96	596.96	4196.70	
Vel Total (ft/s)	0.82	Avg. Vel. (ft/s)	0.54	1.50	0.47	
Max Chl Dpth (ft)	26.62	Hydr. Depth (ft)	3.64	13.65	3.10	
Conv. Total (cfs)	1972728.0	Conv. (cfs)	167807.8	1205693.0	599226.8	
Length Wtd. (ft)	1352.85	Wetted Per. (ft)	873.97	607.86	4203.74	
Min Ch El (ft)	49.90	Shear (lb/sq ft)	0.02	0.09	0.02	
Alpha	2.17	Stream Power (lb/ft s)	0.01	0.13	0.01	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	8589.77	5079.75	1844.70	
C & E Loss (ft)	0.00	Cum SA (acres)	2278.54	265.14	628.32	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 118.50*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.24	3.01	77.56	4.51	76.63	8.02	76.4	16.53	73.49
21.04	70.78	24.07	69.73	28.55	70.63	34.56	70.54	40.57	69.5
43.57	69.34	46.58	69.58	55.6	69.2	72.22	69.11	96.17	68.76
103.68	68.53	120.39	68.21	136.44	68.51	157.78	69.52	168.3	70.07
178.81	70.26	187.83	70.24	208.86	70.33	232.73	70.1	248.77	69.83
274.98	69.69	296.94	69.73	312.54	69.7	318.56	69.88	321.56	71.1
333.58	70.85	353.11	70.93	369.16	70.83	387.68	70.83	405.71	70.74
431.25	70.71	435.76	70.62	449.43	70.7	510.89	70.6	519.91	70.53
531.93	70.57	548.46	70.47	569.5	70.46	584.52	70.54	605.56	70.52
626.6	70.43	652.14	70.49	662.66	70.55	688.21	70.41	707.74	70.54
733.28	70.5	737.79	70.4	761.83	70.36	772.35	70.4	779.87	70.33
817.43	70.38	830.96	70.35	861.01	70.46	873.03	70.26	888.06	70.35
903.08	70.57	916.61	70.67	925.62	70.83	937.64	70.93	955	71.57
981.22	71.76	999.25	71.82	1002.26	71.88	1021.79	71.76	1051.84	71.79
1057.85	71.72	1066.87	71.78	1071.38	71.67	1090.91	71.7	1098.43	71.64
1122.47	71.66	1126.97	71.75	1139	71.78	1157.03	71.73	1172.06	71.63
1195.78	71.73	1220.14	71.69	1256.2	71.67	1268.23	71.76	1275.74	71.72
1289.26	71.8	1293.77	71.71	1314.81	71.79	1332.19	71.68	1352.37	71.74
1359.88	71.7	1386.93	71.81	1412.48	71.7	1433.52	71.82	1486.11	71.92
1492.12	71.88	1532.69	71.9	1538.7	71.81	1556.92	71.76	1583.78	71.8
1597.04	71.89	1613.09	71.76	1627.36	71.87	1688.96	71.83	1699.48	71.92
1719.02	71.94	1722.02	71.89	1737.05	71.95	1761.09	71.9	1773.11	71.97
1788.14	71.86	1807.67	71.86	1819.69	71.94	1843.73	71.82	1903.84	71.91
1906.85	71.85	1947.41	71.94	1972.96	71.85	1975.96	71.96	2004.51	71.9
2009.02	71.97	2022.54	71.97	2039.08	72.09	2072.13	71.88	2082.65	72.21
2090.17	72.11	2097.67	71.55	2108.2	71.33	2127.73	71.46	2130.73	71.57
2139.75	71.82	2142.76	72.2	2149.22	71.75	2155.68	70.59	2158.91	69.71
2164.0766	99921	2171.84	62.24	2175.07	58.43	2187.88	55.56	2194.77	53.17
2196.88	52.89	2200.27	51.82	2210.58	50.28	2220.9	49.29	2231.21	49.18
2240.2649	40343	2248.41	49.89	2257.8	50.18	2267.96	50.65	2277.34	50.85
2286.72	51.43	2291.41	51.45	2299.1	52	2304.63	55.1	2307.19	55.17
2312.32	56.97	2317.45	57.95	2320.01	58.06	2325.14	57.79	2329.3157	92819
2335.4	57.81	2340.53	57.11	2345.66	57.02	2355.92	57.73	2363.62	58.51
2368.75	58.27	2373.88	57.08	2379	56.65	2384.13	56.91	2391.83	58.22
2394.39	58.35	2402.08	58.3	2409.78	58.69	2414.91	59.27	2425.17	60.06

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 2437.99   60.02 2455.95   61.11  2466.2   61.92 2471.33   61.93  2473.9   61.66
  2481.6   60.33 2484.16   60.26 2486.73   60.71 2491.86   62.05 2499.55   62.95
 2514.94    62.5 2525.38   62.34 2532.88   62.35  2545.7   62.88 2553.39   63.54
 2566.21   64.19 2570.63    64.5 2576.11   66.69 2583.49   66.89 2585.3467.06605
  2594.4   67.86 2612.97   70.93 2627.72   73.52  2632.2   73.57 2638.92   73.42
 2645.62   73.74  2650.1   73.53 2656.82   73.74 2661.29   73.67 2670.24   73.92
 2672.48   73.85 2683.67      74 2690.38   73.41 2694.86   73.33 2710.52    72.5
 2719.47    72.7 2728.42   72.48 2739.61   72.79 2755.27    72.2 2761.99   72.06
  2768.7   71.64 2782.12   71.93  2786.6   72.14 2791.08   72.06 2797.79   72.28
 2802.26   72.22 2813.46   72.74  2822.4   72.88 2829.12   72.62 2835.83   72.14
 2855.97   71.46 2864.92   71.01 2869.39   70.93 2882.82   71.01 2898.49   70.95
 2902.96   70.86 2914.15   70.97 2918.63   70.82  2923.1   70.98 2932.05   70.81
 2938.76   71.03 2945.48   70.91 2967.85   71.53 2981.28   72.58 2987.99   73.25
 2996.94   73.09  3005.9   73.25 3014.84   73.21 3026.03   73.04 3039.46    73.2
 3055.12   73.28  3059.6   73.22 3073.6873.35818 3081.97   73.08 3088.69   73.22
 3099.87   73.17 3108.83   73.38 3122.25   73.24  3131.2   73.33 3140.16    73.3
    3167   73.39 3171.48   73.27 3175.96   73.41 3182.67   73.33 3191.62   73.45
 3229.66   73.29  3249.8   73.28 3254.27   73.36 3263.23   73.24 3283.37   73.33
 3287.84   73.25 3296.79   73.34 3305.74    73.2 3337.07   73.15 3348.26   73.05
 3357.21   73.15 3375.11   73.12 3384.06   73.22 3399.73   73.26 3406.44   73.19
 3440.01   73.15 3457.91    73.2 3475.81   73.08 3489.23   73.16 3516.08   73.12
 3520.56   73.19 3538.46   73.14 3551.89   73.24 3563.08   73.21 3565.31   73.29
 3589.93   73.23  3594.4   73.32 3607.83   73.18 3616.78   73.34 3625.73   73.33
 3630.21   73.22 3645.87   73.16 3661.53    73.2 3666.01    73.3 3672.72   73.17
 3679.44   73.25 3692.86   73.08 3710.76    73.1  3730.9   72.99 3739.85   73.04
 3751.04   72.93 3766.71    72.9 3771.18   72.97 3784.61   72.91 3791.32   73.01
 3811.46    72.9 3829.36   72.93 3856.21   72.81 3878.59   72.81 3892.02    72.7
 3916.63   72.72 3918.87   72.67 3936.77   72.68 3943.48   72.55 3947.95   72.64
 3954.67   72.56 3959.15   72.65 3981.52   72.55 3986.21   72.61 3999.42   72.55
 4030.75    72.6 4050.89   72.29 4064.32   72.39 4068.79   72.31 4115.78   72.08
 4133.69   72.11 4160.53   71.95 4162.77   72.01 4191.86   71.94 4203.05   71.95
 4214.24   72.06 4225.42   72.03 4245.56   72.09 4250.04   72.18 4274.65   72.29
 4299.27   72.27 4310.46   72.39 4319.41   72.38 4335.07   72.25 4355.21   72.36
  4366.4   72.29 4375.35   72.36  4384.3   72.26 4395.49    72.3 4408.92   72.17
 4415.63   72.18 4449.19   72.03 4453.67   72.06 4460.38   71.88 4501.46   71.86
 4509.61   71.76 4514.08   71.59  4538.7   71.69 4576.73   71.53 4583.45   71.36
 4596.88   71.38 4599.11   71.52 4605.82   71.23 4621.49   71.03 4648.34    70.8
 4655.05   70.64 4659.53   70.71 4668.48   70.54 4675.19   70.58 4690.85   70.41
 4695.33   70.44 4710.99    70.3 4724.42   70.38  4728.9   70.48 4742.32   70.49
 4749.04    70.2 4751.27   70.32 4766.93    70.2 4773.65   70.38 4780.36   70.27
 4789.31   70.34 4796.02   70.03 4809.45   70.04 4816.16   69.97 4822.87   70.06
  4836.3   69.87 4840.78   69.97 4845.25   69.78 4856.44   69.86 4863.15   69.62
 4869.86   69.64 4883.29   69.42 4887.76   69.45 4896.71   69.21 4903.43   69.39
 4912.38   69.16 4921.33   69.39 4930.28   69.14  4943.7   69.25 4948.18   69.17
 4963.84   69.33 4966.08   69.43 4975.03   69.23 4992.93   69.45 4997.41   69.35
 5001.88   69.52 5013.07   69.68 5035.45   69.72 5039.92   69.91 5051.11   69.89
 5060.06   70.23 5064.54   70.14 5069.01   70.32 5075.72   70.21 5084.68   70.51
 5086.91   70.35 5095.86   70.38 5100.34   70.58 5113.76   70.56 5118.24   70.45
 5129.43   70.74  5133.9   70.68 5140.61   70.88 5149.57    70.7 5165.23   71.01
 5171.94      71 5183.12   71.39  5187.6   71.28 5196.56   71.28 5207.74   71.52
 5216.69   71.54 5230.12   71.86 5234.59   71.84 5256.97   72.06 5263.68   72.29
 5272.63   72.24 5274.87   72.43 5283.82   74.56  5288.3   73.46 5290.53   73.32
 5295.01   73.69 5299.48   73.15 5308.44   72.54 5315.14   72.89 5321.86   73.08
 5330.81   72.92 5339.76   73.02 5348.71   72.99 5364.37   73.35 5384.51   73.47
 5393.46   73.33 5411.36   73.47 5422.55    73.7 5427.02   71.95  5431.5   70.46
 5438.22   70.07 5442.69   70.29 5444.93   70.81 5453.88   73.92 5465.07   76.03
 5474.01   76.21 5480.73   76.19 5485.21   76.39 5488.84   76.02  5496.1   74.46

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2142.76     .07 2175.07    .025 2317.45     .07 2627.72    .085
 3073.68    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2142.76 2627.72          1046.54 1661.33   748.7             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2142.76    72.2       T
 2627.72  5496.1   73.52       T
Left Levee      Station=       0      Elevation=   80.24
Right Levee     Station=5485.207      Elevation=76.39333

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 118.18*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   80.19    2.39   78.19    4.78   75.06    7.17   73.33   12.77   73.14
   19.13   72.51    26.3   71.55   33.47   69.26   35.86   69.03   38.31   69.25
   43.04   70.64   45.43    71.1   50.21   71.25      55   70.97   59.78   70.16
   64.55   68.89   69.34   68.58   74.12   69.05   83.69   68.46   88.47    68.3
  114.92   68.12  121.94      68   133.9   68.03  145.86   67.93  153.02      68
  164.98   67.79  179.33   67.76  191.57   67.66  205.63   67.84  210.41   67.82
  222.37   67.96   239.1   68.24  251.06   68.34   267.8   68.65  284.53   68.75
  298.88   68.69   320.4   68.78  332.35   68.76  341.92   68.65   346.7   68.72
  351.48    68.6  382.56   68.55  384.96    68.5  408.86   68.38  437.56   68.39
  447.13   68.28   451.9    68.4  463.86   68.34  497.33   68.46  504.51   68.61
   506.9   68.87  511.68   71.34  514.07   71.46  521.25   71.04  530.81   70.89
  537.98   71.03  542.76   70.99  561.89   71.07  590.58   71.04  597.76    71.1
  612.11   71.05  616.89    71.1  631.23   71.02  633.62   71.08  645.58   70.97
  686.23   71.02   693.4   70.88  712.53   70.99   719.7   70.94  729.27   71.04
  738.83   70.99  755.56   71.03  765.13   70.97   798.6      71  803.39    70.9
  812.95   70.98   827.3   70.87  839.25    70.9  846.42      71  872.73   70.81
  877.51    70.9  899.03   70.88   906.2   70.81  913.38   70.91  930.11      71
  949.24   70.94  963.59      71  980.32   70.89  994.67   70.97  997.06   70.88
 1008.86   70.95 1037.71   70.98 1054.45   71.08 1064.01   70.96 1071.18      71
  1095.1   70.91 1102.27   71.01 1116.61   70.96 1126.18   71.07 1145.31   71.01
 1152.48   71.11 1166.83   71.08    1174   70.93 1190.74   71.03 1195.52   70.97
 1212.26   70.96    1229   71.04 1240.95    70.9 1248.12   70.96 1264.86   70.92
 1300.73   71.02 1305.51   70.95 1317.47   71.03 1343.76   71.07 1348.55   70.98
 1365.29   70.97 1370.07   71.09 1377.24   70.89 1389.19   70.79 1393.98   70.87
 1413.11   70.87 1417.89   70.99 1432.23   71.07 1437.02   71.17 1477.66   71.29
 1496.79   71.39 1520.71   71.62 1530.27   71.64 1537.44   71.56  1549.4   71.67
 1590.05    71.8 1594.83   71.91 1613.95   71.79 1621.13   71.84 1625.91   71.69
 1630.69   71.81 1640.26   71.75 1661.77   71.74 1673.73   71.79  1683.3   71.64
 1697.65   71.74 1704.81   71.52 1723.97   71.59 1731.12   71.51  1735.9   71.62
 1747.86   71.52 1766.98   71.58 1786.11    71.5 1793.28   71.65 1805.24   71.56
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1812.41	71.64	1833.94	71.56	1841.1	71.62	1865.02	71.48	1874.58	71.62		
1891.32	71.53	1908.06	71.62	1924.8	71.62	1939.14	71.51	1941.53	71.57		
1989.35	71.62	2003.7	71.66	2013.27	71.58	2018.05	71.67	2030	71.58		
2051.52	71.73	2058.7	71.56	2063.48	71.71	2068.25	71.62	2101.73	71.67		
2123.25	71.54	2130.42	71.62	2151.95	71.64	2163.9	71.55	2175.85	71.66		
2185.42	71.63	2190.2	71.71	2197.38	71.63	2206.94	71.73	2218.89	71.61		
2223.68	71.7	2230.85	71.6	2238.02	71.69	2247.58	71.59	2264.32	71.69		
2271.5	71.61	2281.06	71.72	2297.8	71.64	2302.58	71.71	2314.54	71.69		
2326.49	71.76	2333.67	71.7	2350.4	71.78	2357.57	71.71	2364.75	71.81		
2374.31	71.73	2383.87	71.83	2391.05	71.72	2438.87	71.8	2448.43	71.65		
2460.39	71.61	2465.17	71.68	2477.42	71.63	2486.69	71.7	2520.16	71.61		
2527.34	71.71	2536.9	71.65	2560.82	71.69	2587.12	71.65	2611.02	71.66		
2615.81	71.78	2620.59	71.7	2637.33	71.74	2644.5	71.69	2666.02	71.68		
2675.58	71.75	2687.54	71.61	2704.28	71.75	2725.8	71.69	2735.36	71.79		
2740.15	71.69	2764.05	71.8	2773.62	71.69	2785.58	71.7	2797.53	71.79		
2802.31	71.7	2821.44	71.83	2845.35	71.7	2850.13	71.77	2859.7	71.69		
2869.26	71.73	2876.44	71.65	2895.56	71.77	2917.08	71.72	2929.03	71.74		
2933.82	71.61	2943.38	71.72	2945.77	71.58	2962.51	71.61	2974.46	71.75		
2981.64	71.63	2998.38	71.75	3003.16	71.67	3019.89	71.69	3029.46	71.76		
3034.24	71.65	3058.15	71.74	3065.32	71.67	3074.89	71.73	3094.01	71.67		
3098.8	71.8	3110.75	71.63	3117.93	71.69	3125.1	71.57	3129.89	71.68		
3139.44	71.63	3144.23	71.85	3160.97	71.76	3170.53	71.81	3189.66	71.75		
3196.83	71.86	3218.35	71.82	3244.65	72	3266.17	71.87	3270.95	71.91		
3282.91	71.78	3287.69	71.86	3297.25	71.67	3302.03	71.98	3313.99	72.25		
3321.16	72.25	3325.95	72.06	3337.9	70.98	3342.68	70.93	3354.64	70.57		
3361.81	70.54	3371.38	70.68	3385.72	70.65	3390.5	70.84	3404.85	70.97		
3409.63	71.52	3416	71.11	3422.36	70.33	3426.03	69.6444	3428.72	68.9		
3436.28	66.18	3438.27	65.2	3441.45	62.77	3442.94	62.37	3449.6	59.93		
3454.06	58.52	3459.6	56.38	3462.93	55.43	3466.26	53.38	3476.42	50.36		
3484.62	48.9459	3486.58	48.62	3496.74	48.46	3502.37	48.65	3509.14	49.08		
3523.23	49.7	3529.99	49.9	3536.76	50.25	3545.68	50.62	3549.67	52.16		
3553.152	57249	3558.91	53.55	3571.85	53.47	3575.55	53.12	3579.25	53.08		
3586.65	53.43	3592.2	53.83	3595.89	53.71	3599.59	53.11	3603.29	52.89		
3606.99	53.03	3612.53	53.64	3619.93	53.53	3625.48	53.6	3636.57	54.31		
3645.82	54.35	3658.76	55.01	3666.16	55.47	3669.85	55.5	3677.26	54.75		
3679.1	54.73	3684.65	55.67	3690.2	56.18	3708.82	55.79	3714.23	55.94		
3723.47	56.47	3729.01	57.06	3741.45	58.22	3745.39	62.25	3750.01	62.4768		
3756.03	63.74	3761.35	65.3	3771.97	69.34	3782.61	73.68	3788.59	73.76		
3805.34	74.4	3812.52	74.51	3826.89	73.79	3831.67	73.9	3836.46	73.76		
3842.44	73.86	3854.41	73.37	3858	73.13	3867.57	73.29	3875.95	73.25		
3886.72	73.48	3893.89	73.06	3904.67	72.64	3909.45	72.37	3929.8	72.15		
3940.56	72.17	3952.53	72.1	3964.5	72.39	3975.27	73.22	3995.61	73.07		
4011.17	73.15	4022.0473	13386	4025.53	73.01	4035.1	73.04	4039.89	73.16		
4084.16	73.17	4099.72	73.07	4122.46	73.02	4140.41	73.07	4161.95	72.98		
4187.07	73.02	4269.64	73.02	4284	73.11	4306.74	73.07	4311.52	73.15		
4327.08	73.07	4345.03	73.13	4383.32	72.95	4401.27	72.91	4404.86	72.96		
4439.57	72.81	4458.71	72.76	4494.61	72.73	4506.58	72.67	4532.9	72.73		
4543.67	72.58	4550.85	72.64	4578.38	72.45	4587.95	72.45	4602.31	72.34		
4625.05	72.34	4647.78	72.42	4663.34	72.53	4687.27	72.5	4695.65	72.37		
4717.19	72.28	4756.67	71.89	4762.66	71.78	4784.2	71.68	4791.38	71.49		
4804.54	71.44	4824.88	71.21	4828.47	71.1	4836.85	71.1	4840.44	70.91		
4866.76	70.28	4884.82	70.03	4896.68	69.92	4913.43	69.95	4926.59	69.75		
4938.56	69.78	4942.15	69.61	4956.51	69.56	4968.48	69.41	4974.46	69.45		
4978.04	69.32	4991.21	69.25	4995.99	69.13	5004.37	69.13	5009.16	69.25		
5013.94	69.13	5023.52	69.16	5033.09	69.31	5037.88	69.22	5049.84	69.3		
5058.22	69.49	5060.61	69.43	5078.56	69.63	5083.35	69.81	5091.72	69.86		
5096.51	70.06	5114.46	70.23	5126.42	70.64	5131.21	70.63	5143.18	70.97		
5149.16	71.25	5156.34	71.32	5167.11	71.61	5174.29	71.89	5188.65	72.19		
5198.22	72.46	5203.01	73.56	5205.4	73.03	5208.99	73.18	5216.17	72.66		
5223.35	72.99	5228.14	72.95	5237.71	73.11	5246.08	73.51	5256.85	73.86		
5261.64	73.92	5277.2	74.64	5281.98	73.19	5285.58	73.11	5289.16	73.5		
5293.95	75.07	5299.93	76.15	5310.7	76.37	5314.7	76.15	5322.67	75.3		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.163	3409.63	.066	3459.6	.025	3723.47	.066	3782.61	.071

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
3409.63 3782.61 1046.54 1661.33 748.7 .1 .3
Left Levee Station= 0 Elevation= 80.19
Right Levee Station=5310.704 Elevation=76.36666
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
10.33	509.47	71.52	3817.56	5335.63	73.82

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 117.87

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.14	3.28	77.2	6.56	72.57	9.84	70.02	19.68	69.85
26.24	69.91	36.07	69.61	45.91	67.74	49.19	67.92	52.47	68.76
59.03	70.87	62.31	71.58	68.87	71.82	75.43	71.4	81.99	70.18
88.54	68.28	91.82	67.8	95.1	67.82	101.66	68.53	108.22	68.21
114.78	67.64	121.34	67.4	141.02	67.25	150.85	67.11	157.41	67.14
167.25	67	183.65	67.12	200.05	67.06	209.88	67.24	226.28	67.04
245.96	67.15	252.52	67.09	272.19	67.14	282.03	67.29	288.59	67.23
298.43	67.33	304.99	67.26	327.94	67.29	344.34	67.16	367.3	67.23
370.58	67.15	380.42	67.25	390.25	67.25	409.93	67.13	416.49	67.2
429.61	67.16	439.45	67.24	449.28	67.15	455.84	67.2	468.96	67.06
475.52	67.18	482.08	67.02	511.59	67.04	524.71	67.11	527.99	67.05
560.78	66.99	600.14	67.08	613.26	66.94	619.81	67.12	636.21	67
662.45	67.12	672.29	67.23	682.12	67.22	691.96	67.46	695.24	67.86
701.8	71.58	705.08	71.77	714.92	71.16	728.04	70.94	737.87	71.14
744.43	71.08	770.67	71.21	793.62	71.27	810.02	71.25	819.86	71.35
839.54	71.28	846.1	71.36	865.77	71.26	869.05	71.35	885.45	71.19
908.4	71.21	941.2	71.33	951.04	71.14	977.27	71.28	987.11	71.21
1000.23	71.36	1013.35	71.3	1036.3	71.38	1049.42	71.3	1065.82	71.37
1072.38	71.31	1095.33	71.38	1101.89	71.24	1115.01	71.36	1134.69	71.21
1144.53	71.34	1151.08	71.27	1160.92	71.42	1177.32	71.26	1187.16	71.29
1197	71.15	1203.56	71.29	1233.07	71.26	1242.91	71.17	1252.75	71.32
1275.7	71.46	1288.82	71.37	1295.38	71.46	1301.94	71.38	1315.06	71.39
1321.62	71.48	1344.57	71.33	1364.25	71.47	1367.53	71.34	1383.93	71.45
1423.28	71.48	1433.12	71.57	1439.68	71.48	1446.24	71.61	1459.35	71.43
1469.19	71.51	1482.31	71.42	1485.59	71.47	1501.99	71.41	1511.83	71.56
1531.5	71.45	1544.62	71.59	1570.86	71.52	1580.7	71.68	1593.81	71.59
1600.37	71.65	1610.21	71.46	1633.17	71.66	1639.73	71.56	1662.68	71.55

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 1672.52   71.66 1679.08   71.59 1685.64   71.68  1692.2   71.53 1702.04   71.47
 1711.87   71.56 1734.83    71.5 1761.07   71.58 1770.91   71.55 1784.02   71.66
 1790.58   71.56 1806.98   71.68 1813.54    71.6  1820.1   71.67 1843.05   71.72
 1849.61   71.58 1862.73    71.6 1872.57   71.53 1879.13   71.73 1888.97   71.44
 1905.36   71.32 1911.92   71.44 1928.32   71.36 1938.16   71.39 1944.72   71.56
 1964.39   71.63 1970.95   71.77 1987.35   71.82 2000.47   71.79 2007.03   71.86
 2013.59   71.78 2020.15   71.89  2026.7   71.75 2039.82   71.77 2046.38   71.68
 2052.94   71.75 2069.34   71.67 2085.74   71.66 2092.29   71.55 2098.85   71.61
 2108.69   71.47 2125.09   71.62 2131.65   71.57 2141.49   71.69 2167.72   71.77
 2174.28   71.86 2180.84   71.78  2187.4   71.94 2193.96   71.81 2200.52   71.92
 2213.63   71.77 2223.47   71.85 2230.03   71.63 2236.59   71.81 2246.43   71.63
 2249.71   71.72 2279.22   71.72 2295.62   71.78 2308.74   71.56 2328.42   71.71
 2338.25   71.38 2348.09   71.47 2354.65    71.4 2364.49   71.47 2374.33   71.37
 2380.89   71.53 2397.29    71.4 2423.52    71.5 2436.64    71.4  2443.2   71.46
 2449.76   71.34 2459.59   71.55 2475.99   71.39 2485.83    71.5 2495.67   71.44
 2505.51   71.48 2515.35    71.4 2525.18    71.5 2551.42   71.41 2557.98   71.32
  2571.1   71.55 2594.05   71.39 2617.01    71.5 2633.41   71.45 2639.97   71.52
 2659.64   71.36 2662.92   71.46 2708.83   71.53 2718.67   71.47 2728.51   71.57
 2741.63   71.51 2748.19   71.61 2761.31   71.46 2767.87   71.59 2784.26   71.45
 2797.38   71.57 2807.22   71.54 2813.78   71.67 2823.62   71.41 2830.18   71.63
 2836.73    71.5 2869.53   71.58 2876.09   71.48 2882.65   71.57 2912.16    71.4
    2922   71.52 2935.12   71.47 2951.52   71.54 2958.07    71.4 2964.63    71.5
 2967.91    71.4 2984.31   71.56 2997.43   71.51 3003.99   71.63 3013.83    71.5
 3026.94   71.64 3036.78    71.6 3043.34   71.46  3049.9    71.6 3059.74   71.46
 3069.58   71.62 3082.69   71.49 3105.65   71.61 3115.49   71.47 3128.61   71.63
 3151.56   71.48 3158.12   71.58 3174.52   71.53 3190.92   71.63 3200.76   71.54
 3207.31   71.62 3217.15   71.56 3223.71   71.66 3233.55   71.55 3243.39    71.7
 3256.51   71.58 3269.62   71.73 3279.46   71.57  3289.3   71.66 3299.14   71.61
 3312.26   71.66  3322.1    71.6 3328.65   71.66 3338.49   71.59 3345.05    71.7
 3358.17   71.49 3364.73   71.57 3374.57   71.44 3381.13   71.55 3397.52    71.5
 3410.64   71.59 3456.55   71.43 3466.39   71.57 3479.51   71.47 3486.07   71.61
 3492.63   71.54 3512.31   71.57 3518.86   71.47  3528.7   71.56 3548.38   71.48
 3551.66    71.6  3561.5   71.49 3568.06   71.56 3581.17   71.49 3587.73   71.67
 3594.29   71.56 3617.25   71.61 3627.09   71.54  3656.6   71.51 3669.72   71.61
 3686.12   71.38 3692.68   71.51 3709.07   71.59 3725.47   71.47 3738.59   71.49
 3751.71   71.63 3758.27   71.48  3784.5   71.58 3791.06   71.65 3804.18   71.49
 3807.46   71.57 3820.58    71.5 3827.13   71.62 3836.97   71.64 3843.53    71.5
 3853.37   71.64 3856.65   71.56 3869.77    71.7 3882.89    71.6 3902.56   71.53
 3909.12   71.64 3922.24   71.51 3935.36   71.56  3945.2   71.43 3948.47   71.52
 3961.59    71.5 3964.87   71.39 3971.43    71.6 3977.99   71.54 4000.95   71.55
 4004.23   71.48 4017.34    71.6  4023.9    71.4 4037.02   71.56  4040.3   71.34
 4053.42   71.45 4063.26   71.38 4079.65   71.58 4089.49   71.39 4102.61   71.44
 4112.45   71.58 4119.01   71.46 4132.12   71.55 4141.96   71.49 4155.08   71.61
 4161.64   71.44 4171.48   71.57 4178.04   71.49 4194.43   71.59 4204.27   71.48
 4217.39   71.56 4223.95   71.47 4233.79   71.54 4243.62   71.46 4250.18   71.65
 4266.58    71.4 4276.42   71.48 4286.26   71.31 4292.82   71.47 4305.93    71.4
 4312.49   71.74 4335.45   71.62 4348.57   71.69  4358.4   71.62  4374.8    71.6
 4384.64   71.75 4414.15   71.67 4433.83   71.83 4450.23    71.9 4479.74   71.75
  4486.3   71.82  4502.7   71.65 4509.26   71.75 4522.37   71.45 4528.93   71.91
 4535.49      72 4545.33    72.3 4555.17   72.29 4561.73   72.01 4568.29   71.44
 4571.57   70.96 4578.12    70.4 4584.68   70.34 4601.08   69.82 4610.92   69.77
 4624.04   69.94 4627.32   69.83 4633.88   69.93 4643.71   69.85 4650.27   70.11
 4656.83   70.19 4669.95   70.11 4676.51   70.84 4686.35   70.25 4699.46   69.34
 4702.74   68.84  4709.3    66.6 4715.86   63.33  4725.7   59.17 4728.98   57.97
 4732.26   54.94 4742.26   50.44 4752.26   47.94 4762.26   47.74 4772.26   48.44
 4782.26   48.94 4792.26   49.24 4802.26   49.14 4832.26   49.14 4842.26   48.44
 4852.26   48.64 4862.26   48.94 4872.26   49.14 4882.26   49.44 4892.26   49.24
 4902.26   50.14 4912.26   51.94 4914.68   54.94 4914.68   57.81 4917.94   58.12
  4921.2   59.92 4924.46   62.11 4930.97   67.75 4937.49   73.83 4940.75   74.99
    4944   75.11 4950.52   74.14 4957.03   73.39 4970.06   72.91 4973.32   72.98
 4979.84   72.79 4996.12   72.85 5012.41   73.04 5022.19   72.82 5031.96    72.8
 5038.47   72.91 5044.99   72.69  5051.5   72.78 5054.76   72.65 5061.28   71.95
 5067.79   71.49 5074.31   70.75 5077.57   70.02 5080.82   69.64  5090.6   69.04
 5093.85   69.02 5106.88   69.39 5110.14   69.89 5119.91   72.27 5126.43   73.11
 5129.69   74.44 5132.94   76.16  5136.2   76.34 5149.23   76.14

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .163 4676.51    .066 4728.98    .025 4914.68    .066 4937.49    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4676.51 4937.49          2169.02    1775 1720.13            .1       .3
Left Levee      Station=       0      Elevation=   80.14
Right Levee     Station=  5136.2      Elevation=   76.34
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 -175.77 4546.48   72.35 4948.73 5225.92   75.03

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)              76.20    Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.10    Wt. n-Val.                 0.163      0.040      0.071
  W.S. Elev (ft)              76.10    Reach Len. (ft)          2169.02    1775.00    1720.13
  Crit W.S. (ft)              56.53    Flow Area (sq ft)       17767.27    5713.47     211.26
  E.G. Slope (ft/ft)       0.000098    Area (sq ft)            17767.27    5713.47     211.26
  Q Total (cfs)            20000.00    Flow (cfs)               3912.40   16041.58      46.02
  Top Width (ft)            5128.77    Top Width (ft)           4672.45     260.98     195.34
  Vel Total (ft/s)             0.84    Avg. Vel. (ft/s)            0.22       2.81       0.22
  Max Chl Dpth (ft)           28.36    Hydr. Depth (ft)            3.80      21.89       1.08
  Conv. Total (cfs)        2016520.0     Conv. (cfs)             394471.5   1617408.0     4640.5
  Length Wtd. (ft)           1847.61    Wetted Per. (ft)         4674.55     275.96     196.48
  Min Ch El (ft)               47.74    Shear (lb/sq ft)            0.02       0.13       0.01
  Alpha                         8.89    Stream Power (lb/ft s)      0.01       0.36       0.00
  Frctn Loss (ft)               0.21    Cum Volume (acre-ft)     7657.92    4216.79    1410.05
  C & E Loss (ft)               0.00    Cum SA (acres)           2078.85     216.06     515.10


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 117.54*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.24    9.84   81.33    16.4   81.29   22.95   81.34   29.51   81.21
   42.63   81.42   45.48   79.87   48.32   77.48   51.16   76.11   65.36   75.26
```

```
   73.87   74.56    82.4   73.06   85.24   72.97   88.08   73.21   93.76   73.98
    96.6   74.25  102.28    74.2  107.96   73.68  112.46   72.91  116.34   71.81
  119.32   70.58  122.16   69.58     125   68.88  135.74   67.55  142.04    67.4
  147.38   67.53   162.9   69.11  166.78   69.22  178.42   68.41  190.06   68.14
  197.82   68.16   201.7   67.89  217.21   67.72  224.97   67.85  238.61   67.69
  248.25   67.74  267.65   67.66  286.89   67.81   301.1   67.83  318.08   67.78
  329.72   67.84  337.48   67.73  345.24   67.82  363.58   67.71  372.11   67.79
  407.32   67.75  423.23   67.88  431.74   67.74  454.47   67.82  460.15    67.7
  469.39    67.8  473.27    67.7  481.03   67.78  484.91   67.71  496.55   67.82
  512.07   67.75  523.69   67.81  531.45   67.74  539.21   67.83  546.97   67.74
   562.4   67.85  573.76   67.74  589.65   67.84  601.29   67.78  609.05   67.82
  616.81   67.79  632.32   67.92  640.08   67.93  644.76   68.19  650.45    70.1
  653.29   70.17  661.81   69.85  673.17   69.73  681.69   69.85  686.64   69.77
   694.4   69.91  710.09   69.85  717.68   69.95  733.19   69.87  744.83   69.95
  756.47   69.89  764.23   69.94  768.11   69.89  783.63   69.94  792.46   69.91
   795.3   69.96  806.91   69.85  822.43    69.9  837.94   69.86  857.78   69.93
  866.31   69.81  880.62    69.8  892.26   69.93  897.55    69.9  908.91   69.98
  931.06   69.98  940.15   70.02  950.44   69.92  965.96   69.97  969.84   69.89
  981.48   70.02  996.95   69.91 1008.32   70.01 1025.36    69.9 1033.88   70.03
1048.08   70.09 1062.28   69.99  1070.8   70.03 1078.47   69.94 1085.01   70.01
1101.75   70.09 1119.09   69.98 1132.79   70.19 1144.43   70.13 1156.06   70.23
1164.53    70.2 1171.58   70.11 1181.57   70.11 1194.86   70.18 1210.38   70.13
1218.14   70.21 1227.02   70.14 1260.81   70.24  1275.3   70.25 1283.82   70.33
1295.19   70.31 1306.54   70.19 1322.89   70.27 1334.52   70.21  1357.8    70.3
1369.03   70.21 1392.72   70.35 1403.12    70.3 1411.64   70.38  1431.5   70.31
1447.02   70.33 1457.08   70.44 1462.54   70.36 1474.18   70.39 1482.64   70.32
1491.16   70.39 1502.52   70.42 1516.73   70.33 1525.24   70.37 1532.37   70.33
1540.13   70.37 1547.89   70.33 1563.41   70.42 1571.17   70.37 1582.81   70.46
1593.41    70.4 1606.08    70.5  1613.3   70.44 1638.85   70.52 1644.53   70.44
1664.42   70.38  1670.1   70.51 1678.62   70.36 1687.56   70.28  1698.5   70.36
1710.83   70.32 1726.91   70.46 1734.11   70.44 1749.62   70.55 1757.39   70.54
1769.03   70.62 1780.87   70.63 1786.55   70.59 1792.23   70.65 1803.93   70.58
1811.69   70.64 1831.09   70.55 1842.73   70.64 1854.71   70.52  1860.4   70.56
1868.92   70.49  1885.4   70.54  1904.8   70.67 1912.56   70.65 1925.72    70.7
 1931.4   70.64 1937.09   70.69 1942.77   70.58 1951.36   70.64 1955.24   70.81
1968.33   70.73 1974.01    70.6 1979.69   70.72 1988.21    70.6 1997.91   70.59
2009.55   70.65 2021.19   70.66 2030.81   70.75 2042.18   70.58 2052.23   70.67
2059.22   70.66 2067.73    70.5  2075.5   70.59 2081.94   70.55 2098.98   70.53
2104.66   70.57 2118.87   70.48 2125.94   70.53 2145.34   70.59 2152.95   70.54
2172.82   70.57 2176.37   70.52 2195.55   70.62 2204.07   70.58 2221.11   70.56
2242.31   70.63 2258.04   70.55  2269.4   70.68 2292.75    70.6 2308.27    70.7
2319.91   70.68 2346.08   70.54 2350.94   70.63 2362.58   70.68 2370.34   70.65
2381.98   70.69 2397.21   70.66 2405.73   70.71 2417.09   70.64 2428.53    70.7
2434.13    70.6 2451.81   70.69 2463.45   70.63 2479.58   70.81  2488.1   70.68
2493.78    70.8 2513.89   70.74 2525.52   70.88 2533.54   70.78 2539.22   70.83
2564.78   70.71 2579.84   70.73  2587.6   70.79 2598.87   70.78 2604.54   70.71
2610.22   70.77 2627.27   70.78 2634.14   70.73 2644.31   70.86 2653.54   70.76
2664.19    70.9 2678.39   70.78 2684.07    70.9  2692.6   70.79 2701.12   70.87
2715.61   70.81 2731.13   70.92 2740.88   70.84 2758.29   70.94 2772.12   70.88
 2777.8   70.95 2785.45   70.88 2792.01   70.89 2808.72   71.01 2814.73   70.92
2834.61   71.02 2843.64   70.92 2851.65   71.03 2866.92   70.99 2874.37   71.06
2890.19   70.97 2901.83   71.03 2913.47   70.93 2925.49   70.98 2932.87   70.91
2940.63   71.07 2951.06   70.91 2956.74   70.96 2965.26    70.9 2970.94   70.96
2985.14    70.9  2996.5   70.94 3014.33   70.95 3022.09   70.91 3045.37   70.95
3056.15   70.92 3061.83      71 3080.28   70.98 3084.56   71.02 3091.92   70.92
 3115.8   70.98 3118.64   71.05 3132.84   71.07 3144.19   71.01 3149.88   71.08
3155.56   71.05 3175.44   71.09 3209.52   71.08 3220.89   71.14 3231.59   70.93
3240.77   71.02 3254.97    71.1 3278.14   71.02 3291.89   71.16 3309.18   71.05
3325.97   71.09 3337.34   71.03 3347.98   71.07 3351.54   71.03 3365.74    71.1
3371.42   71.02 3382.78   71.09 3390.65   71.19 3406.17   71.19 3422.54   71.09
3433.33   71.19 3448.85   71.14 3464.35   71.21 3476.51    71.1 3482.19   71.23
3495.39   71.19 3507.75   71.23 3521.95   71.22 3527.63   71.13 3538.07   71.18
3541.83   71.11  3553.2   71.18 3561.72   71.12 3575.92   71.25 3584.44   71.15
3604.32   71.31    3610   71.25 3621.36    71.3 3629.88   71.27 3641.24   71.31
3646.92   71.22 3655.45   71.29 3666.09   71.23 3675.32   71.28 3689.37   71.21
3695.21   71.26 3717.93   71.23 3723.61   71.35 3737.81   71.25 3754.85   71.22
3760.54   71.33 3771.89   71.22 3777.57    71.4 3782.48   71.43 3794.12   71.35
3805.76   71.46 3817.33   71.39 3831.54   71.37 3844.54   71.48 3856.18   71.47
3865.62   71.41 3879.46    71.4 3896.86   71.52  3910.5   71.54 3922.42   71.49
3929.89   71.58 3942.31   71.47 3947.99   71.52 3959.34    71.4 3964.81   71.59
3970.71   71.63 3979.23   71.78 3987.75   71.81 3993.43    71.7 3999.11   71.42
4001.95   71.18 4007.63   70.96 4013.31   70.97    4023    70.7  4042.4   70.53
 4047.4   70.63 4064.43   70.71 4069.8870.92108 4077.32   71.08 4087.16   71.66
4092.84   72.25  4095.5   71.85 4098.15   71.24 4103.46   70.47 4108.77   70.25
4114.08   70.36 4116.74   70.21 4122.83    69.4 4127.36   68.55 4132.67   66.68
4137.96    65.1 4140.61   64.19 4146.0262.09328 4148.55   61.32 4153.83   60.16
4159.12   58.86 4161.42   58.18 4164.42   57.57  4165.7   55.68 4172.52   52.22
4178.77   49.79 4180.0749.38251 4180.62   49.21 4188.71   48.19 4191.84   47.89
4196.81   47.85 4204.91   47.29 4213.61   47.82 4222.31   48.26 4231.01   48.54
4239.71   48.49 4251.94   48.49  4263.7   48.74 4265.81   48.65 4275.46    47.9
4287.21   48.06 4298.97   48.72  4309.3   49.11    4318    49.1  4326.7   49.54
4330.47   54.32 4334.2354.85997 4334.79 55.0126  4335.4   55.19 4337.51   58.53
4340.34   59.47 4343.18   61.34 4345.83    63.4 4349.67   67.61 4353.52   71.22
4357.35   73.37 4360.45   73.91 4363.55   73.76 4367.67   73.11 4371.11   72.84
4375.95   72.69 4381.43   72.66 4388.36   72.52 4391.46   72.58 4402.07   72.48
 4405.5   72.54 4419.27   72.61 4426.14   72.55 4433.02   72.66 4446.78   72.44
4453.66    72.5  4459.7   72.35  4465.9   72.32 4470.87   72.07  4481.4   71.68
4487.61   71.25 4490.72   70.84 4493.81    70.6 4501.81   70.31  4508.7   70.46
4515.58      71 4518.62   71.09 4521.72   71.38  4525.9   71.97 4529.34   72.85
4531.03   73.55 4536.22   75.38 4543.43   77.18 4556.32    77.3 4559.58   77.29

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .167 4092.84    .066  4165.7    .025 4334.79    .066 4357.35    .068

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4092.84 4357.35          2169.02    1775 1720.13             .1       .3
Left Levee      Station=   42.63      Elevation=   81.42
Right Levee     Station= 4556.32      Elevation=    77.3
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   88.93 4093.52   72.29 4360.454583.665   73.91

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 117.2

INPUT
Description: RGV-02, Begin Wall, Bathymetric elevations translated from IBWC
             2008 Cross-sections
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Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.35	6.56	82.48	19.68	82.52	32.8	82.45	45.91	82.54
59.03	82.28	65.59	82.46	78.71	82.57	81.99	82.73	85.27	82.69
91.83	82.27	95.11	81.94	108.23	80.09	114.79	79	124.63	77.52
127.91	77.12	134.46	76.69	137.74	76.38	144.3	75.38	147.58	74.35
150.86	72.43	154.14	70.3	157.42	68.77	160.7	67.47	163.98	66.85
167.26	66.95	173.82	67.64	186.94	70.96	190.22	71.22	200.06	69.69
209.9	69.26	216.46	69.24	219.74	68.67	226.29	68.56	232.85	68.35
239.41	68.47	255.81	68.28	259.09	68.38	275.49	68.21	285.33	68.37
288.61	68.3	298.45	68.41	305.01	68.32	318.12	68.29	327.96	68.42
334.52	68.26	341.08	68.46	354.2	68.25	364.04	68.34	370.6	68.3
380.44	68.35	383.72	68.43	393.56	68.32	400.11	68.48	406.67	68.52
413.23	68.34	419.79	68.34	426.35	68.47	432.91	68.47	439.47	68.37
446.03	68.57	449.31	68.37	455.87	68.53	459.15	68.39	468.99	68.53
482.11	68.48	491.94	68.62	498.5	68.48	505.06	68.65	511.62	68.45
524.74	68.62	531.3	68.62	537.86	68.46	547.7	68.65	557.54	68.52
564.1	68.56	570.66	68.45	580.49	68.49	583.77	68.62	590.33	68.46
600.17	68.63	603.45	68.47	610.01	68.56	616.57	68.51	626.41	68.57
629.69	68.45	636.25	68.7	642.81	68.57	646.09	68.63	649.37	68.49
655.93	68.66	662.49	68.63	669.04	68.48	675.6	68.52	678.88	68.64
688.72	68.44	695.28	68.57	698.56	68.5	708.4	68.49	711.68	68.57
724.8	68.56	731.36	68.49	734.64	68.57	744.48	68.6	757.59	68.48
777.27	68.53	793.67	68.37	803.51	68.61	813.35	68.55	823.19	68.66
836.31	68.61	842.86	68.67	852.7	68.54	865.82	68.58	869.1	68.46
878.94	68.7	888.78	68.55	898.62	68.66	908.46	68.67	915.02	68.58
928.14	68.8	951.09	68.7	954.37	68.78	960.93	68.72	970.77	68.75
980.61	68.91	987.17	68.82	997.01	68.79	1006.85	69.02	1016.69	68.82
1026.52	69.07	1039.64	68.83	1052.76	68.83	1059.32	68.93	1069.16	68.96
1072.44	68.9	1079	68.99	1095.4	68.88	1115.07	69.01	1128.19	69.03
1138.03	69.13	1144.59	69	1157.71	68.93	1167.55	69.1	1177.38	68.98
1183.94	69.05	1190.5	69	1197.06	69.08	1210.18	68.93	1220.02	69.01
1226.58	69.14	1229.86	69.08	1256.09	69.1	1259.37	69.04	1265.93	69.15
1272.49	69.1	1282.33	69.25	1285.61	69.15	1295.45	69.23	1302.01	69.09
1334.8	69.21	1344.64	69.13	1351.2	69.22	1357.76	69.16	1370.88	69.27
1377.44	69.17	1387.28	69.3	1393.84	69.21	1406.95	69.34	1420.07	69.23
1426.63	69.32	1436.47	69.32	1452.87	69.17	1459.43	69.28	1469.27	69.29
1475.83	69.2	1479.1	69.28	1495.5	69.27	1505.34	69.4	1515.18	69.3
1521.74	69.38	1534.86	69.28	1544.7	69.44	1551.26	69.39	1564.37	69.42
1570.93	69.5	1574.21	69.39	1580.77	69.54	1597.17	69.4	1607.01	69.61
1610.29	69.47	1626.69	69.54	1633.25	69.48	1643.08	69.49	1646.36	69.56
1656.2	69.52	1659.48	69.63	1666.04	69.55	1672.6	69.59	1685.72	69.46
1692.28	69.33	1698.84	69.4	1702.12	69.78	1705.4	69.82	1715.23	69.55
1725.07	69.65	1738.19	69.46	1748.03	69.58	1757.87	69.58	1764.43	69.73
1777.55	69.57	1784.11	69.69	1793.94	69.56	1803.78	69.72	1820.18	69.64
1823.46	69.69	1830.02	69.59	1843.14	69.56	1846.42	69.62	1856.26	69.61
1862.82	69.72	1872.65	69.66	1879.21	69.74	1889.05	69.53	1895.61	69.72
1908.73	69.74	1918.57	69.67	1921.85	69.72	1934.97	69.7	1944.8	69.81
1951.36	69.72	1961.2	69.8	1987.44	69.8	2000.56	69.9	2010.4	69.9
2016.96	69.76	2033.35	69.71	2036.63	69.8	2046.47	69.87	2053.03	69.81
2062.87	69.86	2066.15	69.8	2079.27	69.88	2092.39	69.76	2102.22	69.87
2108.78	69.68	2112.06	69.68	2121.9	69.9	2131.74	69.71	2138.3	69.94
2154.7	69.94	2164.54	70.04	2174.38	69.94	2184.21	70.18	2190.77	70.09
2207.17	70.08	2230.13	69.96	2236.69	70.09	2243.25	70.02	2253.08	70.01
2262.92	70.1	2276.04	69.93	2282.6	70.12	2292.44	70.02	2302.28	70.17
2312.12	70.08	2318.68	70.21	2328.52	70.09	2341.63	70.18	2344.91	70.12
2358.03	70.24	2371.15	70.18	2380.99	70.29	2387.55	70.23	2397.39	70.33
2403.95	70.2	2417.06	70.3	2423.62	70.41	2426.9	70.29	2433.46	70.3
2440.02	70.46	2453.14	70.28	2466.26	70.44	2472.82	70.34	2485.94	70.44
2492.49	70.29	2502.33	70.45	2512.17	70.22	2518.73	70.35	2528.57	70.22
2535.13	70.45	2541.69	70.32	2561.37	70.38	2567.93	70.3	2587.6	70.3
2597.44	70.38	2604	70.34	2617.12	70.44	2623.68	70.34	2640.08	70.41
2653.19	70.39	2656.47	70.48	2663.03	70.36	2672.87	70.36	2692.55	70.57
2702.39	70.58	2712.23	70.49	2722.07	70.59	2728.62	70.52	2738.46	70.62
2774.54	70.67	2781.1	70.43	2790.94	70.56	2800.78	70.61	2807.34	70.55
2810.61	70.62	2820.45	70.56	2836.85	70.75	2846.69	70.56	2863.09	70.52
2879.49	70.62	2886.05	70.51	2895.88	70.56	2902.44	70.51	2915.56	70.72
2922.12	70.69	2928.68	70.78	2945.08	70.62	2951.64	70.79	2964.76	70.72
2971.31	70.89	2977.87	70.91	2987.71	70.8	2997.55	70.9	3004.11	70.83
3017.23	70.94	3023.79	70.82	3030.35	70.86	3040.19	70.82	3046.74	70.96
3059.86	70.85	3069.7	70.93	3082.82	70.91	3089.38	71.02	3105.78	71.06
3122.18	71.05	3128.73	71	3141.85	71.01	3148.41	70.93	3161.53	70.99
3168.09	70.91	3177.93	71.02	3187.77	70.91	3194.33	71.03	3210.72	71.1
3217.28	71.03	3227.12	71.2	3240.24	71	3246.8	71.15	3256.64	71.05
3266.48	71.25	3273.04	71.17	3292.71	71.12	3299.27	71.23	3309.11	71.24
3328.79	71	3355.03	71.26	3364.86	71.22	3371.42	71.36	3377.98	71.28
3387.82	71.29	3394.38	71.37	3400.94	71.28	3414.06	71.25	3423.9	71.39
3433.74	71.41	3440.29	71.63	3450.13	71.42	3459.97	71.45	3466.53	71.2
3473.09	71.38	3482.93	71.48	3496.05	71.98	3499.33	72.39	3505.89	73.47
3509.17	73.67	3512.45	72.99	3515.73	71.89	3522.28	70.59	3525.56	70.36
3528.84	70.41	3535.4	70.91	3538.68	70.75	3548.52	69.06	3551.8	68.32
3558.36	65.97	3561.63	65.07	3564.89	64.47	3568.16	63.65	3574.69	61.45
3577.96	60.69	3581.23	60.26	3584.49	60.09	3587.76	59.7	3591.02	59.11
3594.29	58.28	3597.56	57.71	3597.56	57.29	3607.56	51.84	3617.56	48.34
3627.56	47.84	3637.56	47.84	3647.56	46.84	3667.56	47.84	3687.56	47.84
3697.56	48.34	3707.56	47.34	3717.56	47.34	3727.56	48.34	3737.56	48.84
3747.56	49.04	3754.35	48.84	3754.35	57.71	3757.61	58.02	3760.88	59.49
3764.15	61.83	3767.41	64.84	3770.68	69.47	3773.95	72.71	3777.21	72.91
3780.48	72.83	3787.01	71.76	3790.28	71.7	3793.54	71.94	3800.08	72.15
3803.34	72.07	3813.14	72.25	3819.68	72.16	3822.94	72.25	3836.01	72.29
3842.54	72.1	3849.07	72.38	3855.61	72.29	3862.14	72.07	3868.67	72.09
3875.21	72.01	3885.01	71.71	3891.54	71.91	3898.07	71.85	3907.87	71.53
3914.4	71.49	3920.94	71.82	3927.47	72.71	3937.27	72.98	3940.54	73.87
3947.07	77.78	3950.33	78.45	3956.87	78.01	3966.67	78.42	3969.93	78.43

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.167	3509.17	.066	3597.56	.025	3754.35	.066	3777.21	.068

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
3509.17 3777.21 2233.4 2575 2667.55 .1 .3
Left Levee Station= 81.99 Elevation= 82.73
Right Levee Station= 3950.33 Elevation= 78.45
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
54.08	3508.73	73.67	3777.21	3941.41	72.95

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	75.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.167	0.044	0.068
W.S. Elev (ft)	75.49	Reach Len. (ft)	2233.40	2575.00	2667.55

Crit W.S. (ft)	56.42	Flow Area (sq ft)	6104.83	5292.27	414.74	
E.G. Slope (ft/ft)	0.000225	Area (sq ft)	6104.83	5292.27	414.74	
Q Total (cfs)	20000.00	Flow (cfs)	1212.38	18537.79	249.83	
Top Width (ft)	3799.63	Top Width (ft)	3365.56	268.04	166.03	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)	0.20	3.50	0.60	
Max Chl Dpth (ft)	28.65	Hydr. Depth (ft)	1.81	19.74	2.50	
Conv. Total (cfs)	1332667.0	Conv. (cfs)	80785.0	1235235.0	16647.3	
Length Wtd. (ft)	2555.61	Wetted Per. (ft)	3365.94	287.60	166.59	
Min Ch El (ft)	46.84	Shear (lb/sq ft)	0.03	0.26	0.04	
Alpha	3.97	Stream Power (lb/ft s)	0.01	0.91	0.02	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	6349.00	3767.88	1383.90	
C & E Loss (ft)	0.01	Cum SA (acres)	1677.67	194.50	500.82	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 116.5

INPUT
Description: RGV-02, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.86	3.28	81.16	9.83	81.99	16.38	82.52	19.66	82.72
22.94	82.83	29.49	82.79	36.05	83.09	39.32	83.2	42.6	83.18
45.88	83.08	55.71	83.05	65.54	82.94	72.09	82.71	85.2	81.98
88.48	81.66	91.76	81.27	101.59	79.84	108.14	78.75	111.42	78.35
117.97	77.4	124.53	76.58	131.08	75.64	134.36	75.27	140.91	74.97
144.19	74.75	150.74	73.88	154.02	73.62	157.3	73.59	160.57	73.24
167.13	72.46	170.4	71.78	176.96	71.25	180.23	70.62	183.51	70.17
186.79	70.5	193.34	69.41	199.9	68.37	203.17	67.44	206.45	66.02
209.73	64.91	213	64.57	216.28	64.45	219.56	64.4	222.84	64.5
226.11	64.69	232.67	67.08	235.95	68.21	239.23	68.98	242.51	68.88
245.79	68.68	249.07	68.6	255.63	68.59	258.91	68.39	265.46	68.41
268.74	68.35	275.3	68.42	281.86	68.33	288.42	68.38	301.54	68.4
308.1	68.3	314.66	68.37	317.94	68.35	324.5	68.2	327.78	68.23
334.34	68.36	337.62	68.31	344.18	68.34	347.46	68.28	354.02	68.35
360.58	68.36	363.86	68.28	370.42	68.4	380.26	68.41	386.82	68.38
390.1	68.48	396.66	68.37	399.94	68.35	406.5	68.46	413.06	68.36
422.9	68.43	432.74	68.35	436.02	68.4	442.58	68.39	445.86	68.32
452.42	68.37	455.7	68.32	465.54	68.37	468.82	68.41	475.38	68.41
478.66	68.36	481.94	68.46	485.22	68.38	491.78	68.37	498.34	68.43
504.9	68.43	511.46	68.38	524.58	68.47	527.86	68.45	534.42	68.53
537.7	68.45	544.26	68.53	560.65	68.54	563.93	68.6	570.49	68.51
580.33	68.63	586.89	68.56	590.17	68.59	596.73	68.57	600.01	68.62
606.57	68.59	613.13	68.62	619.69	68.52	629.53	68.59	642.65	68.58
649.21	68.74	659.05	68.72	665.61	68.68	672.17	68.68	675.45	68.63
685.29	68.65	688.57	68.58	695.13	68.64	701.69	68.59	708.25	68.65
711.53	68.72	727.93	68.67	731.21	68.74	734.49	68.55	737.77	68.56
744.33	68.77	747.61	68.76	750.89	68.84	754.17	68.74	757.45	68.77
764.01	68.76	767.29	68.8	770.57	68.73	777.13	68.78	780.41	68.67
783.69	68.83	790.25	68.71	800.09	68.82	803.37	68.76	806.65	68.82
819.77	68.75	823.05	68.79	832.88	68.74	839.44	68.79	842.72	68.78
849.28	68.84	855.84	68.76	862.4	68.81	865.68	68.75	872.24	68.79
878.8	68.74	882.08	68.78	888.64	68.96	891.92	68.96	895.2	68.89
901.76	68.89	908.32	68.94	914.88	68.81	924.72	68.78	928	68.8
934.56	68.95	941.12	68.88	947.68	68.92	954.24	68.87	960.8	68.93
973.92	68.97	977.2	68.95	983.76	69.03	990.32	69.04	993.6	69.01
1000.16	69.03	1006.72	69.12	1010	69.21	1016.56	69	1019.84	69.02
1026.4	69.48	1032.96	69.77	1039.52	70.36	1042.8	70.79	1046.08	71.11
1055.92	71.66	1059.2	71.7	1065.76	71.38	1069.04	71.51	1072.32	71.56
1075.6	71.31	1085.44	71.16	1092	71.33	1098.56	71.19	1105.12	71.13
1108.4	71.26	1111.68	71.26	1121.51	71.03	1128.07	71.24	1131.35	71.25
1134.63	71.12	1141.19	70.99	1144.47	70.99	1147.75	71.11	1151.03	71.16
1154.31	71.08	1157.59	71.1	1167.43	70.82	1170.71	70.87	1173.99	70.85
1177.27	70.75	1187.11	70.87	1190.39	70.87	1193.67	70.76	1200.23	70.76
1203.51	70.69	1210.07	70.47	1213.35	70.46	1216.63	70.57	1219.91	70.6
1226.47	70.46	1233.03	70.53	1242.87	70.58	1249.43	70.5	1255.99	70.34
1269.11	70.56	1275.67	70.43	1278.95	70.43	1288.79	70.78	1301.91	70.96
1305.19	71.15	1311.75	71.97	1315	72.07	1318.26	71.88	1321.51	70.75
1328.03	68.79	1331.28	68.22	1334.54	67.95	1337.79	68.02	1344.3	67.46
1347.56	67.36	1357.32	67.16	1363.83	66.89	1367.09	66.58	1370.34	66.52
1380.11	66.43	1383.36	66.14	1386.62	66.01	1393.13	66.54	1399.64	66.86
1402.9	67.12	1406.15	67.45	1409.41	67.59	1412.66	67.96	1415.92	68.41
1419.17	68.78	1425.68	69.4	1432.19	70.2	1435.45	69.75	1438.7	68.06
1441.96	66.29	1448.47	63.08	1451.72	62.19	1454.98	61.41	1458.23	60.85
1461.49	60.21	1468	58.45	1471.26	57.69	1474.51	57.55	1474.51	55.7
1480.51	54.7	1490.51	52.7	1500.51	49.7	1510.51	48.9	1520.51	47.7
1530.51	45.9	1540.51	47.7	1550.51	47	1560.51	45.7	1570.51	45.7
1580.51	45.9	1590.51	46	1600.51	46.2	1610.51	46.5	1620.51	46.5
1630.51	46.7	1640.51	47.4	1650.51	49.2	1650.74	50.2	1650.74	57.55
1654.01	57.76	1657.28	58.51	1660.54	59.59	1663.81	60.42	1670.35	61.58
1673.61	62.72	1680.15	64.85	1686.68	67.48	1689.95	68.43	1693.22	69.15
1696.48	70.38	1699.75	72.22	1703.02	74.26	1706.29	75.19	1709.55	75.24
1712.82	74.59	1716.09	74.28	1719.36	74.39	1722.62	74.64	1725.89	74.59
1735.69	73.34	1742.23	72.63	1745.49	72.37	1752.03	72.67	1755.3	72.66
1765.1	72.35	1768.37	72.3	1778.2	72.35	1781.47	72.44	1791.3	72.48
1797.85	72.59	1801.12	72.55	1807.67	72.55	1814.22	72.62	1827.32	72.65
1833.87	72.55	1840.42	72.5	1850.25	72.64	1863.35	72.63	1866.62	72.56
1873.17	72.51	1876.45	72.56	1883	72.58	1886.27	72.47	1892.82	72.5
1896.1	72.57	1902.65	72.5	1905.93	72.57	1915.75	72.53	1919.03	72.41
1925.58	72.41	1935.4	72.36	1941.95	72.48	1945.23	72.41	1951.78	72.38
1961.6	72.44	1968.15	72.33	1977.98	72.31	1981.25	72.38	1984.53	72.33
1991.08	72.44	1997.63	72.37	2004.18	72.4	2007.45	72.5	2014	72.34
2017.28	72.33	2023.83	72.19	2027.1	72.27	2040.2	72.25	2043.48	72.33
2046.75	72.33	2050.03	72.21	2056.58	72.18	2059.85	72.12	2066.4	72.19
2072.95	72.08	2076.23	72.14	2082.78	72.06	2092.6	72.07	2095.87	72.02
2099.15	72.14	2102.42	72.05	2118.8	71.98	2125.35	72.04	2128.62	71.98
2135.17	72.05	2138.45	71.98	2145	71.92	2148.27	72.01	2151.55	72.02
2154.82	71.86	2158.1	71.9	2164.65	71.89	2167.92	71.82	2177.75	71.85
2181.02	71.8	2187.57	71.8	2190.85	71.75	2200.67	71.83	2210.5	71.74
2213.77	71.81	2226.87	71.7	2230.15	71.73	2233.42	71.83	2243.25	71.69
2249.8	71.69	2253.07	71.61	2259.62	71.6	2262.9	71.72	2266.17	71.67
2272.72	71.66	2275.99	71.5	2282.54	71.47	2292.37	71.55	2298.92	71.44
2305.47	71.49	2312.02	71.43	2318.57	71.27	2321.84	71.37	2325.12	71.36
2331.67	71.27	2334.94	71.18	2344.77	71.25	2348.04	71.24	2354.59	71.12
2364.42	71.14	2367.69	71.07	2380.79	70.94	2390.62	70.75	2397.17	70.82

2400.44	70.7	2416.82	70.43	2420.09	70.33	2423.37	70.32	2433.19	70.17
2436.47	70.15	2443.01	70.21	2446.29	70.19	2449.56	70.02	2452.84	69.93
2456.11	69.94	2465.94	69.88	2469.21	69.79	2472.49	69.82	2479.04	69.78
2485.59	69.7	2492.14	69.68	2498.69	69.61	2508.51	69.43	2511.79	69.54
2515.06	69.57	2518.34	69.46	2524.89	69.33	2537.99	69.29	2541.26	69.25
2551.09	69.28	2567.46	69.16	2577.29	69.14	2580.56	69.19	2587.11	69.42
2593.66	69.34	2596.94	69.55	2600.21	69.96	2603.49	70.56	2606.76	71.41
2610.03	72.99	2613.31	75.44	2616.58	76.93	2619.86	77.24	2629.68	77.29

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	1432.19	.066	1474.51	.025	1650.74	.066	1693.22	.068

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1432.19 1693.22 2319.56 2249.67 2048.62 .1 .3
Left Levee Station= 39.32 Elevation= 83.2
Right Levee Station= 2629.68 Elevation= 77.29
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
167.13	1315	72.07	1321.51	1432.19	70.2	1709.55	2613.31	75.24

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	75.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.130	0.040	0.068
W.S. Elev (ft)	75.07	Reach Len. (ft)	2319.56	2249.67	2048.62
Crit W.S. (ft)	55.11	Flow Area (sq ft)	4040.38	5850.43	36.77
E.G. Slope (ft/ft)	0.000131	Area (sq ft)	4040.38	5850.43	36.77
Q Total (cfs)	20000.00	Flow (cfs)	1130.72	18851.79	17.49
Top Width (ft)	1567.17	Top Width (ft)	1293.49	261.03	12.65
Vel Total (ft/s)	2.01	Avg. Vel. (ft/s)	0.28	3.22	0.48
Max Chl Dpth (ft)	29.37	Hydr. Depth (ft)	3.12	22.41	2.91
Conv. Total (cfs)	1745089.0	Conv. (cfs)	98660.7	1644902.0	1525.8
Length Wtd. (ft)	2234.63	Wetted Per. (ft)	1293.95	276.49	14.06
Min Ch El (ft)	45.70	Shear (lb/sq ft)	0.03	0.17	0.02
Alpha	2.41	Stream Power (lb/ft s)	0.01	0.56	0.01
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	6088.91	3438.54	1370.07
C & E Loss (ft)	0.01	Cum SA (acres)	1558.24	178.87	495.35

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 116.1

INPUT
Description: RGV-02, Bathymetric elevations translated from IBWC 2008
Cross-sections, Extended blocked obstruction
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.06	3.28	82.85	13.12	82.97	22.96	83.56	26.23	83.52
29.51	83.29	36.07	83.35	39.35	83.32	42.63	83.08	45.91	82.64
49.19	82.33	52.47	81.78	59.03	80.87	62.31	79.94	68.87	78.37
75.43	76.87	78.7	76.5	118.06	76.5	124.62	76.51	131.17	77.43
134.45	78.09	141.01	79.68	144.29	80.03	150.85	81.04	154.13	81.17
160.69	80.95	163.97	81	167.25	80.87	170.53	80.64	173.81	80.71
180.37	80.68	183.64	80.77	186.92	80.75	193.48	80.55	196.76	80.3
200.04	80.17	203.32	80.19	206.6	80.03	213.16	80.05	219.72	79.93
223	79.99	226.28	79.82	229.56	79.85	236.11	79.47	242.67	79.23
245.95	79.01	252.51	78.69	259.07	78.54	265.63	78.32	268.91	78
275.47	77.64	278.75	77.26	285.3	76.98	288.58	76.72	291.86	76.57
298.42	76.46	304.98	76.58	311.54	76.59	314.82	76.52	318.1	77.41
327.94	76.92	334.5	76.82	341.05	76.86	347.61	76.8	360.73	76.52
364.01	76.58	367.29	76.42	370.57	76.35	377.13	76.55	383.69	76.37
393.52	76.41	396.8	76.36	409.92	76.34	416.48	76.39	426.32	76.31
436.16	76.31	442.71	76.36	449.27	76.27	455.83	76.38	462.39	76.32
468.95	76.4	475.51	76.38	482.07	76.3	485.35	76.38	498.46	76.38
501.74	76.32	511.58	76.36	514.86	76.32	521.42	76.38	524.7	76.46
534.54	76.32	537.82	76.41	544.37	76.33	554.21	76.44	557.49	76.39
567.33	76.48	573.89	76.35	580.45	76.46	587.01	76.45	593.57	76.82
603.4	76.89	609.96	76.36	619.8	76.41	626.36	76.32	632.92	76.34
636.2	76.29	642.76	76.4	655.87	76.52	665.71	76.35	672.27	76.38
678.83	76.56	682.11	76.58	688.67	76.41	691.95	76.47	695.23	76.36
701.78	76.42	705.06	76.35	711.62	76.44	714.9	76.42	721.46	76.48
724.74	76.43	731.3	76.57	734.58	76.56	737.86	77.05	741.14	77.81
744.42	78.09	747.7	77.91	757.53	77.48	760.81	77.23	767.37	76.4
770.65	76.14	773.93	75.99	777.21	76.01	780.49	75.88	787.05	75.18
793.61	74.95	796.89	74.78	800.17	74.71	803.45	74.78	810	74.78
813.28	74.71	816.56	74.78	823.12	74.8	826.4	74.68	829.68	74.47
832.96	73.92	836.24	72.62	849.36	66.27	852.64	64.94	855.92	64.17
859.19	63.74	862.47	63.54	869.03	63.41	872.31	63.05	875.59	62.08
878.87	60.41	882.15	58.46	885.43	57.63	888.71	57.51	888.71	56.17
898.71	53.16	908.71	51.46	918.71	50.46	928.71	50.46	938.71	49.46
948.71	49.16	958.71	48.66	968.71	47.86	978.71	47.46	988.71	46.66
998.71	46.46	1008.71	46.46	1018.71	45.66	1028.71	45.46	1038.71	45.16
1048.71	44.66	1055.92	44.66	1055.92	57.48	1059.19	58.22	1062.46	59.34
1065.74	59.87	1072.29	60.49	1075.56	60.67	1078.84	60.95	1082.11	61.55
1085.38	62.7	1088.66	64.07	1091.93	65.33	1095.21	66.29	1098.48	66.92
1101.75	67.29	1111.58	68.08	1124.67	68.6	1127.95	68.85	1131.22	68.91
1137.77	68.87	1147.59	68.59	1154.14	68.55	1160.69	68.45	1163.96	68.3
1170.51	68.28	1173.79	68.2	1183.61	68.34	1186.88	68.61	1190.16	68.8
1196.7	68.49	1203.25	68.11	1206.53	68	1213.08	67.44	1216.35	67.45
1219.62	67.55	1226.17	67.65	1232.72	67.92	1235.99	67.99	1242.54	68.01
1249.09	67.92	1255.64	67.94	1262.19	68.12	1268.74	67.94	1281.83	68.38
1291.66	68.45	1298.2	68.65	1314.57	68.86	1321.12	68.83	1324.4	68.89
1337.49	68.91	1344.04	69.04	1353.86	69.05	1357.14	69.14	1363.69	69.4
1370.23	69.51	1376.78	69.73	1383.33	69.69	1386.6	69.72	1393.15	69.87
1399.7	69.73	1402.97	69.83	1412.8	69.98	1419.35	70.14	1429.17	70.21
1438.99	70.22	1448.81	70.36	1461.91	70.46	1468.46	70.62	1475.01	70.64
1481.55	70.75	1488.1	70.8	1497.92	70.78	1507.75	70.79	1514.3	70.9
1517.57	70.89	1524.12	70.96	1537.21	70.82	1543.76	70.84	1550.31	70.99
1560.13	71.13	1569.95	71.42	1576.5	71.5	1583.05	71.63	1589.6	71.62
1592.87	71.51	1602.7	71.5	1612.52	71.35	1615.79	71.35	1622.34	71.47
1628.89	71.4	1632.16	71.44	1638.71	71.8	1645.26	72.43	1648.54	72.66
1651.81	72.66	1655.08	72.45	1658.36	72.15	1661.63	72.02	1668.18	71.85
1671.45	71.84	1678	71.71	1687.82	71.72	1694.37	71.87	1697.65	71.89
1700.92	71.81	1707.47	71.96	1710.74	71.94	1714.02	72.11	1717.29	71.97
1723.84	71.94	1727.11	71.83	1733.66	71.88	1740.21	71.87	1743.49	71.8

1746.76	71.82	1750.03	71.93	1756.58	71.97	1759.86	72.05	1766.4	71.96
1769.68	72.06	1776.23	72.04	1779.5	71.91	1792.6	72.04	1795.87	72.13
1802.42	71.95	1805.69	71.95	1808.97	71.85	1812.24	71.88	1815.52	72.04
1822.07	72.17	1825.34	72.12	1831.89	72.11	1835.16	72.23	1841.71	72.32
1848.26	72.69	1854.81	73.25	1861.36	73.3	1864.63	73.77	1867.9	73.94
1877.73	73.82	1881	73.72	1890.82	73.89	1894.1	73.42	1900.64	73.08
1903.92	73.11	1910.47	72.12	1913.74	71.69	1917.02	71.62	1920.29	71.68
1923.56	71.27	1926.84	71.07	1930.11	71.09	1933.39	71	1939.93	71.36
1946.48	71.16	1949.76	70.9	1953.03	71.21	1956.31	70.53	1959.58	70.76
1962.85	70.62	1966.13	70.7	1969.4	70.37	1975.95	70.71	1979.22	70.83
1982.5	71.09	1985.77	71.62	1989.05	70.73	1992.32	70.73	1998.87	70.62
2002.14	70.11	2005.42	70.02	2008.69	70.41	2011.97	70.38	2018.51	70.48
2021.79	70.31	2025.06	69.81	2028.34	70.18	2034.89	69.98	2038.16	70.57
2041.43	70.4	2047.98	70.33	2051.26	70.7	2057.8	70.54	2061.08	70.6
2064.35	71	2067.63	70.86	2074.17	71.28	2077.45	70.99	2080.72	71.15
2084	71.05	2087.27	71.1	2090.55	70.81	2097.09	70.87	2100.37	71.32
2103.64	71.44	2106.92	73.62	2110.19	73.52	2113.46	73.28	2116.74	73.27
2120.01	72.92	2123.29	72.77	2126.56	72.71	2129.84	72.56	2133.11	72.17
2136.38	72.11	2139.66	72.37	2146.21	72.09	2149.48	72.17	2156.03	71.9
2162.58	72	2165.85	71.76	2169.13	71.61	2172.4	71.83	2182.22	71.66
2185.5	71.42	2188.77	71.79	2195.32	71.27	2198.59	71.88	2201.87	71.93
2205.14	71.85	2208.42	71.58	2211.69	71.64	2214.96	71.34	2218.24	71.41
2221.51	71.2	2224.79	71.36	2228.06	71.63	2231.34	71.74	2237.88	71.8
2241.16	71.94	2244.43	71.94	2247.71	71.71	2250.98	71.68	2257.53	71.95
2264.08	72.28	2270.63	72.77	2277.17	72.96	2283.72	72.96	2287	73.13
2293.54	72.98	2296.82	73.01	2306.64	72.75	2316.46	72.57	2319.74	72.46
2332.83	72.34	2339.38	72.45	2342.66	72.45	2345.93	72.36	2365.58	72.36
2368.85	72.33	2378.67	72.44	2381.95	72.36	2388.5	72.31	2398.32	72.17
2411.42	71.84	2421.24	71.79	2431.06	71.7	2437.61	71.67	2444.16	71.59
2453.98	71.58	2457.25	71.53	2467.08	71.51	2473.62	71.59	2480.17	71.56
2486.72	71.47	2493.27	71.44	2499.82	71.46	2506.37	71.36	2519.46	71.46
2529.29	71.45	2535.83	71.62	2545.66	71.73	2552.2	71.55	2555.48	71.54
2562.03	71.67	2565.31	71.93	2571.86	72.7	2575.14	73.37	2581.69	75.31
2584.97	75.97	2588.24	76.22	2604.62	76.68	2617.73	76.38	2621	76.42

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	741.14	.066	888.71	.025	1055.92	.066	1131.22	.067

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
836.24 1131.22 1908.51 1935 1844.83 .1 .3
Left Levee Station= 22.96 Elevation= 83.56
Right Levee Station= 2604.62 Elevation= 76.68
Blocked Obstructions num= 1

Sta L	Sta R	Elev
1131.22	2621	68.91

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.066	0.045	0.067
W.S. Elev (ft)	74.78	Reach Len. (ft)	1908.51	1935.00	1844.83
Crit W.S. (ft)	55.86	Flow Area (sq ft)	8.30	5778.73	5217.59
E.G. Slope (ft/ft)	0.000154	Area (sq ft)	8.30	5778.73	5217.59
Q Total (cfs)	20000.00	Flow (cfs)	1.54	16629.85	3368.61
Top Width (ft)	1777.73	Top Width (ft)	34.05	294.98	1448.70
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)	0.19	2.88	0.65
Max Chl Dpth (ft)	30.12	Hydr. Depth (ft)	0.24	19.59	3.60
Conv. Total (cfs)	1612470.0	Conv. (cfs)	124.4	1340757.0	271588.9
Length Wtd. (ft)	1921.10	Wetted Per. (ft)	34.36	314.40	1451.07
Min Ch El (ft)	44.66	Shear (lb/sq ft)	0.00	0.18	0.03
Alpha	2.11	Stream Power (lb/ft s)	0.00	0.51	0.02
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	5981.12	3138.24	1246.52
C & E Loss (ft)	0.01	Cum SA (acres)	1522.89	164.51	460.99

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 115.7

INPUT
Description: RGV-02, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.36	3.28	83.51	9.84	83.66	13.12	83.63	19.67	83.79
26.23	83.79	29.51	83.62	32.79	83.17	36.07	82.56	39.35	81.74
45.91	80.31	52.46	78.58	55.74	77.88	62.3	76.81	65.58	76.54
68.86	76.5	127.88	76.5	131.16	76.74	137.72	78.35	144.28	79.54
147.56	79.98	150.84	80.17	154.12	80.15	163.95	79.95	170.51	80.03
180.35	79.91	183.63	79.61	193.46	78.33	200.02	77.67	206.58	76.65
216.42	75.43	219.7	75.21	222.98	75.16	229.53	75.21	236.09	75.19
245.93	75.3	252.49	75.44	259.04	75.44	272.16	75.55	282	75.82
288.56	75.93	298.39	76.18	304.95	76.15	311.51	76.34	318.07	76.31
331.18	76.42	341.02	76.64	354.14	77.05	363.97	77.01	383.65	77.25
390.21	77.24	393.49	77.29	413.16	77.18	419.72	77.24	426.28	77.4
429.55	77.64	432.83	78.04	436.11	78.33	442.67	78.53	445.95	78.47
449.23	78.52	452.51	78.08	455.79	77.8	462.35	77.35	465.62	77.28
468.9	77.37	478.74	77.5	485.3	77.67	495.14	77.69	498.41	77.78
501.69	77.7	508.25	77.44	514.81	77.11	527.93	76.17	537.76	75.11
547.6	74.01	554.16	73.43	557.44	73.02	564	72.5	567.27	72.05
573.83	71.42	580.39	70.68	586.95	69.81	590.23	69.43	600.07	68.51
613.18	67.59	616.46	67.55	623.02	67.31	626.3	67.25	636.13	66.94
645.97	66.78	649.25	66.83	659.09	66.71	665.65	66.68	668.93	66.59
675.48	66.26	682.04	66.21	688.6	66.29	691.88	66.24	695.16	66.28
698.44	66.17	701.72	66.22	711.55	65.92	714.83	65.93	724.67	66.14
731.23	65.95	737.79	65.99	744.34	65.73	747.62	65.81	754.18	65.62
757.46	65.74	760.74	65.66	764.02	65.47	773.85	65.27	780.41	65.27
786.97	65.33	800.09	65.33	803.37	65.28	809.92	65.39	813.2	65.4
819.76	65.26	823.04	65.31	829.6	65.24	832.88	65.28	839.44	65.21
842.72	65.23	849.27	65.13	852.55	65.2	862.39	64.92	868.95	64.89
872.23	64.77	878.78	64.73	882.06	64.86	888.62	64.88	891.9	64.84
905.02	65.14	911.58	65.21	914.85	65.35	918.13	65.58	921.41	65.96
924.69	66.54	927.97	67.37	931.25	68.31	941.09	69.91	944.37	70.55
947.64	71.29	950.92	72.6	954.2	74.29	957.48	76.4	960.76	77.88
964.04	79.19	967.32	80.11	970.6	80.77	973.88	80.9	977.16	80.41

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  980.44   79.75  986.99   78.16  990.27   77.77  993.55   77.54 1003.39   77.37
 1009.95   77.83 1013.23    78.4 1023.06   79.71 1026.34   80.28 1029.62   80.96
  1032.9    81.5 1039.46   82.44 1042.74   83.01 1046.02   83.28 1052.57   83.09
 1055.85   83.04 1062.41   83.13 1072.25   83.38 1078.81   83.58 1082.08   83.76
 1091.92   83.84 1098.48   84.07 1105.04   84.36  1111.6   84.43 1118.15   84.39
 1121.43   84.43 1127.99   84.75 1134.55    84.9 1137.83   84.93 1144.39   84.76
 1150.94    84.7 1154.22   84.57 1160.78   84.43 1167.34   84.07 1170.62   83.93
 1183.73   84.02 1190.29   84.27 1193.57   84.52 1196.85   84.64 1206.69   84.73
 1213.24   84.55  1219.8   84.71 1223.08   84.62 1232.92   84.22 1239.48   84.21
 1246.03   84.07 1252.59    84.1 1259.15   84.36 1265.71   84.29 1268.99   84.12
 1275.55   84.25  1282.1   84.15 1288.66   83.96 1301.78   83.32 1305.06   82.98
 1311.61   81.37 1314.89    79.9 1318.17   78.56 1321.45   76.84 1324.73   75.01
 1328.01   73.32 1331.29    71.8 1334.57   70.87 1337.85   70.14 1341.13    69.3
  1344.4   68.92 1350.96   68.44 1357.52   67.84  1360.8   67.74 1370.64    67.9
 1377.19    67.9 1390.31    68.2 1396.87   68.44 1403.43   68.45 1413.26   68.35
 1419.82   68.55  1439.5   68.63 1446.05   68.83 1452.61   69.25 1455.89    69.3
 1462.45    69.5 1469.01   69.78 1475.56   70.21 1482.12    70.8 1495.12   71.38
 1501.62   71.19 1504.87   71.26 1511.36   71.54 1514.61   71.54 1517.86   71.29
 1524.36   71.18 1530.86   70.94 1534.11   70.95 1540.61    70.8 1543.85   70.81
  1547.1   70.96 1550.35   70.94 1556.85    71.2  1566.6   71.09  1573.1   71.25
 1576.35    71.2 1582.84   71.38 1589.34    71.3 1595.84   71.31 1602.34   70.93
 1605.59   70.83 1612.08   70.73 1618.58   70.42 1625.08   70.32 1628.33    70.1
 1631.58   69.31 1638.08   66.61 1641.33   65.01 1644.58   63.63 1647.82    62.5
 1651.07   61.99 1654.32   61.72 1670.57   58.66 1677.07   57.52 1680.32   57.48
 1680.32   56.84 1690.32   52.34 1700.32   50.34 1710.32   49.54 1720.32   49.34
 1730.32   48.84 1740.32   49.14 1760.32   49.14 1770.32   48.84 1780.32   48.14
 1790.32   48.54 1800.32   48.84 1810.32   49.34 1820.32   50.34 1830.32   50.34
 1840.32   50.54  1850.2   50.84  1850.2   51.84  1850.2   52.17  1850.2   54.34
  1850.2   56.54  1850.2   56.84  1850.2   57.48 1853.48   57.78 1856.76   59.28
 1860.03   60.46 1863.31   60.55 1866.59   60.78 1869.87   61.17 1873.14   61.41
  1879.7   60.57 1886.25   60.02 1889.53   60.02 1892.81   60.27 1896.08   60.67
 1899.36   61.56 1902.64   62.76 1905.92   64.46 1912.47   68.11 1915.75   69.47
 1919.03   70.12  1922.3   70.12 1925.58   69.78 1928.86   69.33 1932.14   69.05
 1935.41    68.9 1941.97      69 1948.52   68.73  1951.8   68.66 1955.08   68.76
 1961.63   69.08 1968.19    69.1 1974.74   69.26  1981.3   69.49 1987.85   69.54
 1994.41   69.83 2000.96   69.85 2007.52   70.06 2014.07   70.08 2017.35   70.17
 2020.62   70.14 2027.18   69.97 2030.46   69.97 2037.01   70.35 2040.29   70.49
 2046.84   70.62  2053.4   70.87 2066.51   71.18 2069.78   71.19 2076.34   71.42
 2079.62    71.4 2086.17   71.48 2089.45   71.57 2092.73   71.51 2099.28   71.26
 2102.56   71.41 2105.84      72 2109.11   71.49 2112.39   71.72 2118.95   71.43
 2122.22    71.1  2125.5   71.59 2128.78   71.64 2132.05    71.6 2135.33   71.68
 2138.61   71.54 2141.89   71.55 2148.44   71.44    2155   71.38 2161.55   71.44
 2164.83    71.4 2171.38   71.41 2177.94    71.3 2187.77   71.23 2194.32   71.26
 2204.16   71.21 2207.43   71.32 2223.82   71.27 2230.38   71.17 2243.49   71.12
 2250.04   71.03 2259.87   71.02 2266.43   71.18 2279.54   70.96 2282.81   70.95
 2289.37   71.02  2299.2    70.9 2305.76   70.94 2312.31   71.04 2315.59   70.96
  2328.7   70.82 2331.97   70.92 2338.53   70.74 2345.08   70.71 2351.64   70.79
 2361.47    70.8  2371.3   70.65 2374.58   70.63 2377.86    70.7 2384.41   70.58
 2390.97   70.59 2404.08   70.75 2410.63   70.59 2417.19    70.6 2423.74   70.47
 2427.02   70.36 2430.29   70.35 2436.85   70.22  2443.4   70.27 2446.68   70.38
 2449.96    70.4 2456.51   70.23 2463.07   70.27 2469.62   70.19 2476.18   70.24
 2482.73   70.03 2492.56   70.08 2499.12   69.94 2508.95   69.81 2515.51   69.79
 2531.89   69.57 2538.45   69.62    2545   69.51 2551.56   69.54 2558.11   69.41
 2564.67   69.36 2567.94   69.25 2581.05   69.16 2587.61   69.19 2594.16   69.12
 2600.72   68.98 2607.27   68.98 2610.55    68.9 2613.83   68.96 2620.38   68.79
 2626.94   68.77 2633.49   68.96 2636.77   68.91  2646.6   68.88 2649.88   68.83
 2656.43   68.83 2669.54   68.94  2676.1   68.94 2689.21   68.89 2699.04   68.98
 2705.59   68.95 2712.15   68.87 2721.98   68.95 2731.81   68.96 2744.92   68.94
 2754.75   68.97 2761.31   68.83 2764.59   68.81 2771.14   69.04  2777.7   69.01
 2780.97   69.08 2784.25   69.57 2787.53   70.71 2794.08   74.46 2797.36   75.77
 2800.64   76.62 2803.91   76.95 2807.19   77.08 2813.75    77.2  2820.3   77.14

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .052  1282.1    .066 1680.32    .025  1850.2    .066  2125.5    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1628.33 1915.75          1409.57 1801.21 1569.56             .1       .3
Left Levee      Station=  150.84      Elevation=   80.17
Right Levee     Station= 2813.75      Elevation=    77.2
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  2125.5  2820.3   71.59

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             74.64    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                 0.055      0.044     0.067
  W.S. Elev (ft)             74.57    Reach Len. (ft)          1409.57    1801.21    1569.56
  Crit W.S. (ft)             57.36    Flow Area (sq ft)        4528.96    5697.03    2890.36
  E.G. Slope (ft/ft)      0.000106    Area (sq ft)             4528.96    5697.03    2890.36
  Q Total (cfs)           20000.00    Flow (cfs)               4447.54   14062.46    1490.00
  Top Width (ft)           1880.79    Top Width (ft)            714.77     287.42     878.60
  Vel Total (ft/s)            1.52    Avg. Vel. (ft/s)            0.98       2.47       0.52
  Max Chl Dpth (ft)          26.43    Hydr. Depth (ft)            6.34      19.82       3.29
  Conv. Total (cfs)       1944260.0    Conv. (cfs)              432358.9   1367054.0   144847.2
  Length Wtd. (ft)         1737.53    Wetted Per. (ft)          717.73     300.60     879.75
  Min Ch El (ft)             48.14    Shear (lb/sq ft)            0.04       0.13       0.02
  Alpha                       1.94    Stream Power (lb/ft s)      0.04       0.31       0.01
  Frctn Loss (ft)             0.22    Cum Volume (acre-ft)     5881.72    2883.36    1074.83
  C & E Loss (ft)             0.00    Cum SA (acres)           1506.49     151.57     411.70


Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 115.45*

INPUT
Description: RGV-02,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   80.57    5.88   80.72   15.68   80.84   17.64   80.77   21.56   80.28
   27.44    79.2   33.32   78.01   37.24   77.48   41.16   77.33   76.44   77.36
    78.4   77.48   82.32   78.29   86.24   78.89   90.17   79.21  105.91   78.95
  113.78   78.79  126.66   78.42  140.69   77.07   146.3   76.71  151.91   76.18
  160.34   75.57  163.15   75.22  165.95   74.76  171.57   74.09  174.37   73.89
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179.98	73.84	185.6	73.64	188.4	73.28	191.21	73.06	199.64	72.7		
202.44	72.48	210.86	72.47	216.48	72.69	222.09	72.97	224.89	72.87		
227.7	72.66	230.51	72.63	233.32	72.71	236.13	72.65	241.74	72.86		
247.35	73.31	250.16	73.46	261.39	74.26	269.81	74.75	281.04	75.59		
286.65	75.87	295.07	75.54	297.88	75.52	303.5	75.85	309.11	76.37		
311.92	76.55	317.53	76.41	325.95	75.64	331.56	75.21	339.99	75.02		
346.07	74.7	356.83	74.4	362.44	74.42	369.7	74.52	377.58	74.46		
384.9	74.52	390.51	74.76	396.12	74.68	401.74	74.34	405.13	74.22		
413.01	74.23	420.89	74.15	424.81	74.23	428.75	74.43	432.69	74.54		
440.57	74.6	448.44	74.59	452.38	74.39	464.2	74.06	469.11	73.97		
480.34	74.03	485.95	73.98	491.75	74.06	497.18	74.05	499.98	74.1		
505.6	74.05	507.49	74.1	516.83	73.94	519.64	73.82	528.06	73.66		
533.67	73.44	542.94	73.23	547.7	73.03	553.32	72.73	558.93	72.51		
564.55	72.21	574.43	71.86	578.58	71.65	584.19	71.53	590.17	71.2		
598.05	70.91	617.88	69.87	634.72	69.22	643.14	69.03	645.95	68.93		
651.56	68.95	662.79	68.75	668.41	68.72	679.63	68.53	684.67	68.52		
696.48	68.57	708.3	68.5	720.1	68.32	735.86	68.23	741.39	68.22		
747	68.12	755.42	68.17	761.03	68.08	769.46	67.86	772.27	67.9		
775.07	68.2	779.17	68.26	787.04	68.1	794.92	68.12	802.78	68.02		
806.72	68.08	814.6	68.01	818.54	68.06	826.41	67.88	836.83	67.77		
839.64	67.78	848.05	67.7	853.67	67.79	867.7	67.73	885.46	67.86		
893.34	67.83	907	67.84	912.62	67.75	915.42	67.8	928.77	67.72		
940.69	67.79	951.91	67.72	954.72	67.63	964.21	67.6	968.75	67.64		
979.96	67.56	985.6	67.6	994.02	67.75	996.82	67.89	1003.59	67.87		
1007.52	67.95	1015.39	68.19	1019.33	68.48	1027.21	69.43	1030.51	69.69		
1039.02	70.18	1041.73	70.38	1046.89	70.88	1050.83	71.51	1054.76	72.36		
1058.7	73.43	1066.58	74.86	1070.52	75.37	1074.46	75.7	1078.39	75.77		
1082.33	75.51	1086.27	75.16	1094.13	74.33	1102.01	73.94	1113.83	73.87		
1121.7	74.19	1125.64	74.48	1137.17	75.08	1142.79	75.44	1149.26	75.97		
1161.07	76.73	1165.01	76.84	1170.86	76.72	1182.08	76.74	1196.13	76.98		
1204.54	77.03	1210.16	77.15	1215.77	77.13	1221.38	77.26	1224.19	77.23		
1229.81	77.29	1235.42	77.42	1241.04	77.4	1249.45	77.49	1255.56	77.52		
1263.43	77.68	1277.53	77.78	1283.13	77.67	1290.99	77.61	1302.81	77.46		
1308.41	77.33	1314.62	77.24	1330.36	77.34	1346.11	77.66	1357.93	77.63		
1365.79	77.55	1373.67	77.65	1378.58	77.61	1384.19	77.48	1389.42	77.44		
1397.3	77.44	1405.17	77.39	1420.92	77.5	1428.8	77.47	1432.73	77.39		
1443.14	77.53	1448.76	77.5	1467.81	77.16	1077	1476.04	76.86	1483.91	76.03	
1487.85	75.27	1491.78	74.6	1499.66	72.84	1503.6	72.02	1507.54	71.28		
1511.48	70.82	1519.35	69.98	1523.28	69.81	1527.35	69.75	1539.03	69.36		
1544.19	69.27	1549.81	69.31	1552.62	69.26	1562.65	69.29	1572.26	69.44		
1580.69	69.54	1583.5	69.52	1589.11	69.67	1597.53	69.64	1605.95	69.54		
1611.56	69.68	1617.18	69.65	1625.6	69.76	1637.47	69.77	1645.33	69.85		
1662.09	70.14	1667.7	70.2	1680.76	70.49	1688.64	70.79	1701.39	71.1		
1704.25	71.14	1712.05	71.04	1723.75	71.21	1731.55	71.08	1747.16	70.96		
1751.06	70.99	1762.76	70.88	1770.56	71.01	1774.37	71.15	1785.6	70.91		
1790.08	70.77	1796.83	70.7	1801.78	70.72	1810.86	70.92	1822.09	71.35		
1825.18	71.54	1836.13	71.99	1841.74	72.73	1844.55	72.97	1847.35	72.99		
1852.49	72.9	1860.29	72.87	1864.2	72.77	1866.67	72.13	1868.95	71.27		
1871.63	69.84	1876.59	66.99	1879.07	65.67	1884.49	63.05638	1887.96	61.11		
1892.71	59.12	1896.42	58.18	1897.47	57.62	1903.86	55.87	1911.49	52.39		
1919.12	50.1	1923.98	49.08762	1926.75	48.56	1934.38	47.41	1942.01	46.2		
1951.15	45.24	1965.65	43.63	1972.53	43.19	1980.16	42.49	1985.16	42.49		
1992.55	43.34	1999.93	44.44	2007.32	45.26	2014.71	46.58	2020.73	48.29727		
2022.1	48.69	2029.48	49.31	2036.87	50.27	2044.26	52	2049.43	53.58		
2062.52	53.71	2077.99	53.95	2083.33	54.12	2088.17	54.89	2093.02	55		
2093.27	58.33	2098.35	58.69	2103.42	59.58	2108.48	60.25	2119.32	60.59125		
2126.9	60.97	2129.33	61	2136.59	60.53	2141.43	60.53	2143.85	60.67		
2153.53	61.39	2155.96	61.67	2159.2	62.3	2170.48	64.72	2174.41	65.46		
2180.17	66.9	2187.43	68.46	2192.27	69.67	2194.69	70.05	2198.77	70.35		
2202.83	70.32	2211.14	69.88	2219.12	69.81	2227.59	69.89	2235.41	69.82		
2239.49	69.85	2251.7	70.27	2259.85	70.31	2265.97	70.39	2276.14	70.58		
2284.28	70.62	2292.43	70.8	2300.57	70.82	2308.72	70.97	2316.86	70.97		
2320.94	71.03	2326.29	71.03	2331.78	70.96	2337.26	71	2349.44	71.28		
2353.7	71.33	2361.93	71.27	2367.42	71.44	2375.64	71.57	2386.09	71.63		
2394.24	71.8	2405.79	71.77	2410.53	71.83	2422.75	71.7	2426.82	71.78		
2430.9	72.07	2434.96	71.8	2439.04	71.88	2447.19	71.76	2451.25	71.59		
2457.24	71.8673	2467.54	71.83	2471.62	71.74	2485.31	71.7	2499.01	71.62		
2507.24	71.79	2523.69	71.65	2553.07	71.61	2562.07	71.69	2567.55	71.61		
2573.04	71.63	2585.65	71.47	2601.94	71.44	2616.91	71.34	2630.45	71.45		
2644.32	71.32	2650.8	71.31	2658.03	71.36	2663.52	71.32	2679.32	71.34		
2687.46	71.39	2693.67	71.33	2704.64	71.31	2720.04	71.15	2737.54	71.11		
2748.54	71.13	2753.99	71.04	2764.83	70.98	2768.91	71.03	2777.05	70.96		
2797.86	70.9	2803.34	70.92	2809.63	70.82	2814.31	70.84	2817.78	70.78		
2830	70.67	2833.5	70.68	2841.72	70.56	2850.35	70.54	2858.5	70.6		
2866.64	70.49	2874.79	70.48	2885.59	70.38	2891.08	70.44	2899.22	70.33		
2902.04	70.34	2915.75	70.28	2921.23	70.21	2931.8	70.17	2940.42	70.2		
2948.65	70.15	2960.31	70.16	2968.46	70.22	2978.81	70.13	2984.75	70.15		
2989.77	70.06	2995.26	70.1	3005.1	69.99	3011.71	69.95	3022.67	69.93		
3029.55	69.99	3045.84	69.95	3050.09	69.97	3058.05	69.86	3062.13	69.87		
3078.42	69.65	3086.56	69.59	3107.66	69.21	3113.15	69.18	3121.37	69.28		
3126.85	69.19	3132.34	69.21	3137.82	69.1	3148.79	68.96	3151.54	68.86		
3162.5	68.69	3176.21	68.56	3187.18	68.41	3196.52	68.44	3211.85	68.39		
3217.33	68.43	3220.07	68.37	3222.82	68.42	3237.24	68.44	3249.46	68.32		
3261.2	68.47	3263.94	68.58	3266.68	68.89	3269.82	69.46	3273.89	70.45		
3277.97	71.89	3283.13	74.01	3285.88	75.36	3288.61	76.25	3291.36	76.85		
3294.26	77.11	3302.4	77.34	3307.81	77.44	3310.55	77.4	3312.6	77.11		
3314.64	76.55	3318.74	74.77	3322.84	73.87	3324.89	73.63	3326.93	73.55		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.052	1467.81	.066	1884.49	.025	2049.43	.066	2194.69	.067

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1864.2 2194.69 1409.57 1801.21 1569.56 .1 .3
Left Levee Station= 90.165 Elevation= 79.21
Right Levee Station= 3308.91 Elevation= 77.465
Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
132.53	307.23	76.5	313.25	313.25	76.56	315.26	1076.31	75.72
1491.97	1845.38	72.97	2528.11	3279.12	71.66			

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 115.2

INPUT
Description: RGV-02, New Cross-section, End Wall, similar to 115, Bathymetric
elevations translated from IBWC 2008 115 Cross-section
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

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      0   77.77    3.28    77.8    9.83   78.14   29.49   78.25   49.14   77.92
   55.7    77.6    68.8   77.09   72.08   77.01   81.91   76.19   88.46   75.74
  95.01   75.51  101.56   75.03  108.11   74.95  111.39   74.82  114.67   74.41
 117.94   73.78   124.5   72.89  127.77   72.58  134.32   72.49  140.88   72.07
 144.15   71.35  147.43   70.93  157.26   70.15  160.53   69.68  167.09   69.51
 170.36   69.53  176.92   69.94  183.47   70.48  186.74   70.26  190.02   69.83
  193.3   69.74  196.57   69.88  199.85   69.74   206.4   70.04  212.95    70.8
 216.23   71.06  229.34   72.46  232.61   72.67  239.16   73.32  245.72   74.23
 252.27   74.88  258.82   75.41   262.1   75.27  268.65   74.74  271.93   74.69
 278.48   75.31  285.03   76.28  288.31   76.59  291.58    76.5  294.86    76.2
 304.69   74.44  311.24   73.45  314.52   73.21  321.07      73  324.35    72.8
 327.62   72.42  334.17    72.1  340.73   71.68  347.28   71.66  357.11    71.8
 363.66   71.69  370.21   71.67  373.49   71.76  380.04   72.28  383.32   72.12
 386.59   72.14  393.15   71.48  396.42   71.27  406.25   71.23   412.8   70.95
 419.36   70.82  422.63   70.85  435.74   70.66  448.84   70.67  461.95   70.79
  468.5   70.75  471.78   70.63  478.33   70.57  484.88    70.6  491.43   70.41
 494.71   70.47  504.54   70.43  507.81   70.52  514.37   70.37  517.64   70.44
 527.47   70.36  530.75   70.22  540.58   70.26  547.13   70.15   550.4   70.25
 563.51   70.32  570.06   70.22  576.61   70.29  583.17   70.22  586.44   70.31
 599.55   70.29   606.1   70.42  612.65   70.35  622.48   70.41  625.76   70.32
 635.59   70.37  645.41   70.32  655.24   70.35  665.07   70.24   674.9   70.34
 678.18   70.28  684.73   70.43  697.83   70.29  704.39   70.39  717.49   70.22
 733.87   70.31  737.15   70.38  753.53   70.32  756.81   70.26  763.36   70.39
 773.19   70.35  786.29    70.1  789.57   70.18  796.12   70.05  805.95   70.21
  812.5   70.17  822.33   69.76  825.61   69.79  828.88   70.33  832.16   70.41
 841.99   70.26  855.09   70.24   868.2   70.37  878.03    70.4  891.13   70.26
 900.96   70.24  904.24   70.29  914.06   70.12  920.62   70.26     937   70.12
 946.83   70.28  953.38   70.26  963.21   70.41  973.04   70.37  982.86   70.42
 989.42   70.26  992.69   70.38  995.97    70.3 1012.35   70.31 1022.18   70.56
1035.28   70.54 1038.56   70.44 1045.11   70.52 1054.94   70.42 1061.49   70.29
 1074.6   70.25 1084.43    70.4  1087.7   70.63 1090.98   70.52 1104.08   70.55
1110.64    70.4 1117.19   70.45 1127.02   70.62 1140.12    70.4  1143.4   70.52
1149.95   70.42 1166.33   70.47 1172.89   70.62 1182.71   70.64 1202.37   70.49
1208.92   70.36 1215.48   70.31 1218.75   70.39 1225.31   70.37 1235.13   70.58
1251.51   70.48 1258.07   70.36 1264.62   70.44 1277.72   70.48 1290.83    70.3
1297.38    70.4 1303.93   70.38 1320.32   70.58 1330.14   70.47  1336.7   70.52
1343.25   70.45  1349.8   70.64 1353.08   70.51 1359.63   70.45 1366.18   70.49
1372.74   70.39 1382.56   70.58 1395.67   70.62 1408.77   70.54 1415.33   70.68
1428.43   70.49 1434.98   70.57 1444.81   70.48 1451.37   70.49 1471.02   70.64
1484.13    70.7 1493.96    70.7 1507.06   70.53 1523.44   70.55 1533.27   70.63
1539.82   70.57 1546.38   70.67  1556.2   70.66 1572.59   70.77 1585.69   70.61
1602.07   70.69 1608.62   70.85 1615.18   70.85 1618.45   70.76 1638.11   70.82
1641.39   70.75 1651.22   70.74 1661.04   70.64 1670.87   70.64 1687.25   70.78
1693.81   70.67 1700.36   70.66 1706.91   70.83 1723.29   70.88 1726.57   70.79
1733.12   70.78  1736.4   70.65 1752.78   70.68 1759.33   70.79 1769.16   70.81
1772.44   70.68 1778.99   70.89 1788.82   70.86 1798.65   70.73  1805.2   70.87
1811.75   70.74 1821.58   70.94 1831.41    70.9 1841.24   70.93 1854.34   70.72
1864.17   70.86 1870.72   70.81 1877.28   70.85  1887.1   70.77 1900.21    70.8
1910.04   70.93 1919.87   70.85 1926.42   70.93 1936.25   70.87 1939.52   70.74
1946.08   70.89 1955.91   70.87 1959.18   70.94 1972.29   71.06 1982.12   70.95
1988.67   71.01 1995.22   71.23 2001.77   70.85 2008.33   70.68 2014.88   70.38
2021.43   70.17 2031.26    70.3 2037.81   70.47 2044.36   70.97 2050.92   71.39
 2067.3   73.13 2073.85    74.7 2077.13    75.2  2080.4   75.35 2100.06   75.45
2103.34   74.48 2106.61      72 2109.89    69.3 2113.17   65.64 2116.44   61.48
2119.72   58.66    2123   57.42    2123   56.83    2130   53.75    2140   48.85
   2150   44.85    2160   41.35    2170   38.15    2180   36.85    2190   36.85
   2200   38.35    2210   40.35    2220   41.85    2230   44.35    2240   48.35
   2250   49.35    2260   50.85    2270   53.85    2277   56.83 2319.61   57.42
2322.89    57.6 2329.44   59.05 2332.72   59.21    2336   59.16 2339.27   59.31
2345.83    59.8 2355.66   59.98 2362.21   60.26  2378.6   60.43 2381.87   60.61
2385.15   60.63 2394.98   60.29 2401.54   60.63 2404.81   61.04 2411.37   62.04
2417.92   62.76  2421.2   63.23 2424.47   64.03 2431.03    65.8 2437.58    67.1
2440.86   67.61 2447.41    68.3 2453.97    69.1 2457.24   69.33  2463.8   69.59
2470.35   70.52 2473.63   70.63 2486.74   70.48 2493.29   70.45 2499.84   70.68
 2506.4   70.78 2512.95   70.79 2522.78   70.92 2542.44   71.48 2558.83   71.55
2565.38   71.66 2585.04   71.71  2591.6   71.79 2594.88   71.74 2611.26    71.9
2621.09   71.85 2630.92   71.94 2637.48   71.92 2644.03   72.03 2653.86   72.03
2663.69    72.1 2673.52   71.79 2680.08   71.97 2689.91   72.09 2699.74   72.03
2709.57   72.17  2719.4    72.2 2725.95   72.07 2752.17   72.15 2758.72   72.14
2765.28   72.03 2771.83   72.11 2784.94   72.06 2788.22   72.14 2801.32   71.95
2814.43   71.93 2820.99   71.98 2837.37   71.81  2847.2   72.17 2853.76   72.08
2863.59   72.08 2866.86   72.02 2873.42   72.07 2883.25      72 2906.19   72.01
2912.74   72.08 2919.29   71.93 2925.85   71.98 2938.96   71.78 2952.06   71.73
2958.62   71.76 2978.28   71.66 2984.83   71.75 3001.22   71.71 3011.05   71.65
3027.43   71.71 3033.99   71.67 3043.82   71.76 3070.03   71.72 3083.14   71.78
 3089.7    71.6 3096.25   71.55 3106.08   71.57 3122.47   71.43 3138.85   71.46
3142.13   71.35 3151.96   71.33 3165.07   71.37 3181.45   71.26 3194.56   71.09
3201.11   71.13 3204.39   71.04 3214.22   71.08  3217.5   70.97 3227.33   70.96
3237.16   71.01 3240.44    70.9 3246.99    70.9  3260.1   70.79 3269.93   70.79
3283.04   70.72 3299.42   70.56 3305.98   70.64 3319.08   70.63 3328.91    70.5
3335.47   70.55 3342.02    70.5 3358.41   70.55 3364.96   70.61 3374.79   70.61
3397.73   70.83 3410.84   70.75 3417.39   70.76 3423.94   70.67  3430.5    70.8
3450.16   70.68 3463.27    70.7  3473.1   70.81 3479.65    70.8 3496.04   70.96
3505.87   70.81 3525.53   70.69 3535.36   70.33 3555.02   69.86 3564.85   69.58
3571.41   69.53 3581.24   69.68 3587.79   69.47 3594.35   69.49  3600.9   69.27
3614.01   69.01 3617.29   68.82 3623.84   68.71 3630.39   68.44 3640.22   68.23
3646.78   68.18 3659.89   67.93 3669.72   67.94 3689.38   67.83 3695.93   67.91
3699.21    67.8 3702.49   67.89 3718.87   67.91 3741.81    67.8 3748.36   67.91
3751.64   68.15 3754.92   68.75 3761.47   70.67 3764.75   71.72 3768.02   72.97
 3771.3   73.83 3774.58   74.93 3777.86   76.37 3781.13   77.23 3784.41   77.68
3790.96   77.53 3794.24   77.54 3804.07   77.73 3807.35   77.61 3810.63   77.02
 3813.9   75.91 3820.46   72.38 3827.01   70.59 3830.29   70.12 3833.56   69.96

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .109 2100.06    .066    2123    .025    2277    .066 2473.63    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2100.06 2473.63          375.54  332.57   344.1            .1       .3
Left Levee      Station=   29.49      Elevation=   78.25
Right Levee     Station= 3804.07      Elevation=   77.73
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0  2080.4   75.35  2719.4 3764.75    72.2

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             74.11    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.11    Wt. n-Val.                            0.051     0.074
  W.S. Elev (ft)             74.00    Reach Len. (ft)          375.54     332.57     344.10
  Crit W.S. (ft)             52.23    Flow Area (sq ft)                  7087.05    2489.25
  E.G. Slope (ft/ft)      0.000173    Area (sq ft)                       7087.05    2489.25
```

Q Total (cfs)	20000.00	Flow (cfs)		18984.51	1015.50
Top Width (ft)	1667.85	Top Width (ft)		369.66	1298.19
Vel Total (ft/s)	2.09	Avg. Vel. (ft/s)		2.68	0.41
Max Chl Dpth (ft)	37.15	Hydr. Depth (ft)		19.17	1.92
Conv. Total (cfs)	1519197.0	Conv. (cfs)		1442060.0	77136.9
Length Wtd. (ft)	333.34	Wetted Per. (ft)		384.33	1298.45
Min Ch El (ft)	36.85	Shear (lb/sq ft)		0.20	0.02
Alpha	1.56	Stream Power (lb/ft s)		0.53	0.01
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	5792.30	2351.14	868.30
C & E Loss (ft)	0.01	Cum SA (acres)	1481.99	124.32	333.25

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 115

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	74.4	6.56	74.76	9.83	74.73	13.11	74.42	19.67	72.64
26.22	72.69	29.5	72.87	32.78	74.14	36.06	75.11	42.61	76.26
45.89	76.97	52.45	78.16	55.72	78.52	62.28	78.65	65.56	78.61
68.83	78.27	72.11	77.57	78.67	75.72	81.95	74.91	88.5	73.14
95.06	71.57	98.33	71.06	101.61	70.81	108.17	70.01	118	69.28
121.28	68.92	127.84	68.36	140.95	68.21	150.78	68.4	154.06	68.37
160.61	68.46	167.17	68.64	173.72	68.67	180.28	68.83	183.56	68.84
190.11	68.72	196.67	68.96	199.95	68.99	206.5	68.86	216.34	68.95
226.17	68.83	239.28	69.06	249.11	68.92	255.67	69.2	265.5	68.97
278.62	69.15	288.45	69.19	301.56	69.17	308.12	69.25	321.23	69.3
327.78	69.24	334.34	69.45	340.89	69.22	347.45	69.2	350.73	69.31
357.28	69.3	360.56	69.19	363.84	69.25	376.95	69.32	386.78	69.26
393.34	69.35	403.17	69.24	409.73	69.42	422.84	69.3	432.67	69.42
442.51	69.36	458.9	69.51	468.73	69.39	478.56	69.45	485.12	69.41
491.67	69.57	498.23	69.48	501.51	69.51	514.62	69.48	521.17	69.31
534.29	69.51	537.56	69.46	553.95	69.48	560.51	69.45	563.79	69.51
576.9	69.41	580.18	69.48	590.01	69.43	593.29	69.53	603.12	69.53
609.68	69.59	622.79	69.51	626.06	69.58	632.62	69.56	639.18	69.65
652.29	69.65	665.4	69.61	678.51	69.62	681.79	69.7	691.62	69.65
701.45	69.66	714.57	69.73	721.12	69.68	737.51	69.66	744.07	69.6
750.62	69.72	753.9	69.69	763.73	69.81	770.29	69.54	776.84	69.34
783.4	69.03	789.96	69.05	796.51	69.64	799.79	69.73	809.62	69.65
816.18	69.68	822.73	69.59	829.29	69.73	835.85	69.64	842.4	69.71
848.96	69.69	855.51	69.83	865.35	69.71	871.9	69.83	878.46	69.66
885.01	69.68	891.57	69.82	898.12	69.69	904.68	69.69	914.51	69.81
921.07	69.74	927.62	69.81	930.9	69.77	940.74	69.85	953.85	69.78
963.68	69.77	973.51	69.9	980.07	69.85	989.9	69.91	999.74	69.91
1006.29	69.83	1016.13	69.97	1025.96	69.86	1032.52	69.83	1035.79	69.93
1042.35	69.9	1045.63	69.99	1065.29	69.91	1078.4	69.99	1081.68	69.93
1098.07	70.01	1101.35	70.09	1114.46	69.95	1121.02	70.04	1127.57	69.95
1137.41	70.05	1147.24	70.04	1163.63	70.13	1170.18	70.08	1176.74	70.16
1193.13	70.1	1199.68	70.29	1202.96	70.19	1209.52	70.2	1212.79	70.1
1222.63	70.28	1225.91	70.17	1232.46	70.27	1239.02	70.1	1245.57	70.31
1252.13	70.16	1255.41	70.16	1271.8	69.99	1278.35	70.06	1284.91	70.01
1291.46	70.08	1304.57	70.06	1311.13	70.11	1324.24	70.06	1327.52	70.12
1330.8	70	1337.35	70.15	1340.63	70.02	1353.74	70.01	1370.13	70.07
1373.41	70.02	1379.96	70.13	1399.63	70.18	1416.02	70.32	1419.3	70.26
1429.13	70.23	1432.41	70.34	1435.69	70.28	1442.24	70.42	1448.8	70.19
1458.63	70.35	1471.74	70.3	1475.02	70.35	1481.58	70.29	1488.13	70.31
1511.08	70.29	1524.19	70.32	1530.74	70.43	1537.3	70.39	1543.85	70.44
1547.13	70.37	1553.69	70.38	1556.97	70.46	1560.24	70.4	1566.8	70.41
1573.35	70.34	1589.74	70.41	1596.3	70.35	1612.69	70.35	1619.24	70.39
1625.8	70.52	1629.08	70.47	1642.19	70.48	1648.74	70.44	1655.3	70.48
1661.86	70.34	1668.41	70.42	1688.08	70.39	1707.74	70.45	1714.3	70.55
1717.58	70.47	1724.13	70.5	1727.41	70.42	1733.97	70.49	1747.08	70.39
1750.36	70.5	1760.19	70.44	1776.58	70.47	1783.13	70.45	1786.41	70.51
1792.97	70.41	1802.8	70.36	1809.36	70.48	1819.19	70.43	1835.58	70.59
1842.14	70.56	1848.69	70.72	1855.25	70.71	1858.52	70.6	1871.64	70.74
1874.91	70.89	1878.19	70.89	1881.47	70.67	1891.3	70.39	1904.41	70.2
1907.69	70.2	1914.25	70.44	1933.91	71.58	1940.47	72.23	1943.75	72.76
1950.3	74.41	1953.58	75.02	1956.86	75.26	1963.41	75.27	1966.69	75.35
1973.25	75.17	1979.8	75.1	1986.36	76.22	1989.64	75.89	1992.91	73.03
1996.19	67.93	1999.47	63.47	2002.75	60.83	2006.03	58.56	2009.3	57.52
2012.58	57.42	2012.58	54.15	2022.58	49.25	2032.58	45.25	2042.58	41.75
2052.58	38.55	2062.58	37.25	2072.58	37.25	2082.58	38.75	2092.58	40.75
2102.58	42.25	2112.58	44.75	2122.58	48.75	2132.58	49.75	2133.77	51.25
2133.77	57.42	2140.32	57.54	2143.6	58.08	2146.87	58.93	2150.14	59.44
2156.69	60.25	2163.24	60.94	2166.51	61.16	2169.79	61.15	2173.06	61.33
2176.34	61.68	2179.61	62.42	2189.43	65.32	2192.71	66.39	2195.98	67.06
2199.26	67.49	2202.53	67.66	2212.35	67.79	2222.18	68.09	2232	68.29
2248.37	68.95	2258.19	69.16	2264.74	69.21	2271.29	69.5	2284.38	69.69
2287.66	69.84	2294.21	69.88	2300.76	70.14	2304.03	70.15	2310.58	70.31
2317.13	70.19	2323.67	70.34	2336.77	70.54	2343.32	70.48	2356.42	70.64
2359.69	70.74	2372.79	70.85	2376.06	70.92	2382.61	70.88	2385.88	70.94
2395.71	70.85	2398.98	70.96	2405.53	71.03	2408.8	70.98	2421.9	71.12
2431.72	71.16	2438.27	71.26	2461.19	71.31	2471.01	71.41	2477.56	71.33
2484.11	71.4	2497.2	71.35	2507.03	71.44	2516.85	71.33	2523.4	71.4
2529.95	71.34	2536.5	71.45	2546.32	71.44	2559.41	71.51	2565.96	71.64
2572.51	71.63	2579.06	71.71	2611.8	71.81	2615.07	71.74	2624.9	71.75
2631.45	71.82	2637.99	71.77	2654.36	71.88	2657.64	71.84	2670.74	71.93
2677.28	71.88	2680.56	71.76	2687.11	71.88	2696.93	71.82	2700.2	71.89
2716.57	71.83	2726.4	71.9	2739.49	71.77	2746.04	71.79	2749.31	71.64
2759.14	71.4	2765.69	71.3	2772.23	71.32	2775.51	71.26	2782.06	71.34
2785.33	71.26	2791.88	71.29	2798.43	71.22	2801.7	71.29	2808.25	71.23
2814.8	71.29	2847.54	71.16	2857.36	71.08	2867.18	71.2	2883.56	71.09
2896.65	71.09	2899.93	71.13	2916.3	71.03	2922.85	71.03	2929.39	71.11
2939.22	71.06	2949.04	71.13	2962.14	71.13	2968.68	71.01	2975.23	71.11
2985.05	71.02	2991.6	71.13	3011.25	71.06	3017.8	71.15	3024.34	71.05
3034.17	70.99	3040.72	71.12	3047.26	71.06	3057.09	71.05	3063.63	70.97
3070.18	71.01	3089.83	70.83	3096.38	70.89	3106.2	70.89	3112.75	71
3122.57	70.95	3132.39	70.96	3148.76	70.87	3155.31	70.89	3174.96	70.76
3181.5	70.81	3188.05	70.71	3194.6	70.82	3204.42	70.71	3210.97	70.56
3220.79	70.59	3227.34	70.5	3237.17	70.44	3240.44	70.5	3246.99	70.46
3263.36	70.47	3269.91	70.58	3276.45	70.56	3286.28	70.61	3292.83	70.7
3309.2	70.59	3315.75	70.7	3319.02	70.65	3332.12	70.63	3335.39	70.66

3348.49	70.47	3361.58	70.42	3368.13	70.32	3374.68	70.31	3381.23	70.11
3394.32	69.94	3397.6	69.97	3407.42	69.85	3413.97	69.71	3433.61	69.03
3443.44	68.6	3456.53	68.18	3466.36	68.01	3476.18	68.06	3482.73	67.98
3489.28	68	3492.55	68.14	3502.37	68.15	3508.92	68.57	3515.47	69.29
3518.74	69.92	3525.29	71.38	3528.57	72.46	3534.99	75.2	3538.2	76.69
3541.41	77.7	3544.62	77.85	3547.83	77.77	3557.47	77.67	3563.89	77.73
3567.1	77.58	3570.31	76.84	3576.73	73.25	3579.94	72	3583.16	71.39

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.109	1989.64	.066	2012.58	.025	2133.77	.066	2336.77	.074

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1989.64 2336.77 1929.76 1810 1594.01 .1 .3
Left Levee Station= 62.28 Elevation= 78.65
Right Levee Station= 3544.62 Elevation= 77.85
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
72.11	1986.36	76.22	2670.74	3528.57	71.93

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	74.02	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.17	Wt. n-Val.		0.053	0.074	
W.S. Elev (ft)	73.85	Reach Len. (ft)	1929.76	1810.00	1594.01	
Crit W.S. (ft)	52.46	Flow Area (sq ft)		5399.16	2487.44	
E.G. Slope (ft/ft)	0.000407	Area (sq ft)		5399.16	2487.44	
Q Total (cfs)	20000.00	Flow (cfs)		18357.73	1642.27	
Top Width (ft)	1539.87	Top Width (ft)		344.80	1195.07	
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)		3.40	0.66	
Max Chl Dpth (ft)	36.60	Hydr. Depth (ft)		15.66	2.08	
Conv. Total (cfs)	991394.4	Conv. (cfs)		909987.4	81407.0	
Length Wtd. (ft)	1804.78	Wetted Per. (ft)		367.88	1195.46	
Min Ch El (ft)	37.25	Shear (lb/sq ft)		0.37	0.05	
Alpha	1.66	Stream Power (lb/ft s)		1.27	0.03	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	5792.30	2303.47	848.64	
C & E Loss (ft)	0.04	Cum SA (acres)	1481.99	121.59	323.40	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 114.8

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.76	9.84	77.32	16.4	78.85	26.24	78.85	29.52	78.45
32.8	77.52	42.65	74.14	49.21	71.41	52.49	70.52	62.33	68.84
72.17	67.77	78.73	67.6	82.01	67.29	88.57	66.15	95.13	67.1
108.26	66.12	114.82	65.98	124.66	66.26	134.5	66.06	150.9	66.27
157.46	66.23	183.71	66.44	203.39	66.32	213.23	66.42	229.63	66.45
246.04	66.35	249.32	66.53	255.88	66.33	262.44	66.43	272.28	66.35
278.84	66.65	285.4	66.39	291.96	66.35	305.08	66.56	311.65	66.41
351.01	66.49	373.98	66.33	403.5	66.33	410.06	66.19	426.46	66.14
436.3	66.23	459.27	66.23	472.39	66.16	492.07	66.16	521.6	66.38
531.44	66.3	541.28	66.46	560.96	66.29	564.24	66.44	590.49	66.2
610.17	66.17	616.73	66.26	629.85	66.19	636.41	66.27	656.1	66.17
672.5	66.18	685.62	66.39	695.46	66.23	708.59	66.26	711.87	66.37
728.27	66.35	734.83	66.46	754.51	66.32	767.63	66.54	793.88	66.39
810.28	66.49	833.24	66.43	839.81	66.61	856.21	66.45	862.77	66.63
869.33	66.44	879.17	66.7	885.73	66.53	905.41	66.56	921.82	66.44
938.22	66.43	951.34	66.58	961.18	66.47	967.74	66.59	974.31	66.51
1013.67	66.53	1043.2	66.6	1049.76	66.49	1076	66.59	1089.12	66.57
1095.68	66.68	1102.24	66.53	1108.8	66.64	1138.33	66.57	1161.29	66.73
1174.41	66.63	1194.1	66.69	1203.94	66.8	1253.14	66.72	1256.43	66.64
1282.67	66.81	1292.51	66.64	1308.91	66.79	1328.6	66.77	1358.12	66.93
1381.08	66.82	1394.2	66.87	1404.05	66.67	1417.17	66.89	1427.01	66.71
1446.69	66.86	1459.81	66.75	1466.37	67.02	1472.94	66.92	1486.06	67
1492.62	66.88	1499.18	67.01	1505.74	66.84	1512.3	67.09	1518.86	66.9
1538.54	67.09	1548.39	66.86	1561.51	66.87	1581.19	66.99	1584.47	66.91
1594.31	67.18	1604.15	66.98	1610.71	67.14	1627.12	67.07	1636.96	66.9
1653.36	66.94	1659.92	67.14	1669.76	66.97	1676.32	67.1	1682.88	66.96
1699.29	66.87	1709.13	67	1715.69	66.94	1722.25	67.09	1732.09	66.97
1738.65	67.15	1748.49	66.97	1778.02	66.96	1787.86	67.05	1807.54	67.03
1814.1	67.18	1823.94	67.11	1837.07	67.17	1846.91	67.01	1853.47	67.17
1863.31	66.89	1869.87	66.9	1879.71	67.15	1896.11	67.17	1905.96	66.87
1919.08	66.93	1922.36	66.78	1928.92	65.96	1932.2	65.82	1938.76	67.08
1951.88	67.05	1961.72	66.75	1974.85	66.76	1984.69	66.65	1991.25	66.39
2001.09	66.59	2020.77	66.08	2024.05	65.92	2043.73	65.65	2047.02	65.76
2056.86	65.68	2063.42	65.48	2083.1	65.48	2089.66	65.3	2109.35	65.28
2125.75	65.44	2135.59	65.33	2151.99	65.35	2161.83	65.52	2178.24	65.35
2194.64	65.48	2204.48	65.36	2230.73	65.43	2237.29	65.3	2250.4	65.54
2263.51	65.46	2279.89	66.03	2286.45	65.94	2296.28	66.3	2306.11	66.85
2315.94	67.12	2322.49	67.45	2332.32	68.21	2342.15	68.78	2348.7	69.4
2358.53	69.86	2374.91	70.43	2388.02	70.67	2397.85	70.55	2414.23	70.65
2424.06	70.47	2440.44	70.67	2450.27	70.52	2456.83	70.59	2473.21	70.47
2479.76	70.65	2496.15	70.51	2512.53	70.59	2522.36	70.38	2538.74	70.36
2548.57	70.45	2591.16	70.15	2597.72	70.35	2604.27	70.34	2610.82	70.87
2617.38	70.76	2633.76	71.12	2650.14	70.9	2669.8	71.04	2682.91	71.71
2692.74	71.53	2699.29	71.69	2712.4	71.42	2722.23	71.62	2738.61	71.65
2748.44	71.94	2754.99	71.93	2771.37	71.6	2791.03	71.44	2804.14	71.66
2817.25	71.54	2827.07	71.61	2843.46	71.53	2863.12	71.58	2872.95	71.5
2892.61	71.65	2899.16	71.61	2931.92	71.68	2941.75	71.99	2945.03	71.77
2961.41	71.34	2964.69	71.39	2977.8	69.87	2984.35	68.97	2990.9	68.74
3000.73	67.78	3007.28	67.46	3017.11	67.3	3026.94	67.4	3033.5	67.32
3049.88	67.35	3056.43	67.56	3072.81	67.39	3089.2	67.62	3095.75	67.37
3105.58	67.38	3115.41	67.55	3128.52	67.52	3148.18	67.64	3151.45	67.58
3177.66	67.59	3184.22	67.71	3203.88	67.61	3246.47	67.7	3253.02	67.58
3292.34	67.76	3315.28	67.66	3321.83	67.8	3344.77	67.87	3354.6	68.02
3357.87	67.91	3387.36	67.93	3397.19	68.08	3403.74	67.9	3413.57	68.07
3416.85	68.54	3423.4	70.13	3429.96	70.52	3439.79	70.26	3446.34	70.78
3456.17	70.38	3462.72	69.98	3475.83	70.66	3502.04	71.13	3511.87	71.74
3521.7	72.8	3541.36	73.71	3554.47	73.76	3567.57	73.66	3580.68	73.14
3590.51	73.49	3606.89	73.38	3620	72.87	3626.55	72.78	3636.38	73.28

3656.04	73.67	3682.25	73.48	3695.36	73.05	3708.46	73.11	3711.74	73.44		
3718.29	73.67	3721.57	73.51	3731.4	72.12	3741.23	70.19	3754.33	67.98		
3760.89	65.37	3770.72	64.7	3787.1	64.69	3793.65	64.84	3826.42	64.66		
3832.97	64.85	3836.25	65.54	3846.08	71.07	3849.35	72.34	3852.63	72.76		
3859.18	72.96	3872.29	74.12	3878.84	74.3	3898.5	73.99	3908.33	73.33		
3911.61	73.25	3921.44	73.52	3927.99	73.45	3934.54	73.09	3941.1	72.95		
3950.93	73.21	3957.48	73.17	3967.31	73.53	3973.86	73.45	3986.97	73.7		
3993.52	72.9	4003.35	72.78	4013.18	72.86	4023.01	72.64	4032.84	71.8		
4042.67	71.58	4052.5	71.11	4059.05	71.05	4068.88	70.61	4085.26	70.35		
4091.82	69.92	4095.09	68.9	4101.65	65.65	4104.92	64.72	4114.75	63.56		
4118.03	62.5	4124.58	59	4127.86	57.68	4131.14	57.42	4141.14	55.25		
4161.14	54.55	4171.14	51.55	4181.14	51.25	4221.14	51.25	4231.14	50.85		
4241.14	50.85	4261.14	50.25	4271.14	49.55	4281.14	49.25	4291.14	48.55		
4301.14	48.85	4311.14	51.45	4314.6	53.05	4314.6	57.42	4317.88	58.87		
4321.15	61.03	4324.43	61.59	4327.7	61.55	4330.98	62.2	4344.08	70.09		
4347.36	70.89	4360.46	69.05	4376.84	68.48	4389.94	69.12	4399.77	70.27		
4412.88	70.92	4419.43	71.88	4422.7	71.96	4429.26	70.71	4432.53	70.55		
4445.63	70.6	4452.19	70.76	4465.29	70.57	4478.39	70.57	4501.32	70.95		
4507.88	70.66	4517.7	70.78	4527.53	70.6	4534.08	70.7	4543.91	70.57		
4553.74	70.63	4563.57	70.47	4579.95	70.59	4599.6	70.61	4615.98	70.5		
4629.08	70.51	4652.02	70.35	4681.5	70.39	4701.15	70.31	4707.71	70.37		
4727.36	70.19	4737.19	70.25	4747.02	70.14	4760.12	70.13	4763.4	70.02		
4802.71	70.02	4809.26	69.89	4815.81	69.96	4832.19	69.83	4855.12	69.83		
4864.95	69.72	4881.33	69.75	4897.71	69.63	4943.57	69.6	4959.95	69.46		
4966.5	69.51	5005.81	69.42	5022.19	69.48	5064.78	69.34	5090.98	69.22		
5110.64	69.27	5133.57	69.19	5159.78	69.16	5176.16	69.21	5185.98	69.06		
5205.64	69.02	5225.29	69.11	5235.12	68.97	5251.5	68.97	5254.78	68.84		
5303.92	68.83	5310.47	68.75	5323.57	68.81	5343.23	68.68	5389.09	68.49		
5425.12	68.3	5448.05	68.37	5467.71	68.29	5474.26	68.36	5493.92	68.24		
5529.95	68.3	5556.16	68.17	5582.36	68.22	5598.74	68.02	5611.85	68		
5621.68	67.82	5634.78	67.89	5651.16	67.71	5664.26	67.73	5677.37	68.11		
5690.47	68.1	5703.57	68.35	5706.85	68.87	5710.12	70.13	5713.4	70.9		
5716.68	72.56	5723.23	70.71	5726.5	69.25	5729.78	69.14	5736.33	73.56		
5739.61	76.71	5742.88	77.98	5746.16	78.01	5749.43	77.57	5759.26	77.34		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.14	3986.97	.066	4141.14	.025	4314.6	.066	4347.36	.067

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4091.82	4347.36	731.82	720	723.47	.1	.3

Left Levee Station= 26.24 Elevation= 78.85
Right Levee Station= 5746.16 Elevation= 78.01

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	73.72	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.04	Wt. n-Val.	0.139	0.041	0.067	
W.S. Elev (ft)	73.68	Reach Len. (ft)	731.82	720.00	723.47	
Crit W.S. (ft)	58.69	Flow Area (sq ft)	22203.43	4804.28	5943.05	
E.G. Slope (ft/ft)	0.000075	Area (sq ft)	22203.43	4804.28	5943.05	
Q Total (cfs)	20000.00	Flow (cfs)	6623.52	10379.35	2997.14	
Top Width (ft)	5631.24	Top Width (ft)	3986.61	255.54	1389.09	
Vel Total (ft/s)	0.61	Avg. Vel. (ft/s)	0.30	2.16	0.50	
Max Chl Dpth (ft)	25.13	Hydr. Depth (ft)	5.57	18.80	4.28	
Conv. Total (cfs)	2314391.0	Conv. (cfs)	766470.3	1201094.0	346827.2	
Length Wtd. (ft)	724.63	Wetted Per. (ft)	3991.92	267.14	1392.30	
Min Ch El (ft)	48.55	Shear (lb/sq ft)	0.03	0.08	0.02	
Alpha	6.76	Stream Power (lb/ft s)	0.01	0.18	0.01	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	5300.48	2091.49	694.39	
C & E Loss (ft)	0.00	Cum SA (acres)	1393.69	109.12	276.12	

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 114.65

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.62	3.28	76.27	16.39	78.33	26.22	78.52	29.49	78.33
42.6	75.06	49.16	72.91	52.43	72.13	65.54	70.38	75.37	68.68
85.21	67.43	91.76	66.81	101.59	65.45	104.87	65.51	108.15	66.1
111.42	66.23	121.25	65.68	127.81	65.53	137.64	65.54	144.2	65.31
160.58	65.34	170.41	65.52	190.08	65.65	209.74	65.6	219.57	65.65
232.68	65.46	242.51	65.55	294.94	65.56	321.16	65.52	337.55	65.61
347.38	65.53	380.15	65.53	383.43	65.58	412.92	65.51	419.48	65.68
429.31	65.55	439.14	65.59	462.08	65.47	475.19	65.63	488.3	65.52
501.41	65.68	511.24	65.51	527.62	65.52	540.73	65.62	547.29	65.52
566.95	65.7	589.89	65.58	606.27	65.7	619.38	65.62	635.77	65.66
652.15	65.57	688.2	65.72	698.03	65.87	711.14	65.63	730.81	65.83
757.02	65.79	783.24	65.65	789.8	65.79	802.9	65.83	825.84	65.67
835.68	65.72	838.95	65.57	855.34	65.62	861.89	65.77	878.28	65.54
884.83	65.24	901.22	65.93	907.77	65.77	917.6	64.8	924.16	64.81
937.27	65.72	947.1	65.77	956.93	65.48	970.04	65.26	976.59	65
989.7	64.76	996.26	64.77	1025.75	64.3	1045.41	64.11	1058.52	64.34
1068.35	64.16	1084.74	64.21	1091.29	64.32	1110.96	64.28	1147.01	64.46
1160.12	64.67	1179.78	64.49	1189.61	64.72	1202.72	64.63	1215.83	64.66
1228.94	64.85	1242.04	64.65	1258.43	64.8	1274.82	64.76	1281.37	64.65
1294.48	64.72	1317.42	64.73	1337.08	64.82	1363.3	64.77	1369.85	64.84
1382.96	64.66	1399.35	64.81	1412.46	64.83	1438.68	65.03	1445.23	64.94
1458.34	65.02	1468.17	64.89	1484.56	64.9	1494.39	65.04	1533.71	65.06
1550.1	64.95	1566.49	65.14	1579.59	65.18	1609.09	65.13	1625.48	65
1632.03	65.16	1654.97	65.17	1677.91	65.05	1687.74	65.19	1710.68	65.26
1730.35	65.12	1736.9	65.23	1750.01	65.16	1763.12	65.33	1776.23	65.1
1786.06	65.25	1818.83	65.22	1831.94	65.38	1838.49	65.21	1851.6	65.36
1864.71	65.28	1884.37	65.33	1897.48	65.45	1923.7	65.35	1949.92	65.41
1956.47	65.32	1979.41	65.45	1985.97	65.3	2002.35	65.54	2015.46	65.35
2025.29	65.37	2035.12	65.56	2051.51	65.39	2058.06	65.53	2087.56	65.68
2094.11	65.46	2110.5	65.58	2136.71	65.65	2149.82	65.51	2166.21	65.7
2192.43	65.57	2195.7	65.47	2208.81	65.73	2215.37	65.6	2238.31	65.76
2257.97	65.68	2267.8	65.82	2277.63	65.63	2284.19	65.78	2303.85	65.82
2310.4	65.69	2323.51	65.84	2330.07	65.65	2349.73	65.91	2362.84	65.91
2375.95	65.8	2385.78	65.95	2408.72	65.85	2418.55	66.03	2425.11	65.9
2431.66	66.01	2477.54	66.09	2484.09	66.21	2503.76	66.25	2510.31	66.09

2523.42	66.1	2536.53	66.26	2546.36	66.09	2556.19	66.07	2569.3	66.42
2579.13	66.09	2595.52	65.98	2608.63	66.05	2618.46	65.84	2634.84	66.04
2651.23	66.05	2657.78	66.22	2677.45	66.38	2690.56	66.41	2713.5	66.15
2733.16	66.31	2762.66	66.63	2782.33	66.5	2818.4	66.48	2864.29	66.33
2880.68	66.36	2903.63	66.63	2936.41	66.44	2969.2	66.3	2979.03	66.42
2998.7	66.45	3008.54	66.35	3021.65	66.5	3034.76	66.44	3060.99	66.45
3087.22	66.67	3120	66.87	3133.11	67.06	3149.5	66.94	3152.78	67.11
3172.45	66.96	3185.56	67.16	3195.4	67.01	3218.35	67.1	3228.18	67.24
3238.02	67.14	3244.57	67.22	3254.41	67.12	3274.08	67.23	3293.75	66.99
3300.31	67.09	3319.98	67.04	3326.53	67.14	3342.92	67.11	3349.48	67.01
3369.15	67.1	3382.26	66.95	3395.38	67.15	3405.21	67.06	3421.6	67.16
3434.72	66.99	3477.33	66.97	3513.39	67.18	3526.51	67.09	3539.62	67.15
3582.24	67.07	3621.58	67.16	3651.08	67.39	3680.59	67.41	3690.42	67.71
3700.26	67.51	3706.81	67.62	3716.65	67.35	3723.21	67.62	3733.04	68.68
3739.6	70.46	3746.15	73.07	3752.71	74.31	3755.99	74.15	3765.82	73.2
3769.1	72.67	3782.22	68.5	3792.05	67.92	3798.61	68.48	3805.16	67.92
3811.72	68.79	3818.28	68.7	3831.39	67.71	3844.5	67.34	3860.89	68.54
3870.73	71.11	3877.29	72.57	3887.12	72.29	3896.96	71.44	3903.51	70.64
3906.79	70.48	3916.63	71.73	3923.18	71.77	3926.46	70.39	3933.02	65.99
3936.3	65.06	3942.85	65.06	3955.97	64.74	3962.52	64.83	3992.03	64.82
3995.3	65.48	4001.86	68.57	4005.14	69.24	4011.7	69.27	4014.97	69.51
4024.81	71.18	4031.37	71.83	4037.92	73.26	4041.2	73.65	4047.76	73.86
4057.59	74.4	4064.15	73.18	4073.98	69.47	4080.54	68.77	4096.93	68.95
4119.88	69.73	4129.71	69.98	4155.94	69.57	4175.61	68.9	4287.07	68.96
4306.74	69.36	4342.8	69.32	4369.03	69.38	4388.7	69.28	4398.53	69.41
4418.2	69.32	4431.32	69.39	4480.49	69.37	4496.88	69.25	4503.44	69.47
4510	70.25	4516.55	71.93	4523.11	73.3	4529.66	73.68	4536.22	72.89
4539.5	72.04	4549.33	67.82	4552.61	66.6	4555.89	66.08	4562.45	65.52
4565.73	65.51	4572.28	66.43	4575.56	67.21	4582.12	67.65	4588.67	64.56
4601.79	61.04	4608.34	60.02	4618.18	59.14	4628.01	59.17	4637.85	58.48
4647.68	58.73	4657.52	59.41	4660.8	58.82	4667.35	54.8	4670.63	53.19
4674.91	52.67	4683.91	50.92	4703.91	49.42	4713.91	48.92	4733.91	48.22
4753.91	48.22	4763.91	47.42	4783.91	46.42	4793.91	45.22	4813.91	44.62
4823.91	43.92	4833.91	44.12	4843.91	47.12	4853.91	51.92	4854.18	52.69
4857.45	52.94	4860.73	54.14	4864.01	56.03	4867.29	57.35	4877.12	59.67
4880.39	60.69	4883.67	62.41	4893.5	68.89	4896.78	70.4	4900.06	70.99
4903.34	71.07	4916.45	70.95	4926.28	70.57	4932.83	69.93	4939.39	67.44
4942.66	66.82	4945.94	66.75	4949.22	67.16	4955.77	67.47	4959.05	68.08
4965.61	69.8	4968.88	70.33	4972.16	70.42	4978.71	70.08	4988.55	70.35
4995.1	70.2	5024.6	70.66	5103.25	70.8	5119.64	70.67	5152.41	70.6
5155.69	70.71	5168.8	70.58	5178.63	70.73	5191.74	70.63	5208.13	70.76
5214.68	70.97	5227.79	70.92	5234.35	70.77	5257.29	70.78	5273.68	70.69
5290.06	70.82	5303.17	70.7	5335.95	70.69	5352.33	70.53	5404.77	70.4
5414.6	70.46	5424.43	70.35	5457.21	70.3	5483.43	70.2	5493.26	70.26
5506.37	70.07	5512.92	70.16	5548.97	70.05	5568.64	70.05	5575.19	69.92
5591.58	69.97	5621.07	69.81	5637.46	69.89	5660.4	69.77	5712.84	69.66
5719.39	69.74	5732.5	69.63	5768.55	69.66	5778.39	69.81	5814.44	69.65
5847.21	69.56	5866.88	69.65	5873.43	69.55	5889.82	69.55	5899.65	69.64
5906.2	69.52	5922.59	69.61	5988.14	69.35	5991.41	69.53	5997.97	69.38
6014.36	69.3	6024.19	69.34	6030.74	69.22	6053.68	69.26	6070.07	69.19
6079.9	69.29	6122.51	69.07	6132.34	69.19	6152	68.87	6158.56	69.06
6168.39	68.84	6181.5	68.86	6188.05	68.73	6194.61	68.84	6217.55	68.56
6233.94	68.58	6243.77	68.69	6250.32	68.48	6289.65	68.3	6299.48	68.33
6325.7	68.13	6348.64	68.28	6351.92	68.12	6365.03	68.25	6374.86	67.97
6378.14	68.11	6401.08	68.03	6407.64	68.19	6417.47	68.2	6427.3	68.05
6433.86	68.22	6446.96	69.63	6450.23	70.81	6460.04	76.13	6463.3	77.17
6466.57	77.4	6486.18	77.12	6492.71	77.15	6495.98	76.6	6502.52	73.9

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.174	4503.44	.066	4683.91	.025	4853.91	.066	4903.34	.068

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4529.66	4903.34	1166.91	1551.67 1518.74	.1	.3

Left Levee Station= 26.22 Elevation= 78.52
Right Levee Station= 6466.57 Elevation= 77.4
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
4057.59	4529.66	73.68	4903.34	6446.96	71.07

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	73.66	Element	0.174	0.050	0.068
Vel Head (ft)	0.02	Wt. n-Val.	1166.91	1551.67	1518.74
W.S. Elev (ft)	73.64	Reach Len. (ft)	30054.66	6861.37	3988.42
Crit W.S. (ft)	54.88	Flow Area (sq ft)	30054.66	6861.37	3988.42
E.G. Slope (ft/ft)	0.000061	Area (sq ft)	7778.70	10940.77	1280.53
Q Total (cfs)	20000.00	Flow (cfs)	3982.13	373.36	1552.11
Top Width (ft)	5907.60	Top Width (ft)	0.26	1.59	0.32
Vel Total (ft/s)	0.49	Avg. Vel. (ft/s)	7.55	18.38	2.57
Max Chl Dpth (ft)	29.72	Hydr. Depth (ft)	992239.8	1395590.0	163342.2
Conv. Total (cfs)	2551172.0	Conv. (cfs)	3988.55	384.41	1554.48
Length Wtd. (ft)	1463.62	Wetted Per. (ft)	0.03	0.07	0.01
Min Ch El (ft)	43.92	Shear (lb/sq ft)	0.01	0.11	0.00
Alpha	5.95	Stream Power (lb/ft s)	4861.51	1995.08	611.92
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	1326.75	103.92	251.69
C & E Loss (ft)	0.01	Cum SA (acres)			

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 114.47*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.84	15.71	76.99	29.45	78.13	38.4	76.87	46.74	74.53
53.87	72.25	59.71	71.13	69.34	69.89	82.6	68.74	100.28	66.81
111.59	66.04	124.56	64.91	137.53	65.3	159.15	64.84	172.12	64.85
193.11	64.54	206.37	64.85	226.26	65.02	239.52	64.93	255	65.16
272.68	65.68	294.78	65.59	327.93	65.58	356.67	65.48	363.3	65.61
389.82	65.72	407.5	65.15	414.14	64.63	422.98	64.36	467.18	64.11
535.27	64.22	577.69	64.79	593.17	64.8	615.27	64.49	628.53	64.5

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     652   64.76  664.97   64.69  692.63   64.97  701.47   65.27  716.94    65.4
  732.41    65.8   750.1   65.31  765.56   65.69  772.19   65.54  783.24   66.06
  800.93   66.02  807.63   65.83   816.4   66.19  825.24   66.22  847.34   65.82
  860.61   66.46  869.45   66.29  887.13   66.29  893.76   66.52  911.38   66.41
  937.96   65.53  960.07   65.06  968.91   64.98 1024.17   64.95 1035.21   65.13
 1050.68   65.04 1068.37   65.11 1097.28   65.67 1110.36   65.45 1121.42   65.62
 1134.68   66.12 1147.94   65.96 1157.81   65.59 1167.83   65.86 1179.43   65.56
 1192.14   64.47 1201.04    63.9 1209.69   63.79 1226.99   64.38 1239.95   64.47
 1270.22   64.08 1296.15   63.59 1307.07    63.6 1329.18   63.33 1346.86   63.48
 1357.91   64.29 1366.75   64.55 1373.38   64.27 1406.54   63.82  1419.8   63.97
  1441.9   64.69 1450.74   65.65 1459.58   65.78 1475.05   65.61 1492.73   64.85
 1512.63   64.83 1534.73   64.57 1545.78   64.34 1559.87   64.48 1578.93   64.42
 1594.46   64.53 1611.76   65.06 1631.98   65.31 1643.03   65.26 1662.93   64.47
 1680.92   64.21 1718.18   64.02 1724.81   64.13 1740.28   64.06 1753.54   64.21
    1789   64.13 1811.01   64.38 1826.48   64.66 1833.12   64.49 1857.42   64.58
 1864.05   64.87 1890.58   65.16 1903.84   65.05 1939.21   65.08 1965.73   65.42
 1990.04   65.39 2027.61   65.57 2065.19   65.95 2085.08   65.95 2098.34   65.79
  2133.7   65.93 2144.76   65.87  2175.7    65.9 2226.54   66.29 2235.38   66.19
 2250.85   66.32 2281.86   66.27 2292.84   66.12 2316.44   66.39 2333.74   66.24
 2383.47    66.5 2387.89   66.37 2414.41   66.54 2421.04   66.44 2454.19   66.59
 2469.66    66.4 2476.29   66.55 2491.77   66.53  2498.4   66.66 2522.71   66.47
 2535.97   66.73 2544.81   66.59 2549.23   66.84 2558.07   68.23 2562.49   68.12
 2571.33   66.89 2591.23   65.77  2606.7   65.87 2617.75   66.87 2631.01   67.09
 2655.33   66.86 2666.37   65.88    2673   65.89 2686.27   65.38 2701.74   65.15
 2708.37   64.76 2728.26   65.07 2744.44   65.16 2753.09   64.88 2783.52   64.99
 2787.94   65.15 2812.26   64.98 2843.19   65.05 2852.03   65.17 2860.88   65.03
 2878.56    65.2  2887.1   65.07  2904.4   65.27 2922.77   65.34 2927.19   65.52
 2933.82   65.28  2951.5   65.47 2960.34   65.95 2964.76   65.89 2984.66   66.84
 2995.18    66.7  3015.6   66.98 3035.49    66.9 3039.91   67.08 3055.71   67.09
 3064.36   66.88 3117.27   66.87 3143.79   66.76 3157.06   66.81 3170.32   67.04
 3189.74   66.88  3207.9   67.33 3216.74   67.37 3234.41   67.18 3256.52   67.12
 3271.99   67.29 3291.88   67.23 3298.51   67.02 3318.41   66.82 3344.93   67.02
  3360.4   66.92 3378.09   67.71 3400.19   67.47 3415.66   67.05 3420.08   67.29
  3424.5   68.32 3439.97   70.13 3448.81   67.96 3453.23   67.52 3459.86   67.39
 3466.49   65.07 3470.91   63.93 3477.55   63.71 3488.04   63.71 3501.86   63.96
  3510.7   66.89 3521.75   67.32 3526.17   68.64 3530.59   69.15 3539.43   68.61
 3548.28   68.79 3557.12   67.82 3572.59   67.15  3596.9   67.04  3616.8   67.21
 3627.85   67.17 3638.89   67.34 3652.16   67.13 3674.26   67.14 3680.89    67.3
 3689.73    67.1 3696.36    67.3 3729.52   67.13 3758.25   67.22 3762.67   67.06
 3826.77   67.36 3868.76    67.2 3879.82   67.27 3921.81   67.18 3954.97   67.34
  3961.6   67.21 3972.65   67.64  3983.7   67.36  4003.6   67.38 4027.91   67.27
 4072.11   67.55 4096.42   67.58  4111.9   67.82 4151.68   67.82 4175.63   67.73
 4191.47   68.01 4195.89    67.8 4233.47   67.83 4242.31   68.02 4253.35   67.86
 4288.72   67.94 4297.56   67.86  4344.3   67.88 4366.08   67.83 4381.55   68.04
  4392.6   67.84 4435.11   67.82 4450.07   67.73 4458.91   67.99 4482.68   67.81
 4504.31   67.89 4521.61    67.8 4595.95   67.92 4620.26   68.06  4626.9   67.96
 4651.21   68.07 4666.68   67.99 4699.83   68.06 4728.56   67.93 4746.25   68.04
 4781.61   68.03  4799.3   68.36 4805.93   68.12  4821.4    68.4 4845.96   68.29
 4858.93   68.47 4871.91   68.36 4880.55   68.48 4893.53   68.26 4915.16   69.14
 4923.81   70.32 4932.45   72.09  4941.1   72.99 4945.43   72.92 4962.73    71.9
  4971.7   70.62 4980.03   69.09    4993   68.88 5001.66   69.17  5010.3   68.69
 5018.95   69.32  5027.6    69.3  5044.9   68.65 5051.27   68.71 5062.32   68.35
 5083.81   69.24  5096.8   71.03 5105.45   72.02 5118.42   71.74 5144.37   70.49
 5157.35   71.41 5165.99   71.42 5170.31   70.47 5178.97   67.61 5183.29      67
 5209.24   66.74 5256.83   66.93 5261.13   67.35 5269.78   69.37 5274.11   69.79
 5287.08   69.99 5300.06   71.17 5308.71   71.65 5321.68   72.82  5343.3    73.4
 5351.95   72.56 5364.92   70.18 5373.58   69.65 5382.81   69.64 5438.44   70.47
 5486.69   70.09 5497.74   69.58    5511    70.3 5519.85   70.13 5533.11   69.05
 5546.37    68.8 5555.21   68.26 5568.47   68.04 5594.99   68.51 5625.93   68.42
 5654.66   68.52 5670.13   68.93  5685.6   69.99 5692.23   69.75 5698.86   68.98
  5707.7   68.58 5716.54   68.54 5723.17   68.15  5729.8   68.27 5740.85   68.99
  5751.9   68.84 5762.95   68.31    5774   68.78 5780.63   68.81 5787.26   68.46
 5798.31   68.95 5813.78   68.61  5818.2    68.7 5833.67   69.77 5846.93   68.75
 5855.77   68.71 5864.61   67.91 5873.43   67.89 5882.26   68.33 5886.66   69.13
 5897.69   69.61 5904.31    69.1 5913.13    69.6 5917.54   69.59 5931.52   68.87
 5941.79   68.98 5946.21   69.89 5957.41   71.28 5966.05   71.64 5972.42   70.89
  5975.6   70.11 5985.15   66.56 5988.33   65.61 5997.88   64.89 6001.06   64.88
 6011.33   66.04 6016.97   65.38 6023.33   62.88 6036.07   59.98 6042.42    59.3
 6051.98   58.72 6061.52   59.15 6071.07   58.93 6080.61   59.01 6090.16   59.35
 6093.34   58.94 6102.89   54.47 6107.04   53.08 6108.86   50.55 6109.86 50.4026
 6115.78   49.53 6123.0249.07898 6135.19   48.37 6164.31    47.4 6183.72   47.24
 6193.43   46.62 6212.84   45.62 6222.55   44.61 6241.96   43.92 6251.67   43.29
 6258.66   47.15 6268.3550.29658 6275.37    53.7 6279.98 55.3059 6283.36   57.08
 6293.72   60.91 6298.89   63.56 6306.66   69.13 6309.25   70.38 6314.44   71.16
 6332.23   70.62 6337.31   70.14 6342.39   68.48 6344.93   68.08  6355.1   68.54
 6362.73   70.12 6367.81   70.55 6372.89   70.31  6385.6   70.36 6408.48   70.62
 6469.47   70.69 6482.18   70.61 6520.31   70.55  6538.1   70.58 6555.89   70.81
 6571.14   70.67 6601.64   70.62 6649.94   70.62 6662.64   70.51 6771.93   70.29
 6830.39    70.1 6871.05   69.93 6901.56    69.9 6957.47   69.77 6985.43   69.77
 6993.06   69.89 7046.43   69.83 7061.69   69.89 7092.18   69.82 7104.89   69.88
 7188.76   69.58 7219.26   69.51 7226.89   69.57 7259.93   69.38 7267.56   69.45
  7282.8   69.24 7315.85   69.22 7333.64   69.04 7353.97   69.12 7371.34   68.94
 7397.18   69.08 7417.51   68.99  7435.3   69.13 7448.01   68.99 7455.64   68.66
 7475.97   68.56 7496.31   69.43 7501.39   69.81 7511.55   71.28 7514.09    72.2
  7521.7   76.14 7526.76   77.26 7551.32   77.11  7554.4   76.74 7560.54   74.73

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .174 5966.05    .066 6108.86    .025 6268.35    .066 6314.44    .068

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5966.05 6314.44          1166.91 1551.67 1518.74             .1       .3
Left Levee      Station=   29.43      Elevation=   78.13
Right Levee     Station= 7526.76      Elevation=77.25667
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   32.13 5337.92   72.35 6315.55 7536.43   71.11

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 114.28*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   72.07   15.03   75.65   29.54   77.93   40.52    77.1   59.73   71.22
   78.95   68.63   95.41   67.84  117.37   65.94  147.53   64.37  177.77   64.33
  199.73   64.07  213.46    64.2  232.67   63.76  249.13   64.31  273.84   64.46
  290.31   64.21  309.53   64.69  331.49   65.75  378.16   65.58  400.11    65.6
```

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   435.8   65.41  444.03   65.65  476.98    65.9  498.94   64.76  507.27   63.74
  518.15   63.16  573.06    62.7   609.3   62.85  616.97   62.74  666.38   62.98
  691.09   63.64  699.33   63.56  710.31   64.02  729.52   64.11  756.98   63.38
  773.44   63.43  784.42   63.81  811.87   63.79  853.05   64.38  864.03   64.94
  883.25   65.25  888.74   65.72  902.46   65.95  924.42   64.96  943.63   65.78
  951.87   65.49  965.59   66.46  987.55   66.38  995.79   66.03 1006.77   66.74
 1017.75   66.78  1045.2   66.05 1061.67   67.31 1072.65   66.94 1094.62   66.89
 1102.85   67.34 1119.31   67.14 1141.28   66.29 1157.75   65.35  1185.2   64.29
 1196.18   64.14 1226.38   64.12 1264.34   64.24 1278.53   64.47 1297.74   64.25
  1319.7   64.48 1341.66   65.15 1355.39   65.79 1371.86   65.31 1385.59   65.57
 1402.06   66.54 1418.53   66.37 1429.51   65.94 1443.23   66.17 1451.46   65.87
 1473.42   63.48 1484.48   63.01 1500.88   62.71 1532.81   63.18 1583.23   62.77
 1605.19   62.39 1616.17   62.46 1643.62   62.19 1665.58   62.68  1679.3   64.38
 1690.29   64.97 1698.52   64.39 1712.25   63.94  1739.7   63.46 1756.17   63.74
 1783.61   65.08 1794.59      67 1805.57   67.26 1824.79   66.86 1846.75   65.29
 1871.46   65.09 1885.18   64.64 1912.64   64.19 1953.81    64.2 1973.02   64.39
 1997.73   65.39 2019.69   65.96 2033.42   65.78 2058.12   64.16 2101.95   63.45
 2126.74   63.31 2134.98   63.54  2154.2   63.34 2170.67   63.61  2178.9   63.41
 2192.63   63.63 2214.71    63.5 2242.04   64.07 2247.53   64.52 2261.26   64.58
 2269.49    64.2 2299.68   64.31 2307.92   64.86 2324.39   64.92 2340.86   65.31
 2357.33   65.12 2401.25   65.26 2412.23   65.62 2434.19   65.79 2464.38   65.73
 2491.84   65.91 2500.07   66.26 2511.05   66.14 2535.76   66.53 2543.99   66.35
 2557.72   66.73 2582.43   66.73  2598.9   66.42 2642.81   66.86 2656.54   66.57
 2664.77   66.89 2673.01   66.64 2694.97   66.63 2716.93   67.04 2758.11   67.38
 2769.09   67.14 2788.31    67.4 2815.75   67.46 2840.46   67.05 2878.89   67.53
 2895.36   67.36 2920.07   67.47  2928.3   67.82 2936.54   67.54 2953.01   67.77
  2958.5   67.53 2980.45   67.59 2991.43   67.84 2999.67   67.63 3021.63   67.63
 3040.85    67.9 3060.06   67.48  3068.3   67.77 3087.51   67.63 3095.75   67.88
 3125.95   67.58 3142.41   68.09 3153.39   67.81 3158.88    68.3 3169.86   71.05
 3175.35   70.82 3186.33   68.46 3211.04   66.13 3216.53   65.97 3230.25   66.37
 3243.98   68.36 3260.45   68.64 3290.65   68.35 3304.37   66.32  3312.6   66.25
 3329.07   65.29 3348.29   64.83 3356.52   63.98 3381.23   64.53 3405.94   64.64
 3411.43   64.31 3449.86   64.38 3455.35    64.7 3471.82   64.65 3485.55   64.34
 3523.97   64.44 3534.95   64.66 3545.93   64.42 3567.89   64.81 3587.11   64.62
  3622.8   65.04 3628.29   65.36 3636.52   64.86 3658.49    65.2 3669.47    66.2
 3674.96   66.08 3699.66   67.89 3727.11   67.77  3738.1   68.16 3746.32   67.88
 3762.79   68.07 3768.28   68.45 3782.01   68.43 3812.21   67.93 3864.37   67.88
 3897.31   67.59 3913.78   67.74 3930.25    68.2 3946.72   67.88 3960.45    67.9
 3976.92   68.64  3987.9    68.7 4009.85   68.31 4018.09   68.43  4037.3   68.15
 4056.52   68.37 4081.23   68.21 4089.46   67.89 4103.19   67.93 4114.17   67.54
 4147.11   67.88 4166.33   67.77 4188.29   69.03 4215.74   68.89 4234.96   68.11
 4240.45   68.58 4245.94   70.63 4251.43   71.45 4265.14   74.33 4276.12   70.05
 4281.62   69.11 4289.85   68.79  4292.6   67.74 4298.09   64.09 4303.58   61.82
 4311.81   61.38 4333.77    61.4 4342.01   61.67 4344.75   62.66 4352.99   67.48
 4366.72   68.26 4372.21   70.89  4377.7    71.9 4388.68    70.8 4399.66   71.25
 4410.64   69.37 4429.85   68.13 4460.05   67.77 4484.76   67.95 4498.48   67.77
  4512.2   68.07 4528.67   67.72 4556.12   67.78 4564.36    68.1 4575.34   67.71
 4583.58   68.12 4594.56   67.89 4624.75   67.82 4660.44   68.09 4665.93   67.78
 4696.13   67.97 4734.56   67.98 4745.54   68.11 4770.24   67.96 4797.69   67.98
 4836.12   68.18 4863.58   67.95 4871.81   68.25 4882.79   68.03 4904.75   68.29
 4912.99   68.04 4926.72   68.81 4940.44   68.25 4965.15   68.32 4995.34   68.08
 5009.07   68.38 5014.55   68.17 5050.24    68.4 5080.44   68.34 5099.65   68.72
 5116.12    68.5  5141.2   68.64 5184.75   68.51 5198.48   68.87 5203.97   68.48
 5250.64   68.57 5261.62   68.88 5275.34   68.51 5319.26   68.74 5330.24   68.54
 5354.95   68.52 5368.67   68.71 5415.34   68.61 5434.56   68.94 5448.28   68.56
  5467.5   68.69 5483.97   68.54 5519.65   68.48 5530.63   68.96 5544.35   68.56
 5643.18   68.66 5656.91   68.85 5678.87   68.81 5692.59   69.04 5700.83   68.79
 5731.03   68.96 5739.26   68.76 5769.46   69.03 5788.67   68.85 5829.85   69.02
 5851.81   68.82 5860.04   69.13 5865.53   68.76 5887.49   68.96 5909.46   68.88
 5920.44   69.08 5931.42   68.83 5945.14   68.98 5953.38   69.38 5961.61   68.85
  5967.1   69.26 5980.83    69.4  5997.3   69.19 6043.56   69.21 6057.69   69.35
 6065.92   69.09 6079.65   69.47 6097.27    69.6 6118.75    71.1 6134.55   71.71
 6148.28   71.14 6167.49   70.74 6178.47   69.66  6204.7   69.85 6215.43   69.47
 6236.93    69.9 6260.83   69.57 6266.32   69.84 6279.89   69.36    6302   69.69
 6333.61   71.46 6381.94    70.5 6398.06   71.09 6408.79   71.06 6424.92   69.23
 6433.77   68.75 6447.49   68.86 6480.44   68.72  6521.6   69.03  6537.7   70.16
 6559.18   70.47 6596.78   71.91 6629.01   72.39 6655.86   70.89 6678.08   70.44
  6697.3   70.66 6747.17   70.96 6790.15    70.8 6807.09   70.95 6820.82   70.23
 6837.29   71.69 6848.27   71.35 6864.74   69.19 6881.21   68.68 6892.19    67.6
 6908.66   67.15  6941.6   68.09 6980.02    67.9  7015.7   67.94 7034.92   68.53
 7054.14   70.62 7062.37   70.15  7070.6   68.63 7081.58   67.83 7092.56   67.75
  7100.8   66.98 7109.03   67.21 7122.76   68.63 7136.47   68.31  7150.2   67.28
 7163.93   68.25 7172.16   68.34 7180.39   67.57 7194.11   68.51 7199.61   68.55
 7213.33   67.89 7218.82   68.07 7232.55   69.79 7238.03   70.15  7254.5   68.12
 7265.48   68.03 7276.46   66.44 7287.42   66.39 7298.37   67.29 7303.85   68.88
 7317.54   69.85 7325.76   68.84 7336.71    69.9 7342.19   69.91  7359.668.27193
 7372.32   67.39  7377.8   68.35 7391.71   69.25 7402.45   69.59 7411.71   68.18
 7422.72   64.79  7436.4   64.25 7446.36   64.83 7457.99    61.2    7470   58.96
 7486.89   58.29 7493.65   59.06 7507.16   59.55 7525.89   59.06  7530.8   57.94
 7535.8155.36762 7539.17    53.5 7540.94    48.8 7548.0148.11979 7560.53   47.52
 7594.71   46.58 7613.53   46.25 7641.77   44.81 7651.18      44 7679.42   42.67
  7682.847.62791 7684.56   50.21 7693.5853.87538 7705.04   59.13 7712.21   63.31
 7719.82   69.36 7725.53   71.24 7741.78   70.34  7747.2   69.34 7754.42   69.61
 7761.65   70.63  7776.1   70.53 7835.69   70.59 7884.46   70.53  7897.1   70.64
 7929.61   70.55 8007.26   70.47 8121.04   70.05 8171.61   69.97 8194.89   69.84
 8256.49   70.14 8316.38   70.11 8413.61   69.61 8464.18   69.56 8476.51   69.46
 8493.08   69.81  8526.2   69.96 8542.78   69.06 8553.81   69.15 8568.92    71.4
 8576.14   72.93 8583.35   76.16 8586.95   77.11 8609.94   77.06 8618.57   75.56

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .11 7402.45    .066 7539.17    .025 7693.58    .066 7725.53    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7402.45 7725.53          1166.91 1551.67 1518.74             .1       .3
Left Levee      Station=   29.52      Elevation=   77.93
Right Levee     Station=8586.949      Elevation=77.11333
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 6629.01   72.39 7725.53 8618.57   71.24

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 114.1

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   70.29   22.96   76.72   29.52   77.74   42.64   77.33    65.6   70.18
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   88.56   67.37  108.23   66.93  134.47   65.06  183.67   63.39  206.63   63.62
  232.87   63.34  249.27   63.61  272.23   62.98   291.9   63.77  321.42   63.91
   341.1    63.5  364.06   64.22   390.3   65.81   423.1    65.8  429.66   66.07
  446.06    65.6  472.29   65.62  514.93   65.34  524.77    65.7  564.13   66.07
  590.37   64.38  600.21   62.86  613.33   61.96  678.93   61.28  721.56   61.49
   731.4   61.33  767.48   61.66  790.44   61.65  819.96   62.68   829.8   62.55
  842.92   63.25  865.88   63.41  898.68   62.26  918.35   62.37  931.47   62.95
  964.27   62.89 1013.47   63.79 1026.59    64.6 1049.55    65.1 1056.11   65.79
 1072.51   66.09 1098.75   64.61  1121.7   65.88 1131.54   65.43 1147.94   66.86
 1174.18   66.75 1184.02   66.24 1197.14   67.29 1210.26   67.35 1243.06   66.29
 1262.74   68.17 1275.86    67.6  1302.1   67.49 1311.94   68.16 1331.61    67.8
 1357.85   66.59 1377.53   65.18 1410.33   63.52 1423.45    63.3 1459.53    63.3
 1505.45   63.54 1521.84    63.8  1544.8   63.46 1571.04   63.86 1597.28   64.88
 1613.68   65.89 1633.36   65.16 1649.76   65.53 1669.44   66.97 1689.12   66.78
 1702.24   66.27 1718.63   66.47 1728.47   65.92 1744.87   63.46 1754.71   62.49
 1787.51   61.54 1830.15   61.92 1885.91   61.66 1912.15    61.2 1925.26   61.32
 1958.06   61.05  1984.3   61.88  2000.7   64.47 2013.82   65.39 2023.66    64.5
 2040.06   63.76 2072.86    63.1 2092.54   63.51 2125.33   65.47 2138.45   68.36
 2151.57   68.74 2174.53   68.12 2200.77   65.72 2230.29   65.35 2246.69   64.64
 2263.09   64.56 2279.49   64.03 2328.68   63.99 2351.64   64.26 2381.16   65.67
  2407.4    66.6  2423.8   66.29 2453.32   63.85  2505.8   62.81 2535.31    62.6
 2545.15   62.94 2568.11   62.63 2587.79      63 2597.63   62.71 2614.03   63.04
 2640.27   62.86 2673.07   63.75 2679.63   64.45 2696.03    64.5 2705.87    63.9
 2741.94   64.04 2751.78   64.84 2771.46   64.89 2791.14   65.46 2810.82    65.2
  2863.3   65.44 2876.42   65.98 2902.66   66.17 2938.73   66.07 2971.53   66.33
 2981.37   66.88 2994.49   66.72 3024.01   67.26 3033.85   66.97 3050.25   67.52
 3079.77   67.51 3099.45   67.06 3151.92   67.78 3168.32   67.28 3178.16   67.75
    3188   67.38 3214.24   67.37 3240.48   68.01 3289.68   68.46  3302.8    68.1
3325.76   68.48 3358.55   68.63 3388.07   67.98 3433.99   68.68 3453.67   68.47
3483.19   68.58 3493.03   69.11 3502.87    68.7 3522.55   69.05 3529.11   68.68
3555.34   68.71 3568.46   69.14  3578.3   68.82 3604.54   68.78  3627.5   69.21
3650.46   68.56  3660.3   68.99 3683.26   68.73  3693.1    69.1 3729.18   68.68
3748.85   69.45 3761.97   69.02 3768.53   69.76 3781.65   73.88 3788.21   73.53
3801.33   70.03 3830.85   66.49 3837.41   66.25 3853.81   66.88 3870.21   69.85
3889.89    70.2 3925.97   69.85 3942.36   66.77  3952.2   66.61 3971.88    65.2
3994.84   64.51 4004.68    63.2  4034.2   63.98 4063.72   64.16 4070.28   63.73
 4116.2   63.77 4122.76   64.24 4142.44   64.16 4158.84    63.7 4178.51   63.95
4204.75   63.83 4217.87   64.15 4230.99    63.8 4257.23   64.42 4280.19   64.14
4322.83   64.73 4329.39    65.2 4339.23   64.43 4365.47   64.93 4378.59   66.45
4385.15   66.27 4414.67   68.94 4447.47   68.76 4460.59   69.34 4470.42   68.92
 4490.1   69.24 4496.66   69.83 4513.06   69.74 4549.14   69.02 4575.38   68.85
4611.46    68.9 4650.82   68.42  4670.5   68.66 4690.18   69.36 4709.86   68.83
4726.26   68.87 4745.94   69.95 4759.06   70.03 4785.29   69.43 4795.13   69.61
4818.09   69.18 4841.05   69.44 4870.57   69.19 4880.41   68.76 4896.81   68.85
4909.93   68.26 4939.45   68.44 4949.29   68.75 4972.25   68.62 4998.49   70.36
5031.29   70.31 5054.25   69.17 5060.81   69.87 5067.37   72.93 5073.93   74.16
5090.32   78.54 5103.44   72.14    5110   70.71 5119.84    70.2 5123.12   68.61
5129.68   63.12 5136.24   59.71 5146.08   59.05 5172.32   59.01 5182.16   59.38
5185.44   60.85 5195.28   68.06 5211.68   69.21 5218.24   73.14  5224.8   74.66
5237.92      73 5251.04    73.7 5264.16   70.93 5287.12   69.12  5323.2   68.49
5352.72   68.68 5369.12   68.37 5385.51    68.8 5405.19   68.31 5437.99   68.42
5447.83   68.91 5460.95   68.32 5470.79   68.93 5483.91    68.6 5519.99   68.52
5562.63   68.96 5569.19    68.5 5605.27   68.78 5651.19   68.67 5664.31   68.87
5693.82   68.68 5726.62   68.75 5743.02   69.04  5762.7   68.84 5772.54   69.11
5805.34   68.71 5815.18   69.16  5828.3   68.82 5854.54   69.25 5864.38   68.88
5880.78   69.99 5897.18   69.14  5926.7   69.26 5962.78    68.9 5979.18   69.31
5985.73   68.99 6028.37   69.24 6064.45    69.1 6087.41   69.61 6107.09   69.23
6139.89   69.52 6146.45   69.26 6189.09   69.26 6205.49   69.73 6212.05   69.15
6231.73   69.38 6267.81   69.31 6280.93   69.73 6297.32   69.16  6349.8   69.54
6362.92   69.22 6392.44    69.2 6408.84   69.53  6464.6   69.39 6487.56   69.84
6503.96   69.28 6526.92   69.53  6546.6   69.28 6589.23   69.24 6602.35   69.92
6618.75   69.26 6736.83    69.5 6753.23   69.79 6779.47   69.73 6795.87   70.05
6805.71   69.66 6841.79   69.86 6851.63   69.55 6887.71   69.98 6910.66    69.7
6959.86   69.99  6986.1    69.7 6995.94   70.16  7002.5    69.6 7028.74   69.88
7054.98   69.74  7068.1   70.02 7081.22   69.62 7097.62   69.82 7107.46    70.4
 7117.3   69.58 7123.86    70.2 7140.26    70.4 7159.94   70.08 7205.85   69.97
7232.09   70.24 7241.93   69.92 7258.33   70.41 7271.45   70.07 7300.97   70.04
7323.93   70.48 7340.33   70.03 7363.29   70.85 7376.41   70.25 7396.09   70.85
7419.05   70.23 7458.41   70.61 7474.81   70.52 7481.37   70.97 7497.77   70.36
   7524   70.37 7533.84   70.82 7569.92   70.93 7583.04   70.59 7619.12   70.51
7642.08   70.81 7665.04   70.56 7674.88   71.05 7681.44    70.6 7697.84   70.81
 7737.2   70.67  7786.4   71.14 7819.19   70.83 7868.39   71.33 7884.79   71.13
7901.19   71.45 7930.71   71.31 7943.83   71.64 7973.35   71.23 7996.31   71.48
8107.82   71.41  8127.5   71.82  8143.9   70.88 8163.58   73.09  8176.7   72.57
8196.38   69.33 8216.06   68.56 8229.18   66.94 8248.85   66.26 8288.21   67.66
8334.12   67.37 8376.75   67.36 8399.71   68.13 8422.67   71.26 8432.51   70.56
8442.34   68.27 8455.46   67.08 8468.58   66.96 8478.42    65.8 8488.26   66.14
8504.66   68.26 8521.05   67.78 8537.45   66.25 8553.85   67.72 8563.69   67.87
8573.52   66.68 8589.92   68.07 8596.48   68.14 8612.88   67.16 8619.44   67.45
8635.84      70 8642.39   70.54 8662.07   67.48 8675.19   67.36 8688.31   64.97
 8701.4    64.9 8714.49   66.24 8721.03   68.64 8737.39   70.09 8747.21   68.58
 8760.3    70.2 8766.85   70.22 8802.84    65.8 8809.39   66.81 8838.84   67.55
8845.39   66.84 8858.48   63.62 8881.38   63.61 8887.93    60.2 8904.29   57.87
8920.65   57.87  8927.2   59.01 8940.29   60.04  8950.1    59.3 8963.19    59.1
8966.47   57.76 8973.01   52.55 8973.01   47.04 8981.99   46.64 8991.99   46.34
9001.99   46.24 9021.99   45.84 9051.99   45.04 9071.99   43.94 9081.99   43.24
9091.99   42.84 9107.18   42.04 9107.18   52.53 9110.46   53.26 9123.54   59.93
9133.36   69.99 9136.63   71.33 9146.45   70.53 9159.54   70.81 9179.18   70.48
 9306.8   70.48 9355.89   70.19  9401.7   70.13 9414.79   69.94 9444.25   70.36
9486.79   70.47 9535.88   69.98 9581.69   69.99 9591.51   70.55 9611.14   70.86
9620.96   69.55  9627.5   69.64 9647.14   76.97 9673.32   77.03 9676.59   76.39

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .11 8838.84    .066 8973.01    .025 9107.18    .066 9136.63    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8838.84 9136.63           1686.3 1916.67  202.14            .1       .3
Left Levee      Station=   29.52      Elevation=   77.74
Right Levee     Station= 9647.14      Elevation=   76.97
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 8163.58   73.09 9136.63 9676.59   71.33

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             72.91    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.13    Wt. n-Val.                 0.110      0.049      0.071
  W.S. Elev (ft)             72.78    Reach Len. (ft)          1686.30    1916.67     202.14
  Crit W.S. (ft)             53.90    Flow Area (sq ft)        3290.11    5714.10     721.62
  E.G. Slope (ft/ft)      0.000231    Area (sq ft)             3290.11    5714.10     721.62
  Q Total (cfs)           20000.00    Flow (cfs)               1948.53   17758.38     293.09
```

Top Width (ft)	1464.54	Top Width (ft)	667.46	297.79	499.29	
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.59	3.11	0.41	
Max Chl Dpth (ft)	30.74	Hydr. Depth (ft)	4.93	19.19	1.45	
Conv. Total (cfs)	1316916.0	Conv. (cfs)	128302.4	1169314.0	19299.1	
Length Wtd. (ft)	1776.32	Wetted Per. (ft)	670.78	323.77	499.55	
Min Ch El (ft)	42.04	Shear (lb/sq ft)	0.07	0.25	0.02	
Alpha	2.04	Stream Power (lb/ft s)	0.04	0.79	0.01	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	3983.78	1324.51	377.92	
C & E Loss (ft)	0.02	Cum SA (acres)	909.37	68.05	144.35	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 113.73*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.05	29.61	71.09	36.66	72.92	42.3	73.62	50.76	72.62
54.99	73.26	63.45	76.24	71.57	77.2	82.18	76.79	100.74	71.22
119.3	68.52	135.2	67.56	156.42	65.41	177.56	64.24	196.2	63.53
214.76	63.55	235.97	63.26	249.23	63.38	267.79	62.87	281.7663.28464	
307.56	63.45	323.47	63.18	342.03	63.66	363.25	64.71	408.33	64.52
464.01	64.45	471.96	64.71	503.78	65.11	520.24	64.34	532.71	61.99
543.56	61.25	563.88	61.09	588.79	62.55	613.73	62.09	639.02	61.82
686.75	61.86	729.18	62.91	747.74	63.05	774.26	62.3	790.16	62.33
800.77	62.7	827.28	62.32	850.57	62.22	867.06	62.45	877.67	63
896.23	63.42	914.79	64.28	936.01	64.13	954.56	65.19	962.51	64.86
975.77	65.73	996.99	65.57	1004.94	65.23	1015.55	65.92	1026.16	65.95
1052.67	65.21	1068.59	66.43	1079.19	66.03	1100.41	66.03	1108.36	66.52
1124.26	66.38	1145.48	65.7	1161.39	64.83	1180.89	64.08	1205.83	62.17
1224.53	62.15	1243.21	63.86	1255.68	63.96	1296.62	63.38	1317.84	63.65
1339.05	64.34	1352.31	65.02	1368.22	64.55	1381.48	64.81	1397.39	65.79
1423.91	65.35	1437.16	65.49	1445.11	65.14	1466.33	62.85	1492.84	62.22
1527.32	62.47	1572.4	62.29	1593.61	62	1630.73	61.94	1651.94	62.52
1665.2	64.26	1675.81	64.88	1697.02	63.81	1723.54	63.37	1739.45	63.65
1765.96	64.99	1776.57	66.93	1787.17	67.2	1805.74	66.82	1826.95	65.25
1850.82	65.04	1864.07	64.56	1890.59	64.12	1930.36	64.07	1948.92	64.24
1972.79	65.18	1994	65.79	2007.26	65.58	2031.13	63.96	2073.56	63.34
2097.41	63.24	2105.37	63.48	2123.93	63.3	2139.84	63.57	2182.27	63.58
2208.79	64.24	2214.09	64.72	2227.35	64.79	2235.31	64.38	2264.47	64.43
2272.42	64.94	2288.33	64.94	2304.24	65.28	2320.15	65.06	2362.58	65.15
2373.19	65.5	2394.4	65.66	2450.08	65.79	2458.04	66.12	2468.64	65.96
2492.51	66.3	2500.47	66.11	2513.72	66.49	2537.59	66.5	2553.5	66.21
2595.92	66.73	2609.18	66.4	2646.3	66.52	2667.52	66.99	2707.3	67.37
2717.9	67.15	2736.46	67.41	2762.97	67.51	2786.84	67.08	2823.96	67.54
2863.74	67.45	2871.7	67.79	2879.65	67.51	2895.56	67.74	2900.87	67.49
2922.07	67.5	2932.68	67.78	2961.85	67.53	2980.41	67.8	2998.97	67.36
3006.93	67.65	3025.49	67.48	3033.45	67.73	3062.62	67.46	3078.52	67.97
3089.13	67.67	3094.43	68.16	3105.04	70.9	3110.34	70.66	3120.95	68.33
3144.81	65.98	3163.37	66.25	3176.63	68.23	3192.54	68.47	3221.71	68.24
3234.96	66.2	3242.92	66.09	3258.83	65.17	3277.39	64.74	3285.35	63.88
3309.21	64.48	3333.08	64.62	3338.38	64.33	3375.51	64.31	3380.81	64.62
3409.98	64.26	3447.1	64.37	3457.7	64.59	3468.31	64.36	3489.53	64.75
3508.09	64.54	3542.56	64.9	3547.86	65.21	3555.82	64.71	3577.03	65.07
3587.64	66.09	3592.94	65.97	3616.81	67.78	3643.33	67.69	3653.93	68.1
3661.88	67.85	3677.79	68.1	3683.1	68.51	3696.36	68.49	3725.52	68.09
3775.91	68.01	3807.73	67.64	3823.64	67.77	3839.55	68.24	3855.46	67.9
3868.72	67.98	3884.63	68.76	3895.24	68.86	3916.44	68.55	3942.96	68.52
3961.52	68.79	4006.6	68.45	4017.21	68.06	4049.03	68.31	4067.59	68.14
4088.81	69.24	4115.33	69.16	4133.89	68.37	4139.19	68.83	4144.5	70.86
4163.05	74.57	4173.66	70.28	4178.96	69.32	4186.92	68.96	4194.87	64.24
4200.17	61.96	4208.13	61.53	4229.34	61.5	4237.3	61.75	4239.95	62.73
4247.91	67.54	4261.17	68.31	4266.47	70.93	4271.77	71.94	4282.38	70.82
4292.99	71.28	4303.59	69.42	4322.16	68.21	4351.33	67.79	4375.19	67.93
4388.45	67.72	4401.7	68.01	4417.61	67.67	4444.13	67.68	4452.08	67.99
4462.69	67.58	4470.65	67.97	4481.25	67.72	4510.42	67.61	4544.9	67.86
4550.2	67.56	4577.65	67.76	4616.49	67.62	4627.52	67.73	4671.15	67.5
4690.73	67.83	4714.6	67.96	4741.12	67.7	4749.07	68.01	4759.68	67.8
4780.9	68.12	4788.85	67.89	4802.11	68.6	4815.37	68	4839.23	68
4868.4	67.66	4950.6	67.75	4969.16	68.1	4985.07	67.83	5011.59	68.01
5016.89	67.83	5051.37	67.93	5064.63	68.15	5069.93	67.78	5085.84	67.96
5115.01	67.93	5125.62	68.21	5138.87	67.84	5181.29	68.05	5191.9	67.82
5215.77	67.8	5229.03	68.01	5274.11	67.86	5292.67	68.17	5305.93	67.79
5324.49	67.97	5374.87	67.8	5385.47	68.24	5398.73	67.79	5475.14	67.89
5507.45	68.18	5528.67	68.14	5541.93	68.39	5549.88	68.15	5579.05	68.36
5587.01	68.18	5616.18	68.51	5634.73	68.34	5674.51	68.54	5708.98	68.39
5730.19	68.65	5772.62	68.4	5793.84	68.96	5801.79	68.43	5807.1	68.85
5820.35	69.01	5836.27	68.82	5873.38	68.79	5894.6	68.93	5902.55	68.7
5915.81	69	5926.42	68.75	5950.28	68.74	5968.85	69.06	5982.1	68.8
6000.67	69.41	6011.27	69.05	6027.18	69.5	6045.75	69.16	6096.13	69.75
6109.39	69.37	6130.59	69.33	6138.55	69.62	6167.72	69.62	6178.33	69.35
6207.5	69.17	6226.06	69.24	6244.62	68.99	6271.14	69.09	6297.85	68.94
6316.55	67.83	6347.7	67.07	6360.17	67.07	6397.57	70.05	6422.5	70.69
6470.01	71.18	6493.88	71.04	6522.22	71.46	6534.69	71.43	6559.61	70.93
6602.59	70.4	6618.5	70.61	6631.76	69.94	6647.67	71.37	6658.28	70.97
6674.19	68.73	6690.1	68.13	6700.71	67.01	6716.61	66.54	6748.43	67.44
6785.55	67.23	6820.01	67.17	6838.58	67.71	6857.14	69.83	6865.09	69.38
6873.04	67.86	6883.65	67.09	6894.25	67.02	6902.21	66.25	6910.17	66.47
6923.42	67.88	6936.67	67.55	6949.93	66.53	6963.19	67.5	6971.15	67.6
6979.09	66.8	6992.35	67.72	7010.92	67.11	7016.22	67.3	7034.77	69.35
7050.68	67.3	7061.29	67.22	7071.9	65.62	7082.48	65.56	7093.06	66.45
7098.35	68.05	7111.58	69.01	7119.52	67.99	7130.1	69.07	7135.4	69.08
7164.49	66.11	7169.79	66.79	7193.6	67.44	7198.8	66.82	7209.2	63.84
7220.65	62.5	7227.39	61.12	7233.6657	74387	7245.59	56.1	7258.59	56.07
7274.19	57.48	7282.4	56.96	7292.38	54.76	7294.99	53.69	7300.18	46.32
7315.26	45.61	7332.5845	14087	7343.0844	79408	7354.95	44.36	7379.82	41.98
7406.77	40.71	7412.23	49.02	7423.14	50.73	7430.7	53.29	7430.71	54.33
7438.93	57.21	7451.26	58.97	7456.74	59.19	7464.97	60.82	7471.5663	21661
7482.83	65.56	7491.49	68.72	7502.07	70.18	7508.46	69.78	7546.67	69.37
7572.4	69.57	7638.95	70.35	7674.82	70.37	7724.79	70.17	7761.94	70.18
7796.53	70.35	7815.75	70.3	7833.69	70.75	7855.46	70.19	7911.84	70.37
7961.8	70.38	8015.61	70.23	8056.61	70.35	8142.45	70.23	8180.89	70.34
8238.54	70.29	8288.5	70.39	8365.37	70.23	8388.43	70.29	8443.53	70.22
8494.77	70.31	8547.3	70.27	8697.2	70.34	8763.82	70.11	8820.19	70.31
8835.56	70.27	8888.09	70.44	8947.03	70.33	8957.28	70.46	8986.74	70.32

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 9099.49   70.47 9182.76   70.22 9219.92   70.54  9227.6      70 9237.85   70.22
 9244.25   69.88 9304.47    70.2 9322.41   70.08 9386.46   70.13 9513.29   70.04
 9570.95   70.36 9651.66   70.55 9701.87   69.58 9731.57   69.55 9755.43   70.79
 9797.71   72.56 9813.08   73.56 9820.77   77.18 9840.17   77.21 9842.59   76.78

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .11  7193.6    .066 7294.99    .025  7430.7    .066 7502.07    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        7193.6 7502.07           1686.3 1916.67  202.14             .1       .3
Left Levee      Station=   71.57      Elevation=    77.2
Right Levee     Station=9820.773      Elevation=77.18333
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  103.27  6517.5   70.49

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 113.37*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   67.81   23.32   68.29   37.31   68.88   48.96   69.02   55.95   70.42
   60.61   71.99   69.95   72.84   76.93   70.86   83.93   70.02   90.92    70.9
  100.25    74.8  104.91   76.03  113.62   76.67  121.71   76.25  135.88   72.27
  150.04   69.67  161.48   68.29   170.9    66.7  185.06   65.05   194.5   64.32
  208.72   63.66  217.3263.53123  249.19   63.15  263.36   62.76   293.7   62.99
  305.84   62.86   336.2    63.6   370.6   63.43  413.08   63.56  443.44   64.16
     456   63.93  465.51   61.08  473.79   60.54  489.29   60.49  503.55   63.25
  508.31   63.72  517.82   63.48  527.33    62.8  546.63   62.31  583.05   62.08
  615.43   62.58  636.73   62.66  649.83   62.33  670.06   62.44  693.79   61.66
  708.06   61.03  720.65   61.12  742.91   61.74  760.37   62.52  769.89   63.57
  787.42    64.5  793.49   64.29  803.61    64.6  825.87   64.21  842.05   64.55
  862.29   64.13  874.43    64.7  882.52   64.47  898.71   64.56  904.78   64.88
  933.11   64.82  960.13   64.21  964.89    63.6   974.4   61.65  979.16   61.05
  993.43   60.99 1002.93   63.48 1007.69   64.33  1017.2   64.43 1031.47    63.5
 1048.44    63.3 1064.63   63.43 1090.94   64.15 1103.08   63.94 1113.19   64.09
 1125.34   64.61 1161.75   64.35 1177.94   63.21 1198.18   62.89 1224.48   63.01
 1275.07   62.81 1303.39   62.83 1319.58   63.15  1329.7   64.04 1337.79   64.37
 1353.98   63.85 1374.22   63.64 1386.36   63.79 1406.59   64.51 1414.68   65.51
 1422.78   65.67 1436.94   65.51 1453.13   64.77 1471.34   64.72 1501.69   64.22
 1532.04   64.15 1546.21   64.23 1580.61   64.98 1590.72   64.87 1608.94   64.07
 1641.31   63.87 1679.75   63.97 1691.89   64.15 1724.27    64.3 1758.67   65.07
 1764.74   64.86 1786.99   64.82 1793.06   65.05 1817.35   65.09 1829.49   64.93
 1861.86   64.87 1869.96   65.02 1916.09   65.34 1934.71   65.36 1949.38   65.19
  1977.2   65.45 2007.55   65.36 2039.92   65.67 2050.04   65.52 2078.37   65.66
 2094.56   65.96 2124.91   66.27    2133    66.2  2167.4   66.39 2185.61   66.18
 2213.94   66.41 2244.29   66.31  2288.8   66.28  2296.9   66.42 2319.16   66.27
 2333.32    66.4 2347.49   66.16 2373.79   66.36 2396.05   66.24 2420.33   66.56
 2428.42   67.92 2432.47    67.8 2440.56   66.64 2458.77   65.47 2472.94   65.61
 2483.06   66.61  2495.2   66.74 2517.46   66.64 2527.57   65.62 2545.78   65.14
 2559.95   64.97 2566.02   64.56 2591.45   65.08 2634.82   64.86 2638.86      65
 2661.12   64.81 2673.26   64.92 2705.63   64.92 2721.82   65.09 2735.99   64.94
 2772.41   64.99  2788.6    65.2 2818.95   66.62 2853.34   66.77 2869.53   67.19
 2914.85   67.21 2940.36   67.11 2964.64   66.85 2988.92   67.11 3011.18   67.09
 3023.32   67.58 3067.83   67.86 3086.07   68.19 3124.49   67.86 3148.77   67.87
 3162.94   67.67 3179.13   68.12 3199.36   68.01 3213.53   67.57 3235.78   70.59
 3243.87   68.42 3253.99   67.73 3264.11   64.22 3270.18      64 3292.44   64.12
 3300.53   67.01 3310.65    67.4 3318.74   69.22 3326.84   68.65 3334.93   68.86
 3343.03   67.91 3357.19   67.29 3379.45    67.1 3407.78   67.08 3417.89   67.23
 3430.03   67.03 3500.86   66.71 3527.16   66.76 3531.21   66.61 3553.47   66.75
 3590.21   66.59 3623.51   66.26 3638.45   66.62 3656.66   66.81  3676.9    66.7
 3723.44   67.21 3733.56   66.86 3751.77   66.74 3770.94   66.43 3813.74   66.27
 3850.91   66.59 3863.06   66.44 3889.83   66.39 3913.61   66.59 3927.81   66.41
 3962.21   66.54 4012.79   66.57 4020.88   66.43 4049.21   66.49 4083.61   66.33
 4097.78   66.49  4107.9   66.31 4122.06   66.41  4160.5   66.37  4168.6   66.57
 4179.95   66.31 4237.02   66.33 4261.68   66.57 4277.87   66.54 4344.64   67.03
 4415.46   67.18 4431.65   67.41 4464.03   67.19 4480.21   67.52 4486.28   67.28
 4500.45   67.62 4536.66   67.65 4573.29   67.58 4584.21   67.41 4613.76   67.64
 4623.88   67.56 4638.04   67.97 4646.14   67.85 4658.28   68.16 4672.44   68.09
 4706.84   68.34 4710.89   68.53 4737.19    68.3 4765.52   68.32 4773.61   68.11
  4824.2   67.41 4864.82   67.18 4879.09   64.84 4888.59   63.85 4902.86   63.05
 4912.37   63.21 4940.92   68.91 4959.94   70.25 4969.44    70.2 4983.71   70.65
 5014.41   70.85 5036.04   71.44 5045.55    71.4 5064.56   70.42 5088.35   69.55
 5109.51   69.39 5119.62   69.01 5131.77   69.66 5139.86   69.37    5152   68.13
 5164.14    67.7 5172.24   67.08 5184.37   66.82 5208.65   67.21 5263.28   66.99
 5277.44   67.29 5291.61    68.4 5303.74   67.45 5332.07   66.81 5342.19    67.5
  5352.3   67.33 5362.42   66.81 5378.61   67.33 5384.67   66.92 5394.79   67.38
 5408.95   67.05 5427.16   68.16  5439.3   67.12 5447.39   67.08 5455.49   66.27
 5463.56   66.23 5471.64   66.66 5475.67   67.46 5485.77   67.92 5491.82   67.41
 5503.94   67.94 5526.14   66.43 5530.18   66.77 5548.35   67.33 5553.38   66.54
 5559.92   64.07  5568.4   61.38 5578.44   55.29 5589.8154.31183 5596.53   54.27
 5608.09   54.92 5614.17   54.63 5623.51   49.62 5627.36   45.59 5632.64    45.2
 5667.95    43.4 5686.39   40.12 5692.15 39.8621 5703.0239.50328 5706.36   39.38
 5715.59   45.14 5734.05   47.29 5746.82   51.22 5746.85   53.29 5760.75   57.77
 5767.69   57.93 5776.95   59.14 5781.59   59.34 5786.22   58.82 5804.77   60.05
 5814.07   62.65 5835.9564.02303 5848.92   67.42 5858.21   67.47 5867.51   69.04
 5878.89   68.34 5885.71   68.43 5903.92   68.16  5946.9   68.21 5992.69   68.49
  6029.1   68.87 6051.86   69.21 6072.36   69.28 6079.21   69.56 6097.44   69.66
 6111.13   70.01 6124.81   69.96 6174.97   70.19 6213.74   70.02 6231.99   70.09
 6263.91   69.87 6288.99      70 6330.04   69.89 6359.68   69.98  6391.6   70.22
  6425.8   70.12 6437.21   70.67 6457.73   71.02 6496.49    69.9 6510.18      70
 6560.35   70.09 6596.83   70.27 6635.59   70.11 6651.55    70.3 6672.08   70.15
 6685.76   70.27 6749.61   70.05 6763.29   70.19 6781.53   69.97 6792.93   70.13
  6854.5   70.21 6895.54   70.11 6959.39   70.15 6968.51   70.01 6998.16    70.1
 7007.27   69.97 7075.69   70.19 7123.57   70.09 7132.69   70.25 7146.38   70.09
  7178.3    70.1  7212.5   70.26 7244.43    70.2 7283.19   70.28 7404.04   70.11
 7445.09   70.26 7479.29   70.04 7483.85   70.19 7520.34   70.27 7543.14   70.17
 7593.31   70.25 7618.39    70.4 7668.56   70.36 7693.64   70.47 7727.85   70.37
 7798.53   70.46 7816.77   70.31 7828.18   70.44 7889.74   70.44 7923.95   70.53
 7967.27   70.45 7994.63   70.54 8065.32   70.46 8079.01    70.3 8108.65   70.38
 8113.21   70.28 8213.54    70.5  8240.9   70.39 8272.83   70.56 8304.75   70.42
  8334.4   70.55 8348.08   70.46 8377.72   70.52 8439.29   70.28 8457.53   70.52
 8491.74   70.39 8509.98   70.22 8580.67   70.41 8596.63   70.31    8681   70.37
 8710.64   70.48  8749.4   70.32 8774.48    70.4 8858.86   70.17 8877.09   70.27
 8890.78   70.76 8899.89   70.55 8904.46   70.82 8924.98   70.88 8938.66   69.83
 8950.06   69.79 8956.91   70.28  8968.3   69.62 8977.42   69.67 8979.71   70.32
```

8993.38	69.83	9000.23	69.98	9045.83	70.18	9075.48	70.39	9082.32	70.23
9175.8	70.11	9221.41	70.27	9301.22	70.16	9346.82	70.2	9362.78	70.09
9385.58	70.2	9424.35	70.08	9469.95	70.2	9488.19	70.12	9499.6	70.26
9517.84	70.13	9538.36	70.28	9549.76	70.16	9595.37	70.24	9693.42	70.25
9707.09	70.09	9750.42	69.87	9766.38	69.63	9811.98	69.59	9835.64	69.46
9878.11	69.97	9894.08	69.83	9948.8	69.95	9962.48	70.78	9967.04	70.54
9980.72	70.77	9983	71.47	9989.85	75.5	9994.41	77.41	0008.59	77.18

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	113.62	.066	5548.35	.07	5623.51	.025	5734.05	.07
5867.51	.066								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5548.35 5867.51 1686.3 1916.67 202.14 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	5548.35	67.33	T
5867.51	10008.59	69.04	T

Left Levee Station= 113.62 Elevation= 76.67
Right Levee Station=9994.406 Elevation=77.39667

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 113

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	66.57	19.52	66.49	32.53	66.61	52.05	67.08	68.31	66.95
78.07	68.85	84.57	71.06	91.08	72.07	97.59	72.06	100.84	71.4
107.34	68.89	117.1	67.42	126.86	68.54	130.11	69.56	139.87	74.11
146.38	75.82	152.88	76.34	162.64	75.61	175.65	72.04	188.67	68.95
195.17	67.09	204.93	65.23	211.44	64.39	224.5	63.6	263.85	62.51
303.21	62.56	326.16	62.31	342.56	62.41	372.07	62.81	391.75	63.51
398.31	60.17	401.59	59.81	414.71	59.88	424.54	64.15	427.82	64.89
434.38	64.57	440.94	63.51	450.78	62.87	483.57	62.21	509.81	62.26
516.37	62.49	539.32	62.19	555.72	61	565.56	59.83	578.68	59.76
595.07	60.22	601.63	60.89	608.19	62.9	614.75	63.7	621.31	63.83
637.71	63.24	663.94	63.13	686.9	62.89	693.46	62.97	722.97	64.01
739.37	64.33	742.65	63.62	749.21	60.82	752.49	59.92	762.33	59.84
765.6	61.17	768.88	63.54	772.16	64.79	778.72	64.91	788.56	63.39
791.84	63.21	818.08	63.22	880.38	63.58	945.97	63.55	1005	63.89
1034.52	63.93	1093.55	64.42	1126.34	64.24	1182.09	64.14	1247.68	64.76
1290.31	65.36	1306.71	65.25	1346.07	64.69	1369.02	64.53	1398.54	64.93
1421.49	64.33	1500.2	64.69	1549.39	65.26	1601.86	65.28	1637.94	65.12
1696.97	64.96	1733.04	65.03	1752.72	64.93	1828.14	65.06	1851.1	65.28
1864.22	65.59	1903.57	65.34	1946.2	65.49	1979	65.21	2034.75	65.54
2087.22	66.37	2133.13	65.97	2146.25	66.02	2179.04	66.79	2205.28	67.59
2238.07	67.68	2264.31	67.05	2323.34	66.47	2365.97	66.5	2388.93	66.37
2438.12	66.45	2484.03	65.86	2510.27	65.66	2526.66	65.74	2552.9	65.45
2575.86	65.03	2592.25	65.64	2618.49	65.71	2638.16	65.92	2657.84	65.64
2677.52	65.17	2684.08	65.19	2707.03	64.79	2726.71	65.11	2759.5	64.96
2775.9	65.26	2782.46	64.99	2792.3	65.12	2831.65	65.21	2848.05	65.04
2877.56	64.94	2887.4	64.8	2916.92	64.83	2936.59	64.99	2959.55	64.84
2998.9	64.77	3012.02	65.02	3021.86	64.87	3061.21	65.48	3094.01	65.69
3100.56	65.59	3133.36	66.18	3146.48	65.88	3205.51	66.48	3238.3	66.08
3261.26	66.24	3303.89	67.11	3320.29	67.18	3330.12	67.43	3362.92	67.02
3382.6	66.55	3398.99	65.91	3431.79	65.43	3441.63	61.84	3448.18	60.29
3458.02	59.04	3464.58	59.35	3484.26	67.77	3497.38	69.8	3503.93	69.58
3513.77	70.31	3520.33	70.2	3540.01	70.81	3549.85	71.43	3556.41	71.37
3569.52	69.91	3585.92	68.62	3595.76	68.25	3615.44	67.95	3641.67	67.17
3664.63	67	3694.14	66.93	3707.26	66.79	3746.51	67.16	3834.6	66.93
3890.06	66.73	3903.11	67.22	3906.38	66.63	3912.9	63.05	3916.16	60.27
3919.43	56.13	3922.69	52.98	3925.95	52.59	3945.95	52.3	3950.95	45.85
3954.95	44.75	3980.95	42.45	3992.95	38.25	4005.95	38.05	4018.95	41.25
4030.95	42.65	4044.95	43.85	4062.95	49.15	4062.98	52.26	4066.24	52.69
4072.77	55.61	4082.56	58.32	4092.34	58.24	4105.39	59.62	4111.92	59.71
4118.44	58.71	4124.97	58.66	4131.49	59.42	4144.57	59.28	4147.85	59.71
4154.39	61.8	4157.67	62.31	4187.12	62.19	4190.4	62.49	4200.22	65.11
4206.76	66.2	4219.85	65.89	4232.95	67.89	4242.77	67.6	4249.31	66.9
4259.13	67.07	4285.32	66.76	4304.95	66.94	4324.59	66.88	4403.15	67.45
4412.97	67.41	4465.34	67.93	4498.07	68.41	4527.56	68.53	4537.4	68.96
4563.63	69.13	4583.31	69.67	4602.99	69.61	4675.13	70	4691.53	69.84
4730.88	69.79	4757.12	69.89	4783.35	69.8	4803.03	69.56	4839.1	69.76
4862.06	69.61	4875.17	69.69	4898.13	69.59	4911.25	69.78	4940.76	69.73
4986.67	70.09	5012.91	69.92	5035.86	69.94	5052.26	70.76	5081.78	71.29
5091.61	70.87	5101.45	70.78	5117.85	70.1	5137.52	69.61	5157.2	69.76
5196.55	69.84	5199.83	69.94	5229.35	69.9	5255.58	70.12	5281.82	70.16
5308.05	69.93	5337.57	69.92	5360.52	70.21	5390.04	69.98	5409.71	70.17
5442.51	70.13	5465.46	69.98	5488.42	70.07	5501.54	69.83	5521.21	70.04
5547.45	69.72	5563.84	69.95	5570.4	69.76	5586.8	69.98	5632.71	70.07
5639.27	69.89	5652.39	70.08	5665.5	69.85	5675.34	70.04	5711.41	69.93
5777	69.91	5793.4	69.8	5803.24	69.98	5816.35	69.77	5826.19	69.91
5839.31	69.78	5858.99	69.91	5872.1	69.72	5924.57	69.94	5950.81	69.88
5970.49	70.05	6019.68	69.9	6032.79	70.07	6039.35	69.9	6052.47	70.13
6072.15	69.89	6118.06	69.91	6127.9	70.03	6167.25	70.15	6213.16	70.06
6229.56	70.24	6236.11	70.04	6245.95	70.26	6255.79	69.93	6268.91	70.19
6282.03	70	6301.7	70.16	6327.94	70.06	6380.41	70.07	6419.76	69.97
6436.16	70.21	6442.71	69.98	6475.51	70.04	6501.74	70.22	6508.3	70.02
6531.26	70.15	6550.93	69.91	6557.49	70.13	6593.57	70.15	6609.96	70.26
6642.76	70.13	6682.11	70.27	6714.9	70.27	6750.98	70.5	6773.93	70.54
6823.12	70.44	6859.19	70.61	6908.39	70.47	6947.74	70.62	6954.3	70.49
7010.05	70.61	7036.28	70.39	7052.68	70.58	7075.63	70.55	7114.99	70.66
7141.22	70.59	7190.41	70.73	7219.93	70.64	7229.76	70.73	7252.72	70.6
7262.56	70.78	7275.68	70.62	7292.07	70.75	7341.26	70.67	7364.22	70.7
7374.06	70.48	7393.73	70.67	7413.41	70.45	7456.04	70.6	7462.6	70.44
7485.56	70.64	7495.39	70.51	7521.63	70.61	7531.47	70.49	7547.86	70.63
7564.26	70.52	7593.77	70.57	7606.89	70.7	7646.24	70.5	7692.16	70.73
7705.27	70.54	7718.39	70.63	7738.07	70.5	7780.7	70.67	7800.38	70.52
7816.77	70.66	7823.33	70.51	7843.01	70.59	7869.24	70.41	7892.2	70.43
7902.04	70.23	7931.55	70.22	7957.78	70.59	7984.02	70.52	7993.86	70.27
8006.98	70.39	8033.21	70.13	8062.72	70.33	8082.4	70.24	8134.87	70.4
8157.83	70.24	8180.78	70.38	8187.34	70.28	8279.16	70.32	8302.12	70.24
8321.79	70.5	8331.63	70.34	8354.58	70.48	8377.54	70.27	8413.61	70.41
8426.73	70.29	8459.52	70.36	8492.32	70.2	8534.95	70.12	8561.18	70.28
8580.86	71.02	8593.97	70.71	8600.53	71.12	8616.93	71.34	8630.05	71.23
8649.72	69.66	8666.12	69.61	8675.96	70.35	8682.51	70.19	8692.35	69.36
8705.47	69.44	8708.75	70.42	8728.42	69.69	8738.26	69.92	8744.82	69.59

8751.38	69.99	8803.85	70.25	8846.48	70.58	8856.32	70.35
8892.39	70.27	8948.14	70.27	8967.81	70.35	8990.77	70.18
9023.56	70.35	9039.96	70.24	9056.35	70.41	9092.43	70.36
9102.26	70.45	9118.66	70.23	9125.22	70.33	9171.13	70.25
9207.2	70.33	9226.88	70.18	9236.72	70.31	9259.67	70.14
9292.46	70.31	9305.58	70.06	9312.14	70.19	9348.21	70.13
9371.17	70.26	9381	70.14	9413.8	70.29	9440.03	70.1
9456.43	70.28	9482.66	70.01	9512.18	70.16	9528.57	69.96
9564.65	70.01	9571.2	69.89	9594.16	70.04	9620.39	69.79
9626.95	69.95	9682.7	69.99	9692.54	70.08	9708.93	69.85
9735.17	69.96	9754.84	69.73	9817.15	69.77	9840.11	69.54
9849.94	69.75	9876.18	69.55	9905.69	69.59	9941.76	69.3510000.79
69.1610023.75	68.58	10066.38	68.0710102.45	67.510109.01	67.5410122.13	68.4210128.68	67.96
10148.36	67.9910151.64	68.9910161.48	74.8710168.04	77.6110174.59	77.57		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	152.88	.066	3903.11	.07	3945.95	.025	4062.95	.07
4232.95	.066								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
3903.11 4232.95 1041.61 1416.67 323.99 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	3903.11	67.22	T
4232.9510174.59		67.89	T

Left Levee Station= 152.88 Elevation= 76.34
Right Levee Station=10168.04 Elevation= 77.61

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	72.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.066	0.056	0.066
W.S. Elev (ft)	72.39	Reach Len. (ft)	1041.61	1416.67	323.99
Crit W.S. (ft)	53.01	Flow Area (sq ft)	18854.08	6069.94	14069.07
E.G. Slope (ft/ft)	0.000048	Area (sq ft)	26999.46	6069.94	14233.18
Q Total (cfs)	20000.00	Flow (cfs)	8628.83	7475.43	3895.74
Top Width (ft)	9982.95	Top Width (ft)	3728.73	329.84	5924.38
Vel Total (ft/s)	0.51	Avg. Vel. (ft/s)	0.46	1.23	0.28
Max Chl Dpth (ft)	34.34	Hydr. Depth (ft)	5.06	18.40	2.37
Conv. Total (cfs)	2893909.0	Conv. (cfs)	1248552.0	1081661.0	563695.4
Length Wtd. (ft)	1033.67	Wetted Per. (ft)	3737.49	345.84	5926.16
Min Ch El (ft)	38.05	Shear (lb/sq ft)	0.02	0.05	0.01
Alpha	2.56	Stream Power (lb/ft s)	0.01	0.06	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	1404.67	547.75	274.69
C & E Loss (ft)	0.00	Cum SA (acres)	340.56	26.63	99.69

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 112.73*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7.33	69.39	29.02	69.42	42.03	69.73	52.87	69.65	59.38	70.91
63.71	72.39	68.05	73.06	72.39	73.05	78.89	70.94	85.4	69.96
91.91	70.71	94.07	71.39	100.58	74.42	104.92	75.56	109.25	75.91
121.86	75.42	138.66	73.04	155.47	70.98	163.86	69.74	176.46	68.5
184.87	67.94	20167.43295		252.54	66.69	303.37	66.72	333	66.55
354.18	66.62	392.28	66.89	417.69	67.35	426.16	65.13	430.4	64.89
447.34	64.93	460.03	67.78	464.27	68.27	472.74	68.06	481.21	67.35
493.92	66.93	536.26	66.49	570.14	66.52	578.61	66.67	608.24	66.47
629.42	65.68	642.13	64.9	659.07	64.85	680.23	65.16	688.7	65.61
697.17	66.95	705.64	67.48	714.11	67.57	735.29	67.17	769.16	67.1
798.81	66.94	807.28	66.99	845.38	67.69	866.56	67.9	870.79	67.43
879.26	65.56	883.5	64.96	896.21	64.91	900.43	65.79	904.66	67.37
908.9	68.21	917.37	68.29	930.08	67.27	934.31	67.15	968.19	67.16
1048.64	67.4	1133.33	67.38	1209.55	67.61	1247.67	67.63	1323.89	67.96
1366.23	67.84	1438.22	67.77	1522.91	68.19	1577.96	68.59	1599.14	68.51
1649.96	68.14	1679.59	68.03	1717.71	68.3	1747.35	67.9	1848.98	68.14
1912.5	68.52	1980.25	68.53	2026.84	68.43	2103.06	68.32	2149.64	68.37
2175.05	68.3	2272.43	68.39	2302.08	68.53	2319.02	68.74	2369.83	68.57
2424.88	68.67	2467.23	68.49	2539.22	68.71	2574.26	68.99	2574.95	65.83
2606.97	66.11	2666.25	65.88	2683.19	65.92	2725.53	66.45	2759.42	67.01
2801.76	67.09	2835.64	66.69	2884.36	66.47	2911.86	65.92	2938.8	65.54
2941.56	63.67	2962.23	63.71	2972.57	66.13	2999.45	66.76	3036.66	68.63
3052.51	68.64	3081.45	66.6	3119.35	66.36	3153.23	66.23	3174.4	66.29
3208.28	66.1	3237.93	65.83	3259.09	66.24	3292.97	66.3	3318.37	66.44
3343.78	66.26	3369.2	65.95	3377.67	65.97	3407.3	65.71	3432.71	65.93
3475.05	65.84	3496.23	66.04	3504.7	65.87	3517.41	65.96	3568.22	66.03
3589.39	65.92	3627.5	65.86	3640.2	65.77	3678.32	65.8	3703.72	65.91
3733.37	65.82	3784.18	65.78	3801.12	65.95	3813.83	65.86	3864.64	66.36
3906.99	66.61	3918.74	66.6	3931.83	67.56	3935.97	66.93	3938.73	67.52
3957.8	67.3	3974.74	66.89	4050.96	67.22	4093.3	66.91	4122.95	66.99
4178	67.51	4199.17	67.54	4211.87	67.75	4254.22	67.79	4277.77	67.67
4300.79	67.16	4343.15	66.74	4355.85	64.31	4364.31	63.26	4377.02	62.4
4385.49	62.59	4410.9	68.15	4427.84	69.46	4436.3	69.3	4449	69.76
4457.48	69.67	4482.89	70.02	4495.59	70.4	4504.06	70.35	4520.99	69.34
4542.17	68.43	4554.87	68.16	4580.29	67.9	4614.16	67.31	4643.8	67.13
4681.91	67	4698.85	66.87	4749.53	67.01	4827.966.73883		4851.1266.65732	
4934.89	66.78	4951.74	67.16	4955.26	66.23	4962.26	62.78	4965.77	60.39
4972.79	54.32	4982.45	51.97	4989.6550.67327		4997.8	49.9	4999.0448.84502	
5003.17	45.39	5007.47	44.54	5018.43	43.55	5027.2	43.23	5035.42	42.53
5048.32	39.38	5065.63	38.98	5075.83	41.28	5093.1943.15184		5096.21	43.46
5110.33	47.42	5110.35	49.5	5112.91	49.89	5118.03	52.04	5125.71	54.16
5133.38	54.44	5143.61	56.01	5148.73	56.4	5153.84	56.06	5158.96	56.57
5165.76	57.84	5174.33	57.99	5176.9	58.35	5182.03	59.88	5189.5860.40363	
5194.68	60.52	5207.7	61.56	5210.27	61.97	5217.97	64.17	5223.1	65.02
5228.06	65.05	5233.36	65.73	5243.63	68.61	5251.85	68.46	5257.33	68.02
5265.55	68.14	5287.47	67.85	5303.9	67.91	5320.33	67.8	5346.83	67.85
5386.09	68.07	5394.31	68.05	5438.14	68.38	5465.54	68.7	5490.22	68.77
5498.45	69.06	5520.41	69.17	5536.88	69.53	5553.35	69.48	5613.73	69.73
5627.46	69.62	5660.4	69.59	5682.36	69.65	5704.31	69.58	5720.78	69.42
5750.98	69.55	5770.19	69.45	5800.38	69.43	5811.36	69.55	5836.06	69.51
5874.49	69.75	5896.45	69.63	5915.66	69.64	5929.39	70.18	5954.1	70.53
5970.56	70.19	5984.29	69.74	6000.75	69.41	6017.22	69.5	6077.61	69.59
6099.56	69.73	6121.53	69.75	6143.48	69.59	6168.19	69.58	6187.4	69.77

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 6212.11   69.62 6228.57   69.74 6256.02   69.71 6275.23    69.6 6294.45   69.66
 6305.43    69.5 6321.89   69.64 6343.86   69.42 6357.57   69.57 6363.07   69.44
 6376.79   69.59 6415.22   69.64 6420.71   69.52 6431.69   69.64 6442.66   69.49
  6450.9   69.61 6481.09   69.53 6535.99   69.51 6549.71   69.44 6557.95   69.55
 6568.92   69.41 6604.61    69.5 6615.59   69.37  6659.5   69.51 6681.46   69.47
 6697.94   69.58 6755.57   69.47 6766.55   69.62 6783.03   69.46 6821.45   69.46
 6829.69   69.54 6862.62   69.61 6901.05   69.55 6914.78   69.67 6920.26   69.53
 6928.49   69.68 6936.73   69.45 6947.71   69.63 6958.69    69.5 6975.16    69.6
 6997.12   69.53 7041.04   69.53 7073.97   69.46  7087.7   69.62 7093.18   69.46
 7120.63    69.5 7142.59   69.61 7148.08   69.48  7167.3   69.56 7183.76    69.4
 7189.25   69.54 7219.45   69.55 7233.17   69.62 7260.62   69.53 7293.56   69.62
    7321   69.61  7351.2   69.76 7370.41   69.79 7411.58   69.71 7441.77   69.82
 7482.95   69.72 7515.89   69.81 7521.38   69.73 7568.04    69.8 7589.99   69.65
 7603.72   69.77 7622.93   69.75 7655.87   69.82 7677.83   69.77    7719   69.85
 7743.71   69.79 7751.93   69.85 7771.15   69.76 7779.39   69.87 7790.37   69.77
 7804.09   69.85 7845.26   69.79 7864.48   69.81 7872.71   69.66 7889.17   69.78
 7905.65   69.63 7941.33   69.73 7946.82   69.62 7966.04   69.75 7974.26   69.66
 8018.18   69.73 8031.91   69.66 8067.59   69.77 8100.52   69.63 8138.96   69.78
 8149.93   69.65 8160.91   69.71 8177.38   69.62 8213.06   69.72 8229.54   69.62
 8243.25   69.71 8248.75   69.61 8265.22   69.66 8287.17   69.54 8306.39   69.55
 8314.62   69.41 8339.32    69.4 8361.28   69.65 8383.24   69.59 8391.48   69.43
 8402.46    69.5 8424.41   69.33 8449.11   69.46 8465.58   69.39  8509.5   69.49
 8528.72   69.38 8553.42   69.41 8630.27   69.42 8649.49   69.36 8665.95   69.53
 8674.19   69.42  8693.4   69.51 8712.61   69.37  8742.8   69.46 8753.79   69.38
 8781.23   69.42 8808.68   69.31 8844.36   69.25 8866.32   69.35 8882.79   69.84
 8893.76   69.63 8899.25    69.9 8912.98   70.05 8923.96   69.97 8940.43   68.92
 8954.15   68.89 8962.39   69.38 8967.87   69.27 8976.11   68.72 8987.09   68.77
 8989.83   69.42  9006.3   68.93 9014.53   69.08 9020.02   68.86 9025.51   69.13
 9069.43   69.29 9105.11   69.51 9113.35   69.35 9143.54    69.3  9190.2   69.29
 9206.66   69.34 9225.88   69.22 9253.33   69.33 9267.05   69.25 9280.77   69.36
 9376.84   69.24 9407.03   69.29  9423.5   69.19 9431.74   69.27 9450.95   69.15
 9478.39   69.26 9489.37   69.09 9494.86   69.18 9525.05   69.13 9544.27   69.22
  9552.5   69.14 9579.95   69.23 9601.91    69.1 9615.63   69.22 9637.59   69.04
  9662.3   69.13 9676.01      69 9706.21   69.02  9711.7   68.94 9730.91   69.04
 9752.87   68.87 9758.36   68.97 9805.02   68.99 9813.26   69.05 9826.97    68.9
 9848.94   68.96  9865.4   68.81 9917.55   68.83 9936.77   68.67    9945   68.81
 9966.96   68.67 9991.66   68.6910021.85   68.5310071.26   68.3910090.48      68
10126.16   67.6510156.35   67.2510164.31   67.4110172.82   68.88 10178.3   69.23
10193.79   71.1110197.52   71.8310205.75   75.8710211.24   77.7710216.73   77.83

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    7.33    .085  138.66    .066 4554.87     .07  4997.8    .025 5110.35     .07
 5243.63    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      4951.74 5243.63          1041.61 1416.67  323.99             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    7.33 4951.74   67.16       T
 5243.6310216.73   68.61       T
Left Levee      Station=109.2533      Elevation=75.90666
Right Levee     Station=10212.36      Elevation=77.85333

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 112.47*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   14.67   72.22   25.51   72.23   32.02   72.39   37.44   72.34   40.69   72.98
   42.86   73.71    47.2   74.05   50.45   72.99    53.7    72.5   56.95   72.87
   61.29   74.73   63.46    75.3   65.63   75.47   81.07   75.23  101.66   74.04
  122.26   73.01  132.55   72.39     148   71.77   158.3   71.49  178.97   71.23
  241.24   70.86  249.1270.86253  303.52   70.88  339.84    70.8   365.8   70.83
   412.5   70.96  443.64    71.2  454.02   70.08  459.21   69.96  479.97   69.99
  495.53   71.41  500.72   71.66   511.1   71.55  521.48    71.2  537.05   70.98
  588.94   70.76  630.47   70.78  640.85   70.86  677.17   70.76  703.12   70.36
  718.69   69.97  739.46   69.95  765.39    70.1  775.77   70.32  786.16   70.99
  796.54   71.26  806.92    71.3  832.87   71.11  874.38   71.07  910.71   70.99
   921.1   71.02  967.79   71.36  993.75   71.47  998.94   71.23 1009.32    70.3
 1014.51      70 1030.08   69.97 1035.26   70.42 1040.45   71.21 1045.64   71.62
 1056.02   71.66 1071.59   71.16 1076.78    71.1 1118.31    71.1  1216.9   71.22
 1320.69   71.21 1414.11   71.32 1460.82   71.34 1554.24    71.5 1606.13   71.44
 1694.35   71.41 1798.15   71.61 1865.61   71.81 1891.56   71.78 1953.85   71.59
 1990.17   71.54 2036.89   71.67  2073.2   71.47 2197.76   71.59 2275.61   71.78
 2358.64   71.79 2415.74   71.73 2509.15   71.68 2566.23    71.7 2597.38   71.67
 2716.73   71.71 2753.06   71.79 2773.82   71.89  2836.1   71.81 2903.56   71.86
 2955.46   71.76 3043.69   71.87 3086.63   72.02 3087.47   65.69 3126.72   65.85
 3199.37   65.78 3220.14   65.82 3272.03   66.12 3313.55   66.42 3365.44    66.5
 3406.97   66.32 3466.68   66.25 3500.38   65.38  3533.4   64.59 3536.78   60.86
 3562.12   60.93 3574.79   65.79 3607.72   67.15 3653.33   70.83 3672.75   70.84
 3708.23   66.97 3754.67   66.86  3796.2    66.8 3822.14   66.84 3863.66   66.76
    3900   66.63 3925.93   66.85 3967.46   66.88 3998.58   66.97 4029.73   66.88
 4060.87   66.74 4071.25   66.75 4107.57   66.63 4138.72   66.75 4190.61   66.72
 4216.56   66.83 4226.94   66.74 4242.51   66.79 4304.78   66.84 4330.74    66.8
 4377.44   66.78 4393.01   66.74 4439.72   66.77 4470.85   66.83 4507.19    66.8
 4569.46    66.8 4590.22   66.89 4605.79   66.84 4624.58   66.91 4668.06   67.24
 4719.97   67.53 4734.37   67.57 4750.42    69.3 4755.48   67.99 4758.86   69.13
 4782.24   68.43 4794.33   67.96    4803   67.91 4896.42   67.96 4948.31   67.74
 4984.64   67.73  5052.1   67.92 5084.86   67.92 5093.61   68.07 5145.52   68.56
 5174.39   68.75  5202.6   68.42 5254.51   68.05 5270.08   66.79 5280.44   66.23
 5296.01   65.76  5306.4   65.83 5337.54   68.52  5358.3   69.13 5368.67   69.02
 5384.24   69.21 5394.62   69.13 5425.76   69.23 5441.34   69.38 5451.72   69.32
 5472.46   68.76 5498.42   68.24 5513.99   68.06 5545.13   67.85 5586.64   67.45
 5622.98   67.26 5669.67   67.08 5690.44   66.96 5752.55   66.86 5850.4566.46516
 5878.5666.34447  5879.6   66.34 5979.72   66.82 6000.37    67.1 6004.13   65.84
 6011.63   62.51 6015.38   60.52 6022.89   55.65 6026.64   54.05 6033.3551.40067
 6041.52 48.7468 6043.55   48.09 6049.64    47.5 6055.39   44.92 6059.99   44.33
 6071.71   43.24  6081.1   43.34  6089.9   42.61 6099.88    40.9  6103.7   40.51
 6109.26   40.49 6118.65   39.91 6123.43   39.91 6125.32   39.91  6132.7   41.31
 6141.44   42.27 6147.48   43.08 6157.71   45.69 6157.73   46.73 6159.58   47.08
 6163.29   48.47 6168.85   49.99 6174.41   50.63 6181.83    52.4 6185.54   53.09
 6189.82   53.51 6192.95   54.49 6197.88   56.29 6204.09   56.71 6207.2957.33776
 6211.54   58.26 6218.84   58.78 6228.27   60.92 6233.35   62.69 6239.43   63.85
 6243.03   64.04 6246.87   65.58 6254.32   69.32 6260.94   69.32 6265.34   69.15
 6271.96   69.22 6289.61   68.94 6302.84   68.88 6316.08   68.73 6337.42    68.6
 6369.03    68.7 6375.65   68.68 6410.94   68.84    6433   68.99 6452.88   69.02
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 6459.51   69.16 6477.19   69.21 6490.45   69.38 6503.72   69.36 6552.34   69.47
 6563.39   69.41 6589.91   69.38  6607.6   69.41 6625.28   69.37 6638.54   69.28
 6662.85   69.34 6678.32   69.28 6702.63   69.26 6711.48   69.32 6731.37    69.3
 6762.31   69.41 6779.99   69.34 6795.46   69.34 6806.52   69.61 6826.41   69.78
 6833.04   69.63 6839.67    69.6 6850.72   69.37 6863.98    69.2 6877.24   69.25
 6925.87   69.27 6943.55   69.34 6961.23   69.34 6978.91   69.26 6998.81   69.25
 7014.28   69.34 7034.17   69.25 7047.43   69.31    7085   69.23 7100.48   69.25
 7109.32   69.17 7122.58   69.23 7140.26   69.12 7151.31   69.19 7155.73   69.12
 7166.78   69.19 7197.73   69.21 7202.15   69.15 7210.99   69.21 7219.83   69.13
 7226.46   69.19 7250.77   69.14 7294.98   69.11 7306.03   69.07 7312.66   69.13
  7321.5   69.06 7350.24   69.09 7359.07   69.02 7394.43   69.08 7412.12   69.05
 7425.38    69.1 7471.79   69.03 7480.64   69.11  7493.9   69.02 7524.84   69.01
 7531.48   69.05    7558   69.08 7588.94   69.04 7611.04   69.09 7617.67   68.98
 7626.51   69.06 7635.36      69 7648.61   69.04  7666.3      69 7701.66   68.99
 7728.18   68.95 7739.24   69.02 7743.65   68.94 7765.76   68.95 7783.44      69
 7787.86   68.94 7803.33   68.97 7816.59   68.89 7821.01   68.96 7845.33   68.95
 7856.37   68.99 7878.48   68.93    7905   68.97  7927.1   68.96 7966.89   69.03
 8000.04   68.98 8024.35   69.03 8057.51   68.97 8084.03   69.01 8088.45   68.96
 8126.03   68.99 8143.71    68.9 8154.76   68.96 8196.75   68.97 8214.43   68.94
 8247.59   68.97 8267.48   68.93 8274.11   68.96 8289.58   68.91 8296.21   68.97
 8305.06   68.91  8316.1   68.95 8364.73   68.91 8371.36   68.84 8384.62   68.89
 8397.88   68.81 8426.62   68.85 8431.04    68.8 8446.51   68.86 8453.14   68.81
 8470.82   68.84 8477.45   68.79  8488.5   68.83 8499.55   68.79 8528.29   68.84
 8554.81   68.76 8585.75   68.83 8594.59   68.76  8616.7   68.74 8645.43   68.78
 8658.69   68.72 8669.74   68.77 8674.16   68.71 8687.42   68.73  8705.1   68.67
 8720.58   68.67 8727.21    68.6  8747.1   68.59 8764.78    68.7 8782.46   68.67
 8789.09   68.58 8797.94   68.62 8815.62   68.53  8835.5   68.58 8848.77   68.55
 8884.13   68.59 8899.61   68.53 8915.08   68.57  8919.5   68.53 8981.38   68.52
 8996.86   68.48 9010.11   68.56 9016.75   68.51 9032.21   68.55 9047.69   68.47
    9072   68.51 9080.84   68.46 9102.94   68.48 9125.05   68.41 9153.78   68.37
 9171.46   68.42 9184.72   68.66 9193.56   68.55 9197.98   68.69 9209.03   68.76
 9217.87   68.72 9231.13   68.19 9242.18   68.17 9248.82   68.41 9253.23   68.36
 9259.86   68.08 9268.71    68.1 9270.92   68.42 9284.17   68.17 9290.81   68.25
 9295.23   68.14 9299.65   68.27 9335.01   68.34 9363.74   68.44 9370.38   68.36
 9394.69   68.32 9432.26    68.3 9445.52   68.32 9460.99   68.26 9483.09   68.31
 9494.15   68.27 9505.19   68.32 9582.55   68.23 9606.86   68.25 9620.13   68.19
 9626.76   68.23 9642.23   68.17 9664.33   68.22 9677.59   68.17  9701.9   68.14
 9717.37   68.18    9724   68.13 9746.11   68.17 9763.79    68.1 9774.84   68.16
 9792.52   68.06 9812.41    68.1 9823.46   68.03 9847.78   68.04 9852.19   67.99
 9867.67   68.04 9885.34   67.95 9889.77      68 9933.97   68.02 9945.02   67.94
  9962.7   67.97 9975.96   67.8910017.96   67.8810033.43    67.810040.06   67.87
10057.74   67.7910077.63    67.810101.94   67.7110141.73   67.63 10157.2   67.43
10185.93   67.2310210.24      6710216.65   67.0710223.51   69.3410227.92    70.5
 10240.4   74.22 10243.4   74.6610250.03   76.8610254.45   77.9410258.86   78.08

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
   14.67    .085  132.55    .066 6000.37     .07 6043.55    .025 6163.29     .07
 6254.32    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6000.37 6254.32          1041.61 1416.67  323.99             .1       .3
Left Levee      Station=65.62667      Elevation=75.47334
Right Levee     Station=10256.68      Elevation=78.09666
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 3008.61 6003.44   67.16 6244.4110347.68   69.25

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 112.2

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      22   75.04    3599   75.04    3600   65.54    4049   66.04    4128   63.64
    4132   58.04    4162   58.14    4177   65.44    4216   67.54    4270   73.04
    4293   73.04    4335   67.34    4363   67.34    5420   67.84    5550   68.54
    5569   71.04    5575   69.04    5579   70.74    5621   68.94    5965   68.24
    6071   69.84    6188   69.24    6873   66.19    6906   66.04    7049   67.04
    7070   58.64    7084   50.91    7087   49.55    7095   45.94    7105   44.64
    7115   43.94    7125   42.94    7135   43.44    7145   42.64    7155   41.64
    7165   41.64    7175   40.84    7185   40.84    7195   41.94    7205   43.94
    7215   46.64  7221.8   49.54    7225   50.91    7230   54.74    7243   57.04
    7252   62.04    7258   63.04    7265   70.04    7276   70.34    7328   69.34
   10233   66.84   10269   66.74   10287   77.34   10301   78.34

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
      22    .075    6873    .075    6906    .066    7084    .025    7225    .066
    7265    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          7049    7265               0       0       0             .1       .3
Left Levee      Station=      22      Elevation=   75.04
Right Levee     Station=   10301      Elevation=   78.34
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
      22    5569   71.04    7265   10301   70.04

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            72.20    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.10    Wt. n-Val.                 0.073      0.042     0.074
  W.S. Elev (ft)            72.10    Reach Len. (ft)
  Crit W.S. (ft)            52.36    Flow Area (sq ft)       7980.40    4951.85    6199.39
  E.G. Slope (ft/ft)      0.000116   Area (sq ft)            7980.40    4951.85    6199.39
  Q Total (cfs)           20000.00   Flow (cfs)              3332.40   14499.99    2167.62
  Top Width (ft)           6639.64   Top Width (ft)          3410.54     216.00    3013.10
  Vel Total (ft/s)            1.05   Avg. Vel. (ft/s)           0.42       2.93       0.35
  Max Chl Dpth (ft)          31.26   Hydr. Depth (ft)           2.34      22.93       2.06
  Conv. Total (cfs)       1857787.0   Conv. (cfs)            309544.3   1346894.0   201348.4
  Length Wtd. (ft)                    Wetted Per. (ft)        3412.35     228.23    3013.67
  Min Ch El (ft)             40.84    Shear (lb/sq ft)           0.02       0.16       0.01
  Alpha                       5.73    Stream Power (lb/ft s)     0.01       0.46       0.01
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)
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Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

SUMMARY OF MANNING'S N VALUES

River:Rio Grande

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7
Lower Reach	186	.114	.066	.015	.066	.062		
Lower Reach	185.50*	.085	.066	.07	.025	.07	.066	
Lower Reach	185	.085	.066	.07	.025	.07	.066	
Lower Reach	184.50*	.112	.066	.015	.066			
Lower Reach	184	.112	.066	.015	.066			
Lower Reach	183.80*	.112	.066	.015	.066			
Lower Reach	183.60*	.066	.07	.025	.07	.066		
Lower Reach	183.40*	.066	.07	.025	.07	.066		
Lower Reach	183.2	.066	.07	.025	.07	.066		
Lower Reach	183.00*	.082	.066	.015	.066	.061		
Lower Reach	182.80*	.082	.066	.015	.066	.061		
Lower Reach	182.60*	.082	.066	.015	.066	.061		
Lower Reach	182.4	.082	.066	.015	.066	.061		
Lower Reach	182.05*	.082	.066	.015	.066	.061		
Lower Reach	181.70*	.082	.066	.015	.066	.061		
Lower Reach	181.35	.085	.066	.066	.025	.066		
Lower Reach	181.01*	.085	.066	.066	.025	.066		
Lower Reach	180.66*	.085	.066	.025	.066			
Lower Reach	180.32	.085	.066	.025	.066			
Lower Reach	180.3	.157	.066	.015	.066	.074		
Lower Reach	180.08*	.157	.066	.015	.066	.074		
Lower Reach	179.85*	.066	.12	.025	.066			
Lower Reach	179.63*	.066	.12	.025	.066			
Lower Reach	179.4	.066	.12	.025	.066			
Lower Reach	179.10*	.066	.12	.025	.066			
Lower Reach	178.80*	.154	.066	.015	.066	.061		
Lower Reach	178.5	.154	.066	.015	.066	.061		
Lower Reach	178.23*	.154	.066	.015	.066	.061		
Lower Reach	177.97*	.154	.066	.015	.066	.061		
Lower Reach	177.7	.085	.12	.025	.066			
Lower Reach	177.40*	.085	.12	.025	.066			
Lower Reach	177.10*	.154	.066	.015	.066	.084		
Lower Reach	176.8	.154	.066	.015	.066	.084		
Lower Reach	176.40*	.154	.066	.015	.066	.084		
Lower Reach	176.00*	.066	.025	.066	.085			
Lower Reach	175.6	.066	.025	.066	.085			
Lower Reach	175.27*	.066	.025	.066	.085			
Lower Reach	174.93*	.198	.066	.015	.066	.069		
Lower Reach	174.6	.198	.066	.015	.066	.069		
Lower Reach	174.2	.066	.025	.066	.085			
Lower Reach	174.10*	.066	.025	.066	.085			
Lower Reach	174	.066	.025	.066	.085			
Lower Reach	173.33*	.066	.025	.066	.085			
Lower Reach	172.67*	.066	.025	.066	.085			
Lower Reach	172	.066	.025	.066	.085			
Lower Reach	171.90*	.081	.066	.015	.066	.067		
Lower Reach	171.8	.081	.066	.015	.066	.067		
Lower Reach	171.48*	.081	.066	.015	.066	.067		
Lower Reach	171.15	.066	.025	.085	.06			
Lower Reach	170.83*	.186	.066	.015	.066	.076		
Lower Reach	170.5	.186	.066	.015	.066	.076		
Lower Reach	170.38*	.186	.066	.015	.066	.076		
Lower Reach	170.26	.085	.12	.025	.12	.06	.085	
Lower Reach	170.02	.177	.066	.015	.066	.131		
Lower Reach	169.9	.188	.066	.015	.066	.187		
Lower Reach	169.83	.188	.066	.015	.066	.187		
Lower Reach	169.49	.066	.025	.085	.06	.06	.085	
Lower Reach	169.14	.048	.06	.015	.06			
Lower Reach	169.13	Inl Struct						
Lower Reach	169.12	.06	.015	.06				
Lower Reach	169.1	.14	.015	.14				
Lower Reach	168.85	.2	.2	.066	.015	.066	.116	
Lower Reach	168.58	.085	.12	.025	.085			
Lower Reach	168.3	.2	.2	.066	.015	.066	.116	
Lower Reach	168	.085	.066	.12	.025	.12	.085	
Lower Reach	167.70*	.085	.066	.12	.025	.12	.085	
Lower Reach	167.4	.106	.106	.066	.015	.066	.13	
Lower Reach	167	.085	.066	.025	.066	.085		
Lower Reach	166.6	.118	.066	.015	.066	.132		
Lower Reach	166	.118	.066	.015	.066	.132		
Lower Reach	165	.118	.066	.015	.066	.132		
Lower Reach	163	.066	.12	.025	.12	.085	.06	
Lower Reach	162.1	.066	.12	.025	.12	.085	.06	
Lower Reach	161.4	.108	.108	.066	.015	.066	.144	
Lower Reach	161.35	.108	.066	.015	.066	.144		
Lower Reach	161.3	.108	.066	.015	.066	.144		
Lower Reach	160	.108	.066	.015	.07	.066	.144	
Lower Reach	159	.108	.066	.015	.066	.144		
Lower Reach	157.2	.102	.066	.015	.066	.078		
Lower Reach	157.15	.102	.102	.066	.015	.066	.078	
Lower Reach	156.93	.14	.14	.066	.015	.066	.14	
Lower Reach	156.915	Bridge						
Lower Reach	156.9	.06	.06	.066	.015	.066	.06	
Lower Reach	156.87	.06	.066	.015	.066	.06		
Lower Reach	156.855	Bridge						
Lower Reach	156.84	.14	.14	.066	.015	.066	.04	
Lower Reach	156.7	.06	.085	.07	.025	.07	.085	.06
Lower Reach	156.6	.076	.076	.066	.015	.066	.06	
Lower Reach	156.15	.06	.066	.07	.025	.07	.066	.06
Lower Reach	155.7	.092	.066	.015	.066	.06		
Lower Reach	155.36	.066	.07	.025	.07	.066	.06	
Lower Reach	155.2	.066	.07	.025	.07	.066	.06	
Lower Reach	155.01	.092	.066	.015	.066	.099		
Lower Reach	154.81	.066	.12	.07	.025	.07	.066	.06
Lower Reach	154.6	.168	.168	.066	.015	.066	.067	
Lower Reach	154.23	.066	.12	.07	.025	.07	.066	.06
Lower Reach	153.85	.132	.066	.015	.066	.076		
Lower Reach	153.61	.066	.07	.025	.07	.066		
Lower Reach	153.36	.096	.066	.015	.066	.085		
Lower Reach	153.08*	.096	.066	.015	.066	.085		

Lower Reach	152.81*	.169	.066	.015	.066	.102			
Lower Reach	152.53	.169	.066	.015	.066	.102			
Lower Reach	152.25*	.169	.066	.015	.066	.102			
Lower Reach	151.98*	.1	.066	.015	.066	.082			
Lower Reach	151.7	.1	.1	.066	.015	.066	.082		
Lower Reach	151.49	.066	.085	.07	.025	.07	.066	.06	
Lower Reach	151.27	.06	.06	.066	.015	.066	.067		
Lower Reach	151.255	Bridge							
Lower Reach	151.25	.06	.06	.066	.015	.066	.06		
Lower Reach	151.24	.06	.066	.015	.066	.067			
Lower Reach	150.78	.06	.066	.07	.025	.07	.066	.06	
Lower Reach	150.31	.09	.066	.015	.066	.102			
Lower Reach	149.66*	.09	.12	.066	.015	.066	.102		
Lower Reach	149	.066	.12	.07	.025	.07	.066		
Lower Reach	148.34*	.105	.066	.015	.066	.095			
Lower Reach	147.68	.105	.066	.015	.066	.095			
Lower Reach	147.34*	.105	.066	.015	.066	.095			
Lower Reach	147.01*	.105	.066	.015	.066	.095			
Lower Reach	146.67*	.066	.07	.025	.07	.085	.066		
Lower Reach	146.34*	.066	.07	.025	.07	.085	.066		
Lower Reach	146	.066	.07	.025	.07	.085	.066		
Lower Reach	145.67*	.066	.07	.025	.07	.085	.066		
Lower Reach	145.5	.066	.066	.015	.066	.088			
Lower Reach	145.2	.066	.066	.015	.066	.088			
Lower Reach	145	.066	.066	.015	.066	.088			
Lower Reach	144.7	.09	.066	.015	.066	.088			
Lower Reach	144.55	.172	.066	.015	.066	.067			
Lower Reach	144	.172	.066	.015	.066	.067			
Lower Reach	143.5	.07	.12	.025	.07	.066	.085		
Lower Reach	143.25	.07	.12	.07	.025	.07	.066	.085	
Lower Reach	143	.07	.12	.07	.025	.07	.066	.085	
Lower Reach	142.5	.192	.066	.015	.066	.074			
Lower Reach	142	.07	.12	.07	.025	.07	.066		
Lower Reach	141.9	.066	.12	.07	.025	.07	.066		
Lower Reach	141.5	.07	.12	.07	.025	.07	.066		
Lower Reach	140.74	.183	.066	.015	.066	.068			
Lower Reach	140	.066	.12	.07	.025	.07	.066		
Lower Reach	139.85	.157	.066	.015	.066	.074			
Lower Reach	139.57*	.157	.066	.015	.066	.074			
Lower Reach	139.29*	.094	.066	.015	.066	.06			
Lower Reach	139.01	.094	.066	.015	.066	.06			
Lower Reach	138.69*	.066	.07	.025	.07	.066			
Lower Reach	138.36	.066	.07	.025	.07	.066			
Lower Reach	138.04*	.102	.066	.015	.066	.067			
Lower Reach	137.71	.102	.066	.015	.066	.067			
Lower Reach	137.43*	.066	.085	.07	.025	.07	.066		
Lower Reach	137.14	.066	.085	.07	.025	.07	.066		
Lower Reach	136.8	.101	.066	.015	.066	.074			
Lower Reach	136.2	.101	.066	.015	.066	.074			
Lower Reach	136	.101	.066	.015	.066	.074			
Lower Reach	135.5	.101	.066	.015	.066	.074			
Lower Reach	135	.101	.066	.015	.066	.074			
Lower Reach	134.65	.085	.066	.07	.025	.07	.066		
Lower Reach	134.33*	.085	.066	.07	.025	.07	.066		
Lower Reach	134.02*	.085	.066	.07	.025	.07	.066		
Lower Reach	133.70*	.118	.066	.015	.066	.067			
Lower Reach	133.38*	.118	.066	.015	.066	.067			
Lower Reach	133.07*	.118	.066	.015	.066	.067			
Lower Reach	132.75	.118	.066	.015	.066	.067			
Lower Reach	132.46*	.118	.066	.015	.066	.067			
Lower Reach	132.18*	.118	.07	.015	.07	.067			
Lower Reach	131.89*	.066	.07	.025	.07	.066			
Lower Reach	131.6	.066	.07	.025	.07	.066			
Lower Reach	131.35	.099	.066	.015	.066	.088			
Lower Reach	130.93	.066	.07	.025	.07	.066			
Lower Reach	130.51	.074	.066	.015	.066	.067			
Lower Reach	129.3	.068	.068	.066	.025	.066	.06		
Lower Reach	129.27	.085	.066	.07	.07	.025	.07	.066	
Lower Reach	129.23	.144	.144	.066	.025	.066	.06		
Lower Reach	129.22	.144	.144	.066	.025	.066	.06		
Lower Reach	129.216	.015							
Lower Reach	129.215	Inl Struct							
Lower Reach	129.214	.015							
Lower Reach	129.213	.015							
Lower Reach	129.212	.015							
Lower Reach	129.211	.015							
Lower Reach	129.21	.015							
Lower Reach	129.2	.168	.066	.025	.066	.067			
Lower Reach	129.03	.14	.066	.025	.066	.071			
Lower Reach	128.5	.066	.085	.07	.025	.07	.066		
Lower Reach	128.23*	.066	.085	.07	.025	.07	.066		
Lower Reach	127.97*	.114	.066	.025	.066	.074			
Lower Reach	127.7	.114	.066	.025	.066	.074			
Lower Reach	127.4	.066	.07	.025	.07	.085			
Lower Reach	127.05*	.11	.066	.025	.066	.074			
Lower Reach	126.7	.11	.066	.025	.066	.074			
Lower Reach	126.35*	.11	.066	.025	.066	.074			
Lower Reach	126.00*	.066	.07	.025	.07	.066			
Lower Reach	125.65*	.066	.07	.025	.07	.066			
Lower Reach	125.3	.066	.07	.025	.07	.066			
Lower Reach	125	.108	.066	.025	.066	.074			
Lower Reach	124.80*	.108	.066	.025	.066	.074			
Lower Reach	124.60*	.085	.066	.085	.07	.025	.07	.066	
Lower Reach	124.4	.085	.066	.085	.07	.025	.07	.066	
Lower Reach	124.20*	.085	.066	.085	.07	.025	.07	.066	
Lower Reach	124.00*	.1	.089	.066	.025	.066	.07		
Lower Reach	123.8	.1	.066	.025	.066	.07			
Lower Reach	123.48*	.066	.085	.07	.025	.07	.066		
Lower Reach	123.15	.066	.085	.07	.025	.07	.066		
Lower Reach	122.83*	.066	.085	.07	.025	.07	.066		
Lower Reach	122.5	.099	.099	.066	.025	.066			
Lower Reach	121.98*	.111	.066	.025	.066	.071			
Lower Reach	121.46	.111	.066	.025	.066	.071			
Lower Reach	121.13*	.044	.066	.025	.066	.075			
Lower Reach	120.8	.044	.066	.025	.066	.075			
Lower Reach	120.7	.044	.066	.025	.066	.075			
Lower Reach	120.62	.088	.088	.066	.025	.066	.08		
Lower Reach	120.605	Bridge							
Lower Reach	120.59	.104	.104	.066	.025	.066	.06		
Lower Reach	120.5	.159	.066	.025	.066	.076			
Lower Reach	120.4	.159	.066	.025	.066	.076			
Lower Reach	120.39*	.164	.066	.025	.066	.073			

Lower Reach	120.38	.164	.066	.025	.066	.073	
Lower Reach	120.07*	.164	.066	.025	.066	.073	
Lower Reach	119.75*	.164	.066	.025	.066	.073	
Lower Reach	119.44*	.066	.07	.025	.07	.085	.066
Lower Reach	119.12*	.066	.07	.025	.07	.085	.066
Lower Reach	118.81	.066	.07	.025	.07	.085	.066
Lower Reach	118.50*	.066	.07	.025	.07	.085	.066
Lower Reach	118.18*	.163	.066	.025	.066	.071	
Lower Reach	117.87	.163	.066	.025	.066	.071	
Lower Reach	117.54*	.167	.066	.025	.066	.068	
Lower Reach	117.2	.167	.066	.025	.066	.068	
Lower Reach	116.5	.13	.066	.025	.066	.068	
Lower Reach	116.1	.1	.066	.025	.066	.067	
Lower Reach	115.7	.052	.066	.025	.066	.067	
Lower Reach	115.45*	.052	.066	.025	.066	.067	
Lower Reach	115.2	.109	.066	.025	.066	.074	
Lower Reach	115	.109	.066	.025	.066	.074	
Lower Reach	114.8	.14	.066	.025	.066	.067	
Lower Reach	114.65	.174	.066	.025	.066	.068	
Lower Reach	114.47*	.174	.066	.025	.066	.068	
Lower Reach	114.28*	.11	.066	.025	.066	.071	
Lower Reach	114.1	.11	.066	.025	.066	.071	
Lower Reach	113.73*	.11	.066	.025	.066	.071	
Lower Reach	113.37*	.085	.066	.07	.025	.07	.066
Lower Reach	113	.085	.066	.07	.025	.07	.066
Lower Reach	112.73*	.085	.066	.07	.025	.07	.066
Lower Reach	112.47*	.085	.066	.07	.025	.07	.066
Lower Reach	112.2	.075	.075	.066	.025	.066	.074

SUMMARY OF REACH LENGTHS

River: Rio Grande

Reach	River Sta.	Left	Channel	Right
Lower Reach	186	850	1950	1075
Lower Reach	185.50*	850	1950	1075
Lower Reach	185	850	1950	1075
Lower Reach	184.50*	850	1950	1075
Lower Reach	184	1037.5	1525	1100
Lower Reach	183.80*	1037.5	1525	1100
Lower Reach	183.60*	1037.5	1525	1100
Lower Reach	183.40*	1037.5	1525	1100
Lower Reach	183.2	1037.5	1525	1100
Lower Reach	183.00*	1037.5	1525	1100
Lower Reach	182.80*	1037.5	1525	1100
Lower Reach	182.60*	1037.5	1525	1100
Lower Reach	182.4	1987.52	1916.67	1916.38
Lower Reach	182.05*	1987.52	1916.67	1916.38
Lower Reach	181.70*	1987.52	1916.67	1916.38
Lower Reach	181.35	1561.05	1691.8	1675.24
Lower Reach	181.01*	1561.05	1691.8	1675.24
Lower Reach	180.66*	1561.05	1691.8	1675.24
Lower Reach	180.32	557.41	674.61	694.11
Lower Reach	180.3	1062.5	1652.05	1250
Lower Reach	180.08*	1062.5	1652.05	1250
Lower Reach	179.85*	1062.5	1652.05	1250
Lower Reach	179.63*	1062.5	1652.05	1250
Lower Reach	179.4	1754.79	1830.6	1749.92
Lower Reach	179.10*	1754.79	1830.6	1749.92
Lower Reach	178.80*	1754.79	1830.6	1749.92
Lower Reach	178.5	1087.82	1400	1513.92
Lower Reach	178.23*	1087.82	1400	1513.92
Lower Reach	177.97*	1087.82	1400	1513.92
Lower Reach	177.7	2073.72	1400	1374.03
Lower Reach	177.40*	2073.72	1400	1374.03
Lower Reach	177.10*	2073.72	1400	1374.03
Lower Reach	176.8	1153.45	2530	2395.52
Lower Reach	176.40*	1153.45	2530	2395.52
Lower Reach	176.00*	1153.45	2530	2395.52
Lower Reach	175.6	1212.33	1503.33	1122.85
Lower Reach	175.27*	1212.33	1503.33	1122.85
Lower Reach	174.93*	1212.33	1503.33	1122.85
Lower Reach	174.6	3662.8	2000	1560.98
Lower Reach	174.2	472.5	1764.5	2016
Lower Reach	174.10*	472.5	1764.5	2016
Lower Reach	174	1056.67	1804.67	1796
Lower Reach	173.33*	1056.67	1804.67	1796
Lower Reach	172.67*	1056.67	1804.67	1796
Lower Reach	172	2737	1911	1305.5
Lower Reach	171.90*	2737	1911	1305.5
Lower Reach	171.8	1869.27	1625	951.28
Lower Reach	171.48*	1869.27	1625	951.28
Lower Reach	171.15	859.81	1625	1934.01
Lower Reach	170.83*	859.81	1625	1934.01
Lower Reach	170.5	1270.17	1075	1060.89
Lower Reach	170.38*	1270.17	1075	1060.89
Lower Reach	170.26	1559.58	2150	1999.52
Lower Reach	170.02	2106.1	389.75	107.13
Lower Reach	169.9	2629.05	610.25	109.21
Lower Reach	169.83	1276.91	1300	905.72
Lower Reach	169.49	188.88	1299.95	1556.14
Lower Reach	169.14	48.38	50.04	47.52
Lower Reach	169.13	Inl Struct		
Lower Reach	169.12	100.93	99.44	96.53
Lower Reach	169.1	1118.21	1200.01	1232.42
Lower Reach	168.85	1531.01	1524.99	1539.3
Lower Reach	168.58	1510.38	1525.35	1543.94
Lower Reach	168.3	1645.88	1675	1663.72
Lower Reach	168	1221.72	1587.5	1609.1
Lower Reach	167.70*	1221.72	1587.5	1609.1
Lower Reach	167.4	1756.68	2500	2391.12
Lower Reach	167	1855.62	2500.27	1953.43
Lower Reach	166.6	417.4821	2330.936	2564.68
Lower Reach	166	203.14	3680.24	4630.8
Lower Reach	165	200.92	3697.62	2252.28
Lower Reach	163	2552.46	4131.21	2270.67
Lower Reach	162.1	2695.37	2260.89	1608.69
Lower Reach	161.4	2304.01	1690.29	1564.64

Lower Reach	161.35	427.09	384.49	366.72
Lower Reach	161.3	2822	2844	2893
Lower Reach	160	4690.55	4824.53	1212.75
Lower Reach	159	11213.44	11093.09	6165.786
Lower Reach	157.2	936.61	4252.55	5284.79
Lower Reach	157.15	2369.53	2114	2067.51
Lower Reach	156.93	86	86	86
Lower Reach	156.915	Bridge		
Lower Reach	156.9	198.66	198.52	198.75
Lower Reach	156.87	91	91	91
Lower Reach	156.855	Bridge		
Lower Reach	156.84	490.49	510	528.74
Lower Reach	156.7	520.54	510.48	507.59
Lower Reach	156.6	2582.86	2000	4032.36
Lower Reach	156.15	2250	2000.04	2300
Lower Reach	155.7	2226.15	2050	2058.78
Lower Reach	155.36	1101.32	1093.11	1083.33
Lower Reach	155.2	959.6	956.88	939.12
Lower Reach	155.01	1629.91	1325	767.57
Lower Reach	154.81	1120.03	1324.83	1829.96
Lower Reach	154.6	1291.37	1665	1771.03
Lower Reach	154.23	1440.02	1665.03	1862.69
Lower Reach	153.85	1187.43	1110	998.61
Lower Reach	153.61	1342.72	1110	910
Lower Reach	153.36	1522.36	1400.85	1430.05
Lower Reach	153.08*	1522.36	1400.85	1430.05
Lower Reach	152.81*	1522.36	1400.85	1430.05
Lower Reach	152.53	1576.77	1533.33	1581.16
Lower Reach	152.25*	1576.77	1533.33	1581.16
Lower Reach	151.98*	1576.77	1533.33	1581.16
Lower Reach	151.7	1340.35	1235	1164.92
Lower Reach	151.49	1074.69	1235.01	1212.32
Lower Reach	151.27	90	90	90
Lower Reach	151.255	Bridge		
Lower Reach	151.25	12.07	10	22.96
Lower Reach	151.24	2853.84	2485	1923.56
Lower Reach	150.78	2017.47	2485.16	3297.89
Lower Reach	150.31	881.09	1506.5	1723.2
Lower Reach	149.66*	881.09	1506.5	1723.2
Lower Reach	149	1249.78	1505.93	1342.39
Lower Reach	148.34*	1249.78	1505.93	1342.39
Lower Reach	147.68	1070.14	1752	1559.36
Lower Reach	147.34*	1070.14	1752	1559.36
Lower Reach	147.01*	1070.14	1752	1559.36
Lower Reach	146.67*	1070.14	1752	1559.36
Lower Reach	146.34*	1070.14	1752	1559.36
Lower Reach	146	2057.24	1788.32	1279.38
Lower Reach	145.67*	2076	870.68	188.51
Lower Reach	145.5	1658.45	1444.91	1082.27
Lower Reach	145.2	920.68	1243.87	995.11
Lower Reach	145	1054.14	1745.3	2394.82
Lower Reach	144.7	1041.28	836.82	499
Lower Reach	144.55	855.55	4265.19	3099.28
Lower Reach	144	1039.03	1363.41	2237.29
Lower Reach	143.5	1673.73	2335.33	3367.52
Lower Reach	143.25	1772.15	3068.24	1935.18
Lower Reach	143	889.07	960.39	837.85
Lower Reach	142.5	741.16	2145.86	2675.39
Lower Reach	142	2632.84	1550.77	1580.34
Lower Reach	141.9	2997	3385	3501.58
Lower Reach	141.5	1939.57	3724.88	726.46
Lower Reach	140.74	3623.66	4885.99	2026.76
Lower Reach	140	1951.2	1010	1431.32
Lower Reach	139.85	1378.43	1433.33	1501.58
Lower Reach	139.57*	1378.43	1433.33	1501.58
Lower Reach	139.29*	1378.43	1433.33	1501.58
Lower Reach	139.01	1872.8	1725	1469.48
Lower Reach	138.69*	1872.8	1725	1469.48
Lower Reach	138.36	1700	1725	1637.5
Lower Reach	138.04*	1700	1725	1637.5
Lower Reach	137.71	1088.69	1566	1979.92
Lower Reach	137.43*	1088.69	1566	1979.92
Lower Reach	137.14	1159.96	1152.38	1315.88
Lower Reach	136.8	6010.21	5782.22	1539.14
Lower Reach	136.2	2472.19	2469.54	881.5
Lower Reach	136	1496.01	1684.16	1239.16
Lower Reach	135.5	911.83	679.76	443.07
Lower Reach	135	1851.1	1850	1680.42
Lower Reach	134.65	439.55	1691.6	1780.35
Lower Reach	134.33*	439.55	1691.6	1780.35
Lower Reach	134.02*	439.55	1691.6	1780.35
Lower Reach	133.70*	439.55	1691.6	1780.35
Lower Reach	133.38*	439.55	1691.6	1780.35
Lower Reach	133.07*	439.55	1691.6	1780.35
Lower Reach	132.75	755.05	1535	1364.62
Lower Reach	132.46*	755.05	1535	1364.62
Lower Reach	132.18*	755.05	1535	1364.62
Lower Reach	131.89*	755.05	1535	1364.62
Lower Reach	131.6	1454.61	1509.52	1621.49
Lower Reach	131.35	2159.16	2175	2278.61
Lower Reach	130.93	2220.46	2174.42	1705.8
Lower Reach	130.51	1031.28	2400.25	3908.06
Lower Reach	129.3	1060.66	1050	1065.26
Lower Reach	129.27	704.22	1050	1152.61
Lower Reach	129.23	57.04	70	79.73
Lower Reach	129.22	79.88	70	67.66
Lower Reach	129.216	15.43	20	21.58
Lower Reach	129.215	Inl Struct		
Lower Reach	129.214	25.03	25.01	25.62
Lower Reach	129.213	25.03	25.01	25.62
Lower Reach	129.212	10.01	10.01	10.25
Lower Reach	129.211	112.99	100	95.7
Lower Reach	129.21	472.44	400	409.67
Lower Reach	129.2	1099.85	1148.64	1145.18
Lower Reach	129.03	3555.05	2827	2507.63
Lower Reach	128.5	1964.77	1391	1506.6
Lower Reach	128.23*	1964.77	1391	1506.6
Lower Reach	127.97*	1964.77	1391	1506.6
Lower Reach	127.7	1186.43	1486	1991.76
Lower Reach	127.4	1737.71	1757.01	769.76
Lower Reach	127.05*	1737.71	1757.01	769.76
Lower Reach	126.7	587.49	1806.25	1797.03

Lower Reach	126.35*	587.49	1806.25	1797.03
Lower Reach	126.00*	587.49	1806.25	1797.03
Lower Reach	125.65*	587.49	1806.25	1797.03
Lower Reach	125.3	2076.9	1775	1633.38
Lower Reach	125	941.35	1489.33	1466.35
Lower Reach	124.80*	941.35	1489.33	1466.35
Lower Reach	124.60*	941.35	1489.33	1466.35
Lower Reach	124.4	1288.43	1489.08	953.22
Lower Reach	124.20*	1288.43	1489.08	953.22
Lower Reach	124.00*	1288.43	1489.08	953.22
Lower Reach	123.8	1216.82	1719	1770.81
Lower Reach	123.48*	1216.82	1719	1770.81
Lower Reach	123.15	1667.19	1702.07	1720.26
Lower Reach	122.83*	1667.19	1702.07	1720.26
Lower Reach	122.5	1373.09	1755.19	2222.98
Lower Reach	121.98*	1373.09	1755.19	2222.98
Lower Reach	121.46	1874.31	1742.61	1664.76
Lower Reach	121.13*	1874.31	1742.61	1664.76
Lower Reach	120.8	249.26	264.4	279.46
Lower Reach	120.7	517.73	423.08	373.07
Lower Reach	120.62	119.42	110	109.64
Lower Reach	120.605	Bridge		
Lower Reach	120.59	604.8	598	590.27
Lower Reach	120.5	318.1	268.58	237.07
Lower Reach	120.4	1776.6	1865.74	1849.12
Lower Reach	120.39*	1776.6	1865.74	1849.12
Lower Reach	120.38	821.82	1653.32	845.1
Lower Reach	120.07*	821.82	1653.32	845.1
Lower Reach	119.75*	821.82	1653.32	845.1
Lower Reach	119.44*	821.82	1653.32	845.1
Lower Reach	119.12*	821.82	1653.32	845.1
Lower Reach	118.81	1046.54	1661.33	748.7
Lower Reach	118.50*	1046.54	1661.33	748.7
Lower Reach	118.18*	1046.54	1661.33	748.7
Lower Reach	117.87	2169.02	1775	1720.13
Lower Reach	117.54*	2169.02	1775	1720.13
Lower Reach	117.2	2233.4	2575	2667.55
Lower Reach	116.5	2319.56	2249.67	2048.62
Lower Reach	116.1	1908.51	1935	1844.83
Lower Reach	115.7	1409.57	1801.21	1569.56
Lower Reach	115.45*	1409.57	1801.21	1569.56
Lower Reach	115.2	375.54	332.57	344.1
Lower Reach	115	1929.76	1810	1594.01
Lower Reach	114.8	731.82	720	723.47
Lower Reach	114.65	1166.91	1551.67	1518.74
Lower Reach	114.47*	1166.91	1551.67	1518.74
Lower Reach	114.28*	1166.91	1551.67	1518.74
Lower Reach	114.1	1686.3	1916.67	202.14
Lower Reach	113.73*	1686.3	1916.67	202.14
Lower Reach	113.37*	1686.3	1916.67	202.14
Lower Reach	113	1041.61	1416.67	323.99
Lower Reach	112.73*	1041.61	1416.67	323.99
Lower Reach	112.47*	1041.61	1416.67	323.99
Lower Reach	112.2	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Rio Grande

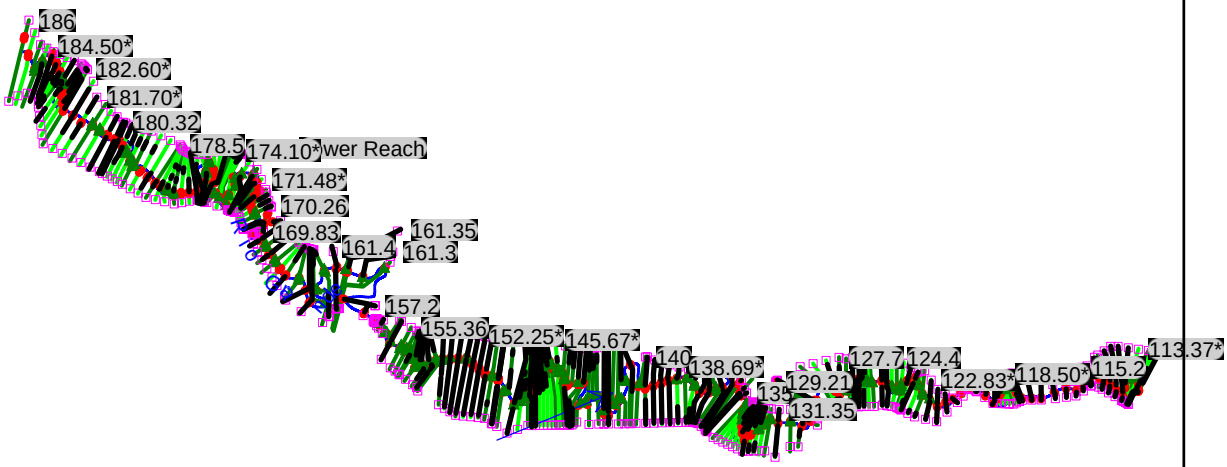
Reach	River Sta.	Contr.	Expan.
Lower Reach	186	.1	.3
Lower Reach	185.50*	.1	.3
Lower Reach	185	.1	.3
Lower Reach	184.50*	.1	.3
Lower Reach	184	.1	.3
Lower Reach	183.80*	.1	.3
Lower Reach	183.60*	.1	.3
Lower Reach	183.40*	.1	.3
Lower Reach	183.2	.1	.3
Lower Reach	183.00*	.1	.3
Lower Reach	182.80*	.1	.3
Lower Reach	182.60*	.1	.3
Lower Reach	182.4	.1	.3
Lower Reach	182.05*	.1	.3
Lower Reach	181.70*	.1	.3
Lower Reach	181.35	.1	.3
Lower Reach	181.01*	.1	.3
Lower Reach	180.66*	.1	.3
Lower Reach	180.32	.1	.3
Lower Reach	180.3	.1	.3
Lower Reach	180.08*	.1	.3
Lower Reach	179.85*	.1	.3
Lower Reach	179.63*	.1	.3
Lower Reach	179.4	.1	.3
Lower Reach	179.10*	.1	.3
Lower Reach	178.80*	.1	.3
Lower Reach	178.5	.1	.3
Lower Reach	178.23*	.1	.3
Lower Reach	177.97*	.1	.3
Lower Reach	177.7	.1	.3
Lower Reach	177.40*	.1	.3
Lower Reach	177.10*	.1	.3
Lower Reach	176.8	.1	.3
Lower Reach	176.40*	.1	.3
Lower Reach	176.00*	.1	.3
Lower Reach	175.6	.1	.3
Lower Reach	175.27*	.1	.3
Lower Reach	174.93*	.1	.3
Lower Reach	174.6	.1	.3
Lower Reach	174.2	.1	.3
Lower Reach	174.10*	.1	.3
Lower Reach	174	.1	.3
Lower Reach	173.33*	.1	.3
Lower Reach	172.67*	.1	.3
Lower Reach	172	.1	.3
Lower Reach	171.90*	.1	.3
Lower Reach	171.8	.1	.3
Lower Reach	171.48*	.1	.3

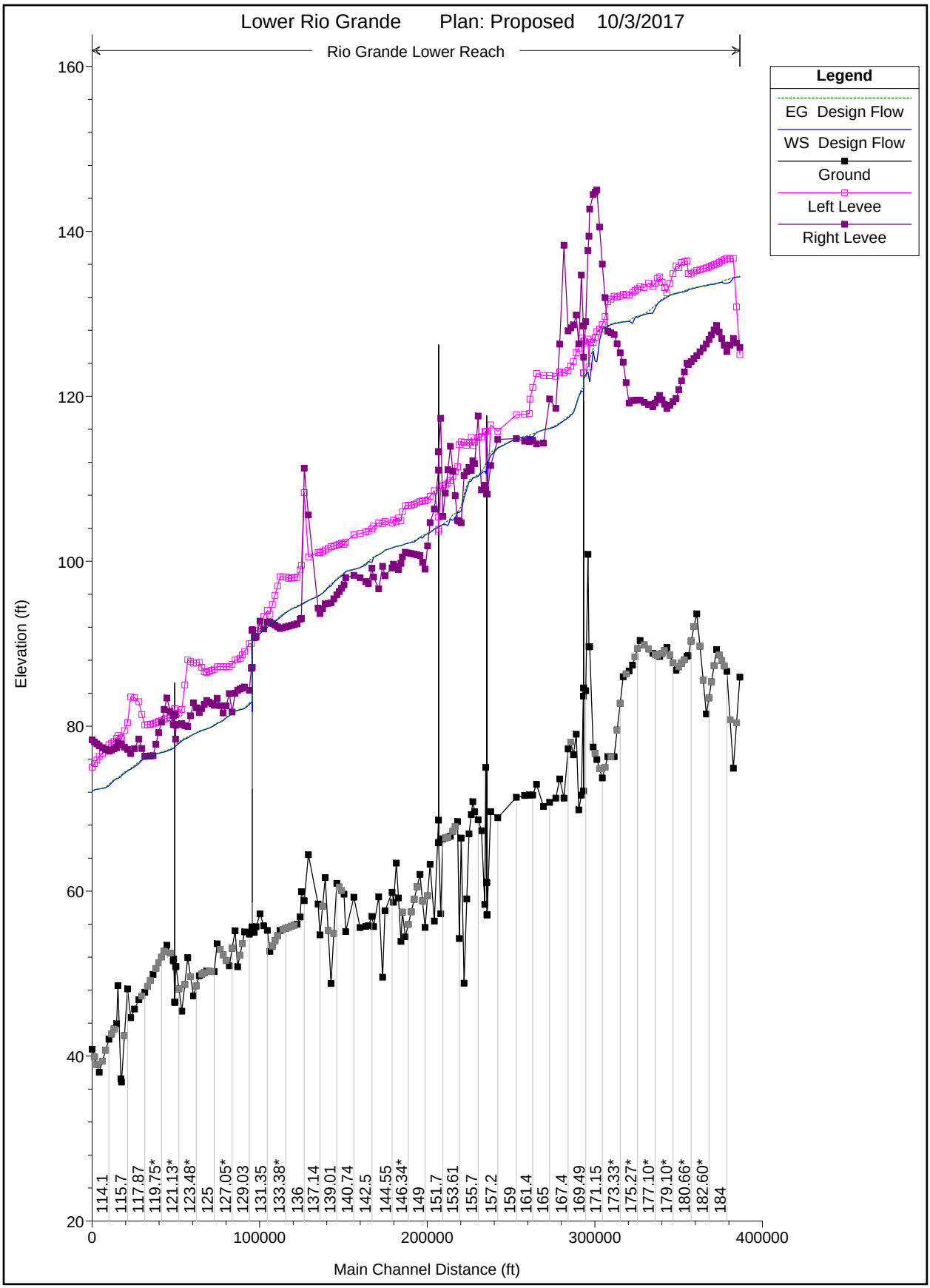
Lower Reach	171.15		.1	.3
Lower Reach	170.83*		.1	.3
Lower Reach	170.5		.1	.3
Lower Reach	170.38*		.1	.3
Lower Reach	170.26		.1	.3
Lower Reach	170.02		.1	.3
Lower Reach	169.9		.1	.3
Lower Reach	169.83		.1	.3
Lower Reach	169.49		.1	.3
Lower Reach	169.14		.2	.5
Lower Reach	169.13	Inl Struct		
Lower Reach	169.12		.2	.5
Lower Reach	169.1		.1	.3
Lower Reach	168.85		.1	.3
Lower Reach	168.58		.1	.3
Lower Reach	168.3		.1	.3
Lower Reach	168		.1	.3
Lower Reach	167.70*		.1	.3
Lower Reach	167.4		.1	.3
Lower Reach	167		.1	.3
Lower Reach	166.6		.1	.3
Lower Reach	166		.1	.3
Lower Reach	165		.1	.3
Lower Reach	163		.1	.3
Lower Reach	162.1		.1	.3
Lower Reach	161.4		.1	.3
Lower Reach	161.35		.1	.3
Lower Reach	161.3		.1	.3
Lower Reach	160		.1	.3
Lower Reach	159		.1	.3
Lower Reach	157.2		.1	.3
Lower Reach	157.15		.1	.3
Lower Reach	156.93		.2	.5
Lower Reach	156.915	Bridge		
Lower Reach	156.9		.2	.5
Lower Reach	156.87		.2	.5
Lower Reach	156.855	Bridge		
Lower Reach	156.84		.2	.5
Lower Reach	156.7		.1	.3
Lower Reach	156.6		.1	.3
Lower Reach	156.15		.1	.3
Lower Reach	155.7		.1	.3
Lower Reach	155.36		.1	.3
Lower Reach	155.2		.1	.3
Lower Reach	155.01		.1	.3
Lower Reach	154.81		.1	.3
Lower Reach	154.6		.1	.3
Lower Reach	154.23		.1	.3
Lower Reach	153.85		.1	.3
Lower Reach	153.61		.1	.3
Lower Reach	153.36		.1	.3
Lower Reach	153.08*		.1	.3
Lower Reach	152.81*		.1	.3
Lower Reach	152.53		.1	.3
Lower Reach	152.25*		.1	.3
Lower Reach	151.98*		.1	.3
Lower Reach	151.7		.1	.3
Lower Reach	151.49		.1	.3
Lower Reach	151.27		.2	.5
Lower Reach	151.255	Bridge		
Lower Reach	151.25		.2	.5
Lower Reach	151.24		.1	.3
Lower Reach	150.78		.1	.3
Lower Reach	150.31		.1	.3
Lower Reach	149.66*		.1	.3
Lower Reach	149		.1	.3
Lower Reach	148.34*		.1	.3
Lower Reach	147.68		.1	.3
Lower Reach	147.34*		.1	.3
Lower Reach	147.01*		.1	.3
Lower Reach	146.67*		.1	.3
Lower Reach	146.34*		.1	.3
Lower Reach	146		.1	.3
Lower Reach	145.67*		.1	.3
Lower Reach	145.5		.1	.3
Lower Reach	145.2		.1	.3
Lower Reach	145		.1	.3
Lower Reach	144.7		.1	.3
Lower Reach	144.55		.1	.3
Lower Reach	144		.1	.3
Lower Reach	143.5		.1	.3
Lower Reach	143.25		.1	.3
Lower Reach	143		.1	.3
Lower Reach	142.5		.1	.3
Lower Reach	142		.1	.3
Lower Reach	141.9		.1	.3
Lower Reach	141.5		.1	.3
Lower Reach	140.74		.1	.3
Lower Reach	140		.1	.3
Lower Reach	139.85		.1	.3
Lower Reach	139.57*		.1	.3
Lower Reach	139.29*		.1	.3
Lower Reach	139.01		.1	.3
Lower Reach	138.69*		.1	.3
Lower Reach	138.36		.1	.3
Lower Reach	138.04*		.1	.3
Lower Reach	137.71		.1	.3
Lower Reach	137.43*		.1	.3
Lower Reach	137.14		.1	.3
Lower Reach	136.8		.1	.3
Lower Reach	136.2		.1	.3
Lower Reach	136		.1	.3
Lower Reach	135.5		.1	.3
Lower Reach	135		.1	.3
Lower Reach	134.65		.1	.3
Lower Reach	134.33*		.1	.3
Lower Reach	134.02*		.1	.3
Lower Reach	133.70*		.1	.3
Lower Reach	133.38*		.1	.3
Lower Reach	133.07*		.1	.3
Lower Reach	132.75		.1	.3
Lower Reach	132.46*		.1	.3

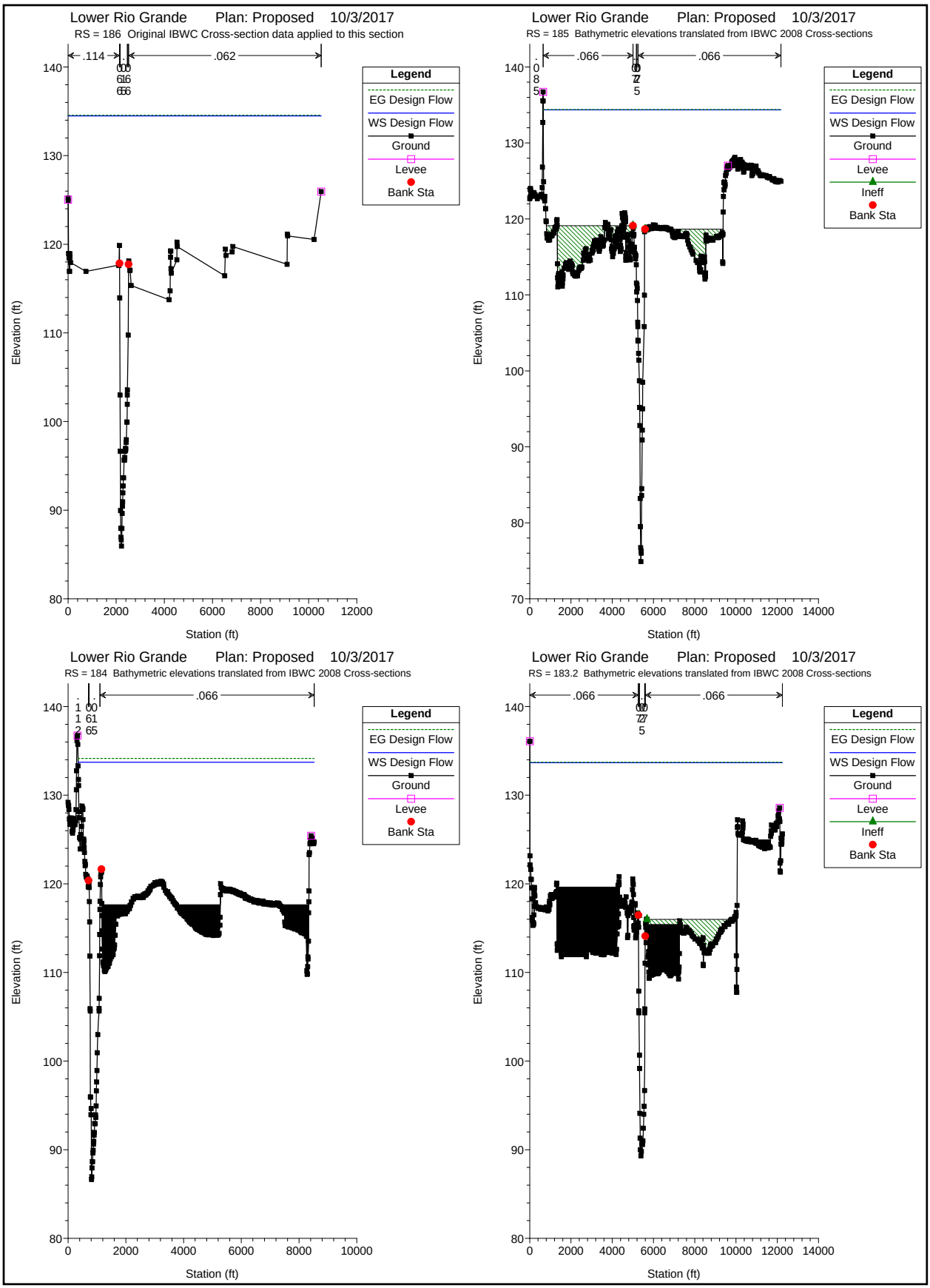
Lower Reach	132.18*	.1	.3
Lower Reach	131.89*	.1	.3
Lower Reach	131.6	.1	.3
Lower Reach	131.35	.1	.3
Lower Reach	130.93	.1	.3
Lower Reach	130.51	.1	.3
Lower Reach	129.3	.1	.3
Lower Reach	129.27	.1	.3
Lower Reach	129.23	.1	.3
Lower Reach	129.22	.1	.3
Lower Reach	129.216	.2	.5
Lower Reach	129.215	Inl Struct	
Lower Reach	129.214	.2	.5
Lower Reach	129.213	.2	.5
Lower Reach	129.212	.2	.5
Lower Reach	129.211	.2	.5
Lower Reach	129.21	.2	.5
Lower Reach	129.2	.1	.3
Lower Reach	129.03	.1	.3
Lower Reach	128.5	.1	.3
Lower Reach	128.23*	.1	.3
Lower Reach	127.97*	.1	.3
Lower Reach	127.7	.1	.3
Lower Reach	127.4	.1	.3
Lower Reach	127.05*	.1	.3
Lower Reach	126.7	.1	.3
Lower Reach	126.35*	.1	.3
Lower Reach	126.00*	.1	.3
Lower Reach	125.65*	.1	.3
Lower Reach	125.3	.1	.3
Lower Reach	125	.1	.3
Lower Reach	124.80*	.1	.3
Lower Reach	124.60*	.1	.3
Lower Reach	124.4	.1	.3
Lower Reach	124.20*	.1	.3
Lower Reach	124.00*	.1	.3
Lower Reach	123.8	.1	.3
Lower Reach	123.48*	.1	.3
Lower Reach	123.15	.1	.3
Lower Reach	122.83*	.1	.3
Lower Reach	122.5	.1	.3
Lower Reach	121.98*	.1	.3
Lower Reach	121.46	.1	.3
Lower Reach	121.13*	.1	.3
Lower Reach	120.8	.1	.3
Lower Reach	120.7	.1	.3
Lower Reach	120.62	.2	.5
Lower Reach	120.605	Bridge	
Lower Reach	120.59	.2	.5
Lower Reach	120.5	.1	.3
Lower Reach	120.4	.1	.3
Lower Reach	120.39*	.1	.3
Lower Reach	120.38	.1	.3
Lower Reach	120.07*	.1	.3
Lower Reach	119.75*	.1	.3
Lower Reach	119.44*	.1	.3
Lower Reach	119.12*	.1	.3
Lower Reach	118.81	.1	.3
Lower Reach	118.50*	.1	.3
Lower Reach	118.18*	.1	.3
Lower Reach	117.87	.1	.3
Lower Reach	117.54*	.1	.3
Lower Reach	117.2	.1	.3
Lower Reach	116.5	.1	.3
Lower Reach	116.1	.1	.3
Lower Reach	115.7	.1	.3
Lower Reach	115.45*	.1	.3
Lower Reach	115.2	.1	.3
Lower Reach	115	.1	.3
Lower Reach	114.8	.1	.3
Lower Reach	114.65	.1	.3
Lower Reach	114.47*	.1	.3
Lower Reach	114.28*	.1	.3
Lower Reach	114.1	.1	.3
Lower Reach	113.73*	.1	.3
Lower Reach	113.37*	.1	.3
Lower Reach	113	.1	.3
Lower Reach	112.73*	.1	.3
Lower Reach	112.47*	.1	.3
Lower Reach	112.2	.1	.3

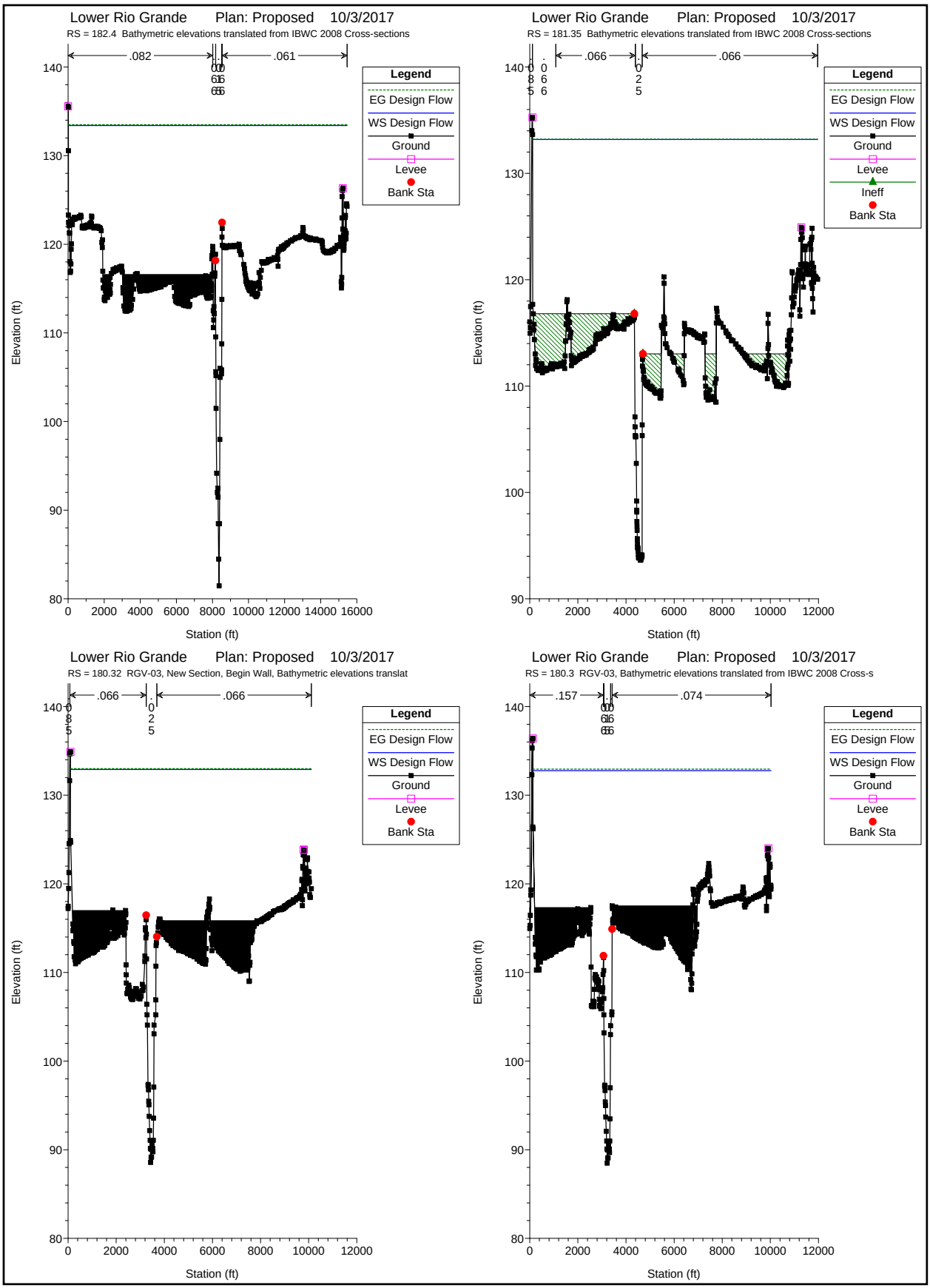
- **Penitas to Hidalgo-Cameron County Line Proposed HEC-RAS Model**

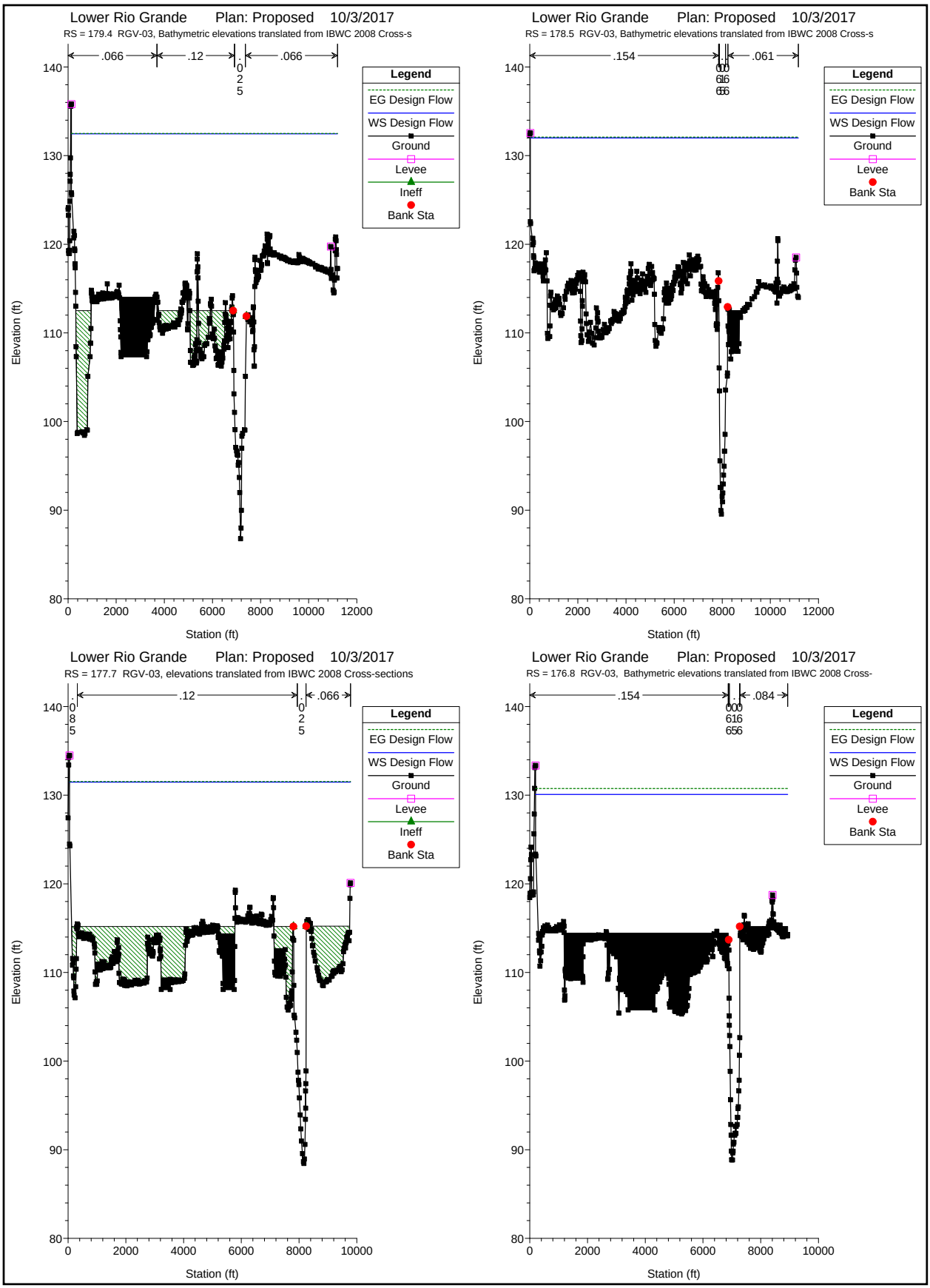
Proposed Condition

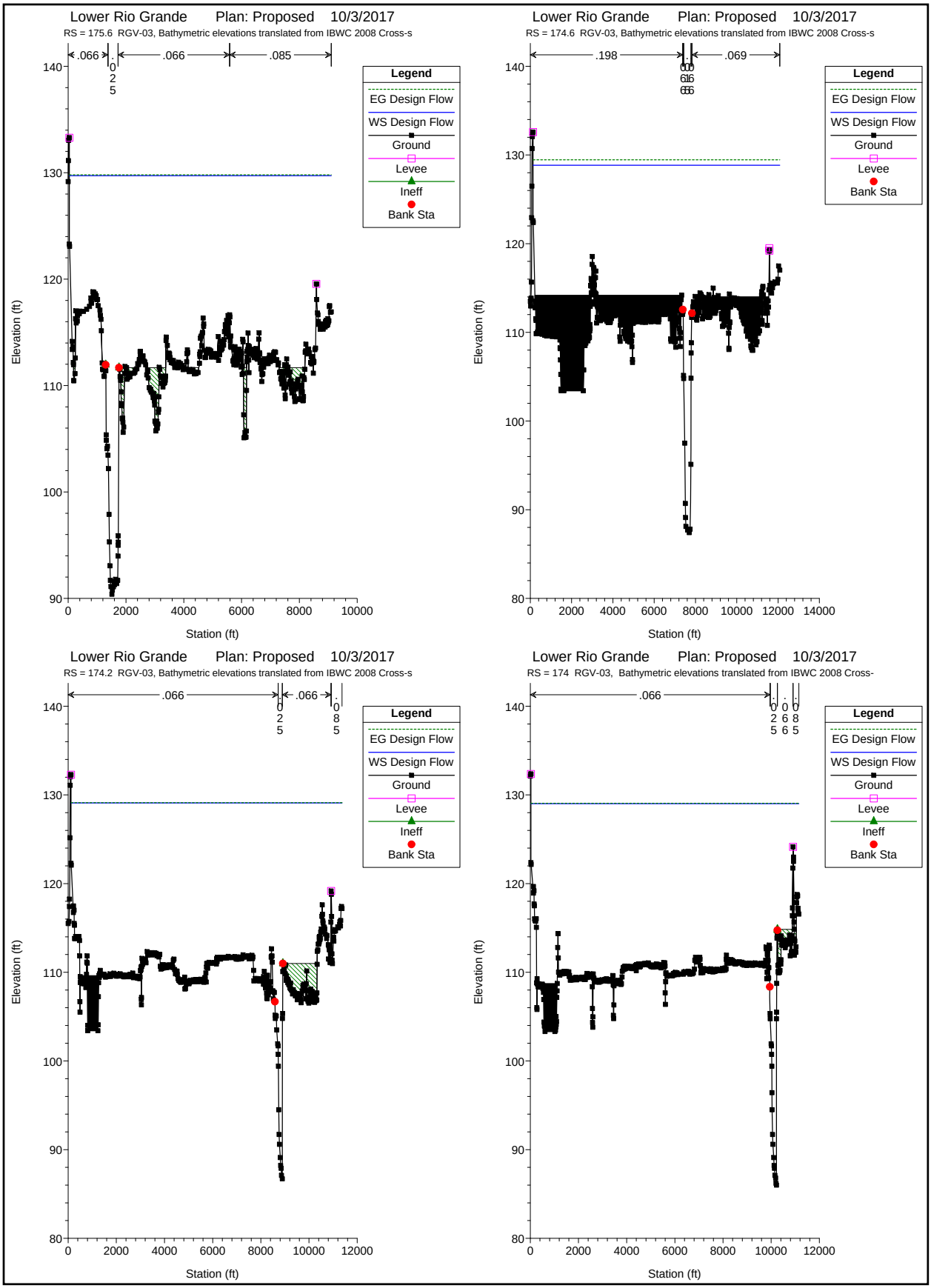


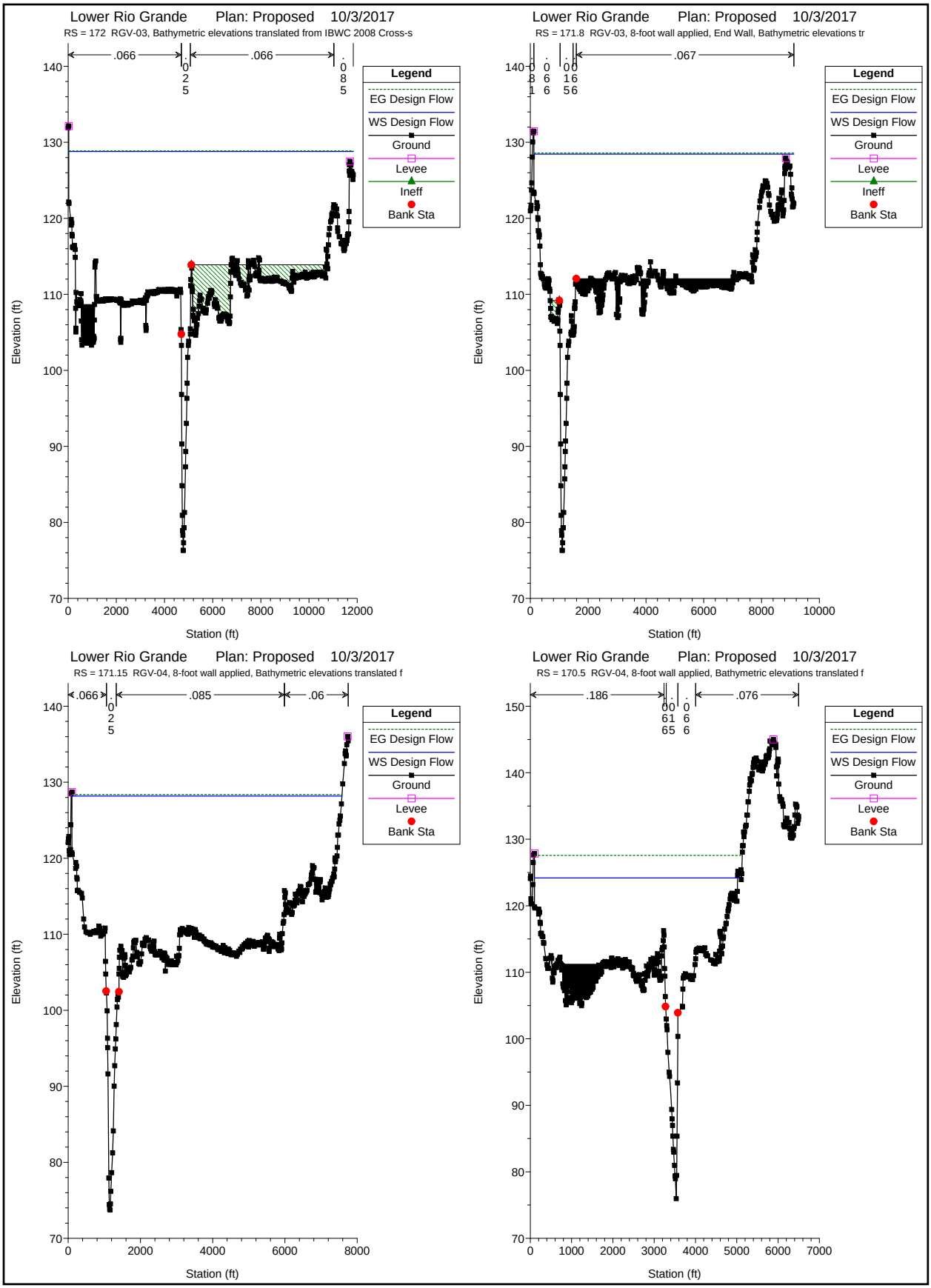

Lower Rio Grande Plan: Proposed 10/3/2017
Rio Grande Lower Reach
Legend
EG Design Flow
WS Design Flow
Ground
Left Levee
Right Levee
Elevation (ft)
Main Channel Distance (ft)
160
140
120
100
80
60
40
20
0
100000
200000
300000
400000
114.1
115.7
117.87
119.75*
121.13*
123.48*
125
127.05*
129.03
131.35
133.38*
136
137.14
139.01
140.74
142.5
144.55
146.34*
149
151.7
153.61
155.7
157.2
159
161.4
165
167.4
169.49
171.15
173.33*
175.27*
177.10*
179.10*
180.66*
182.60*
184

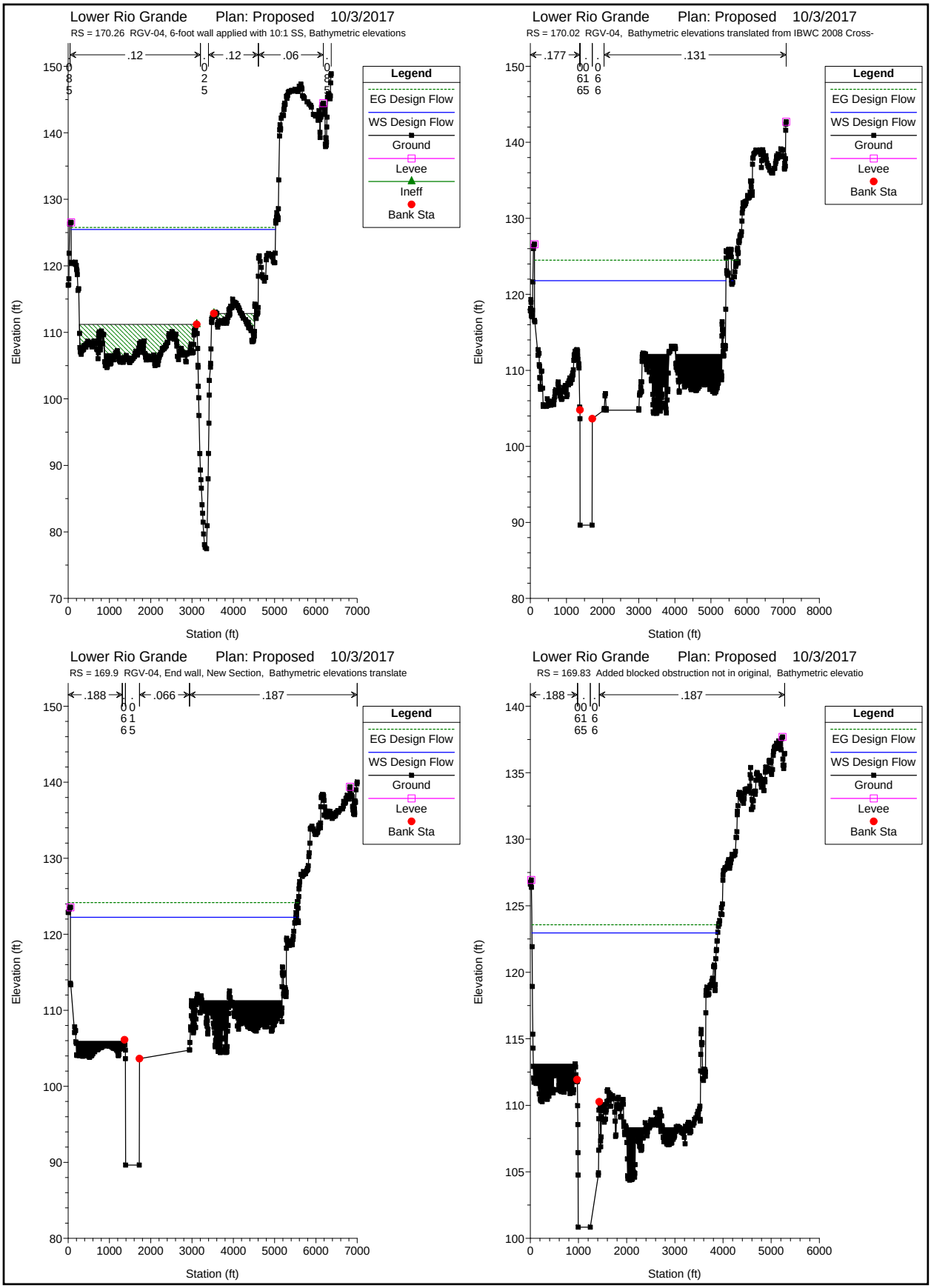

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 186 Original IBWC Cross-section data applied to this section
.114
.062
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 185 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 184 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 183.2 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

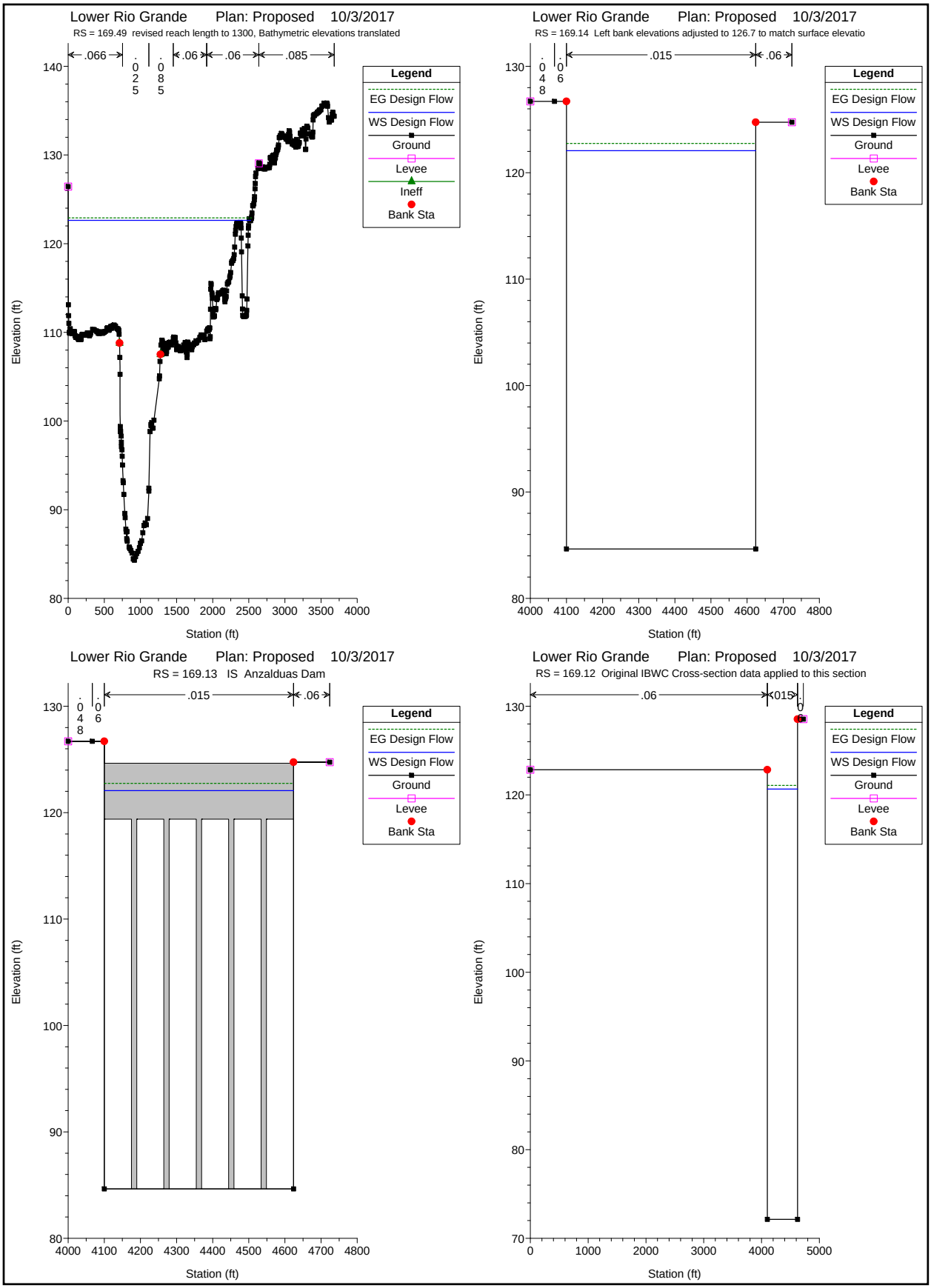

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 182.4 Bathymetric elevations translated from IBWC 2008 Cross-sections
.082
.061
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 181.35 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 180.32 RGV-03, New Section, Begin Wall, Bathymetric elevations translat
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 180.3 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.157
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

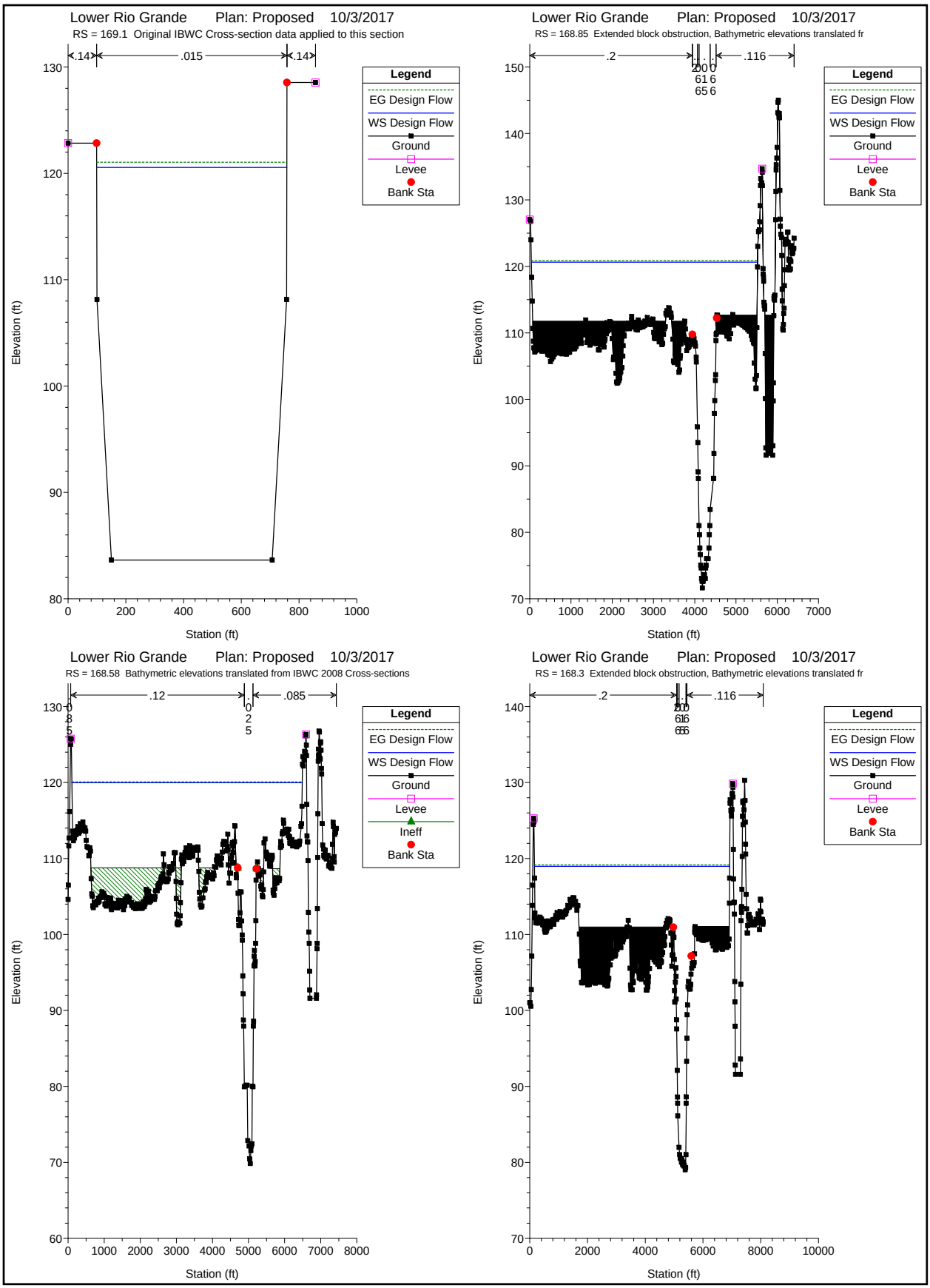

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 179.4 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.12
.025
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 178.5 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.154
.061
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 177.7 RGV-03, elevations translated from IBWC 2008 Cross-sections
.085
.12
.025
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 176.8 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-
.154
.084
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

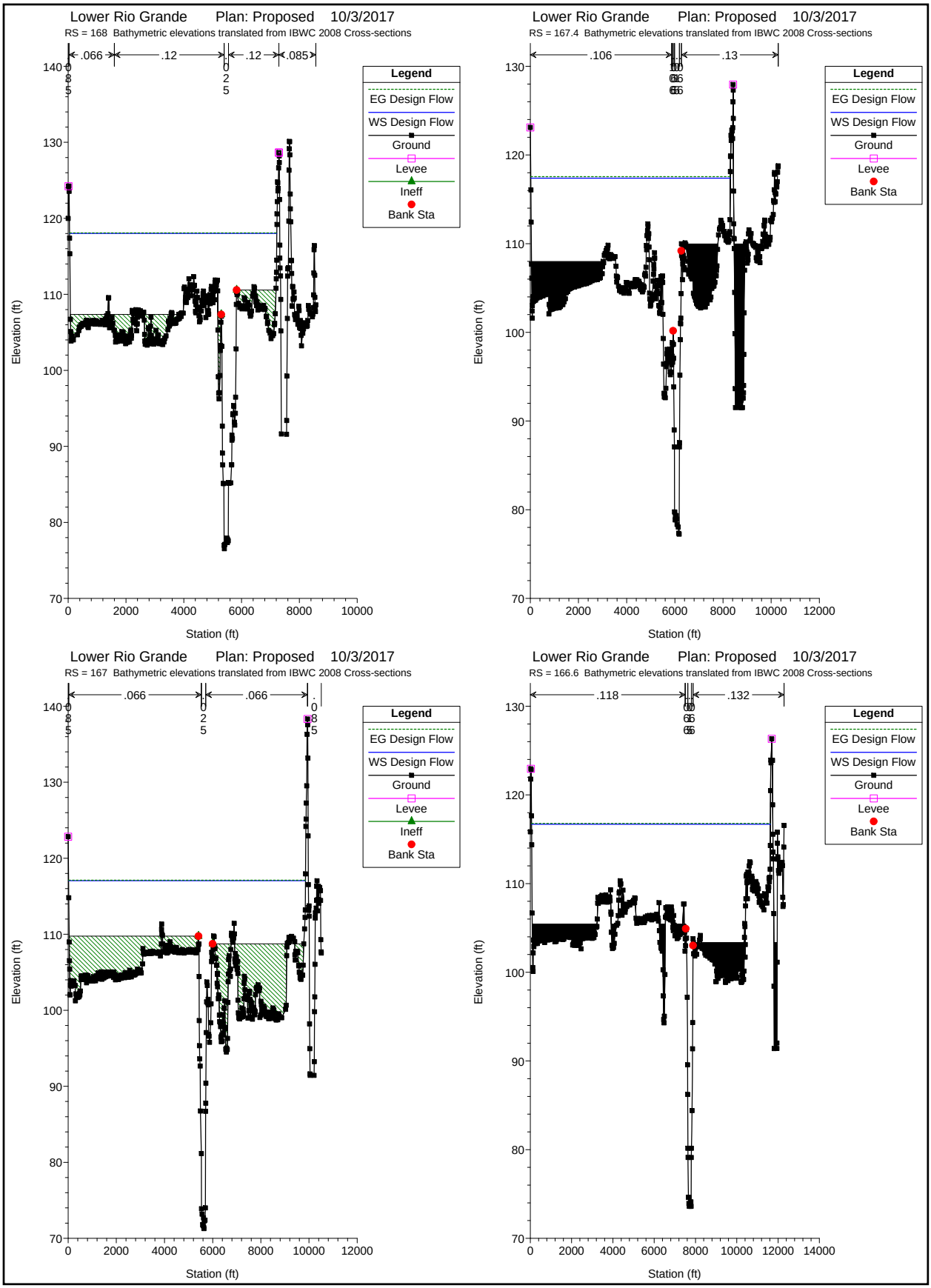

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 175.6 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.025
.066
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 174.6 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.198
.069
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 174.2 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.025
.066
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 174 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-
.066
.025
.066
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

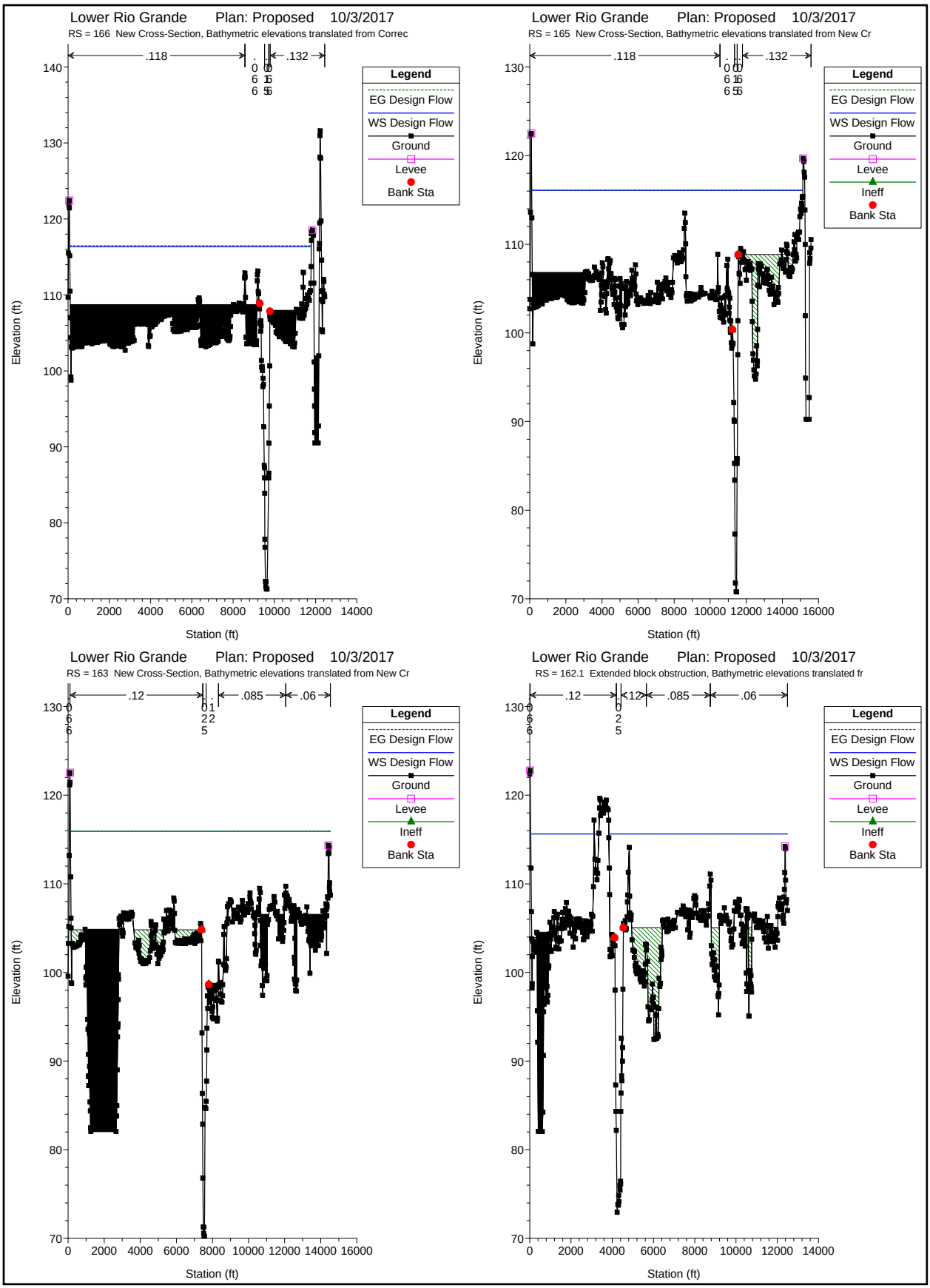

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 172 RGV-03, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 171.8 RGV-03, 8-foot wall applied, End Wall, Bathymetric elevations tr
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 171.15 RGV-04, 8-foot wall applied, Bathymetric elevations translated f
.066
.085
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 170.5 RGV-04, 8-foot wall applied, Bathymetric elevations translated f
.186
.076
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

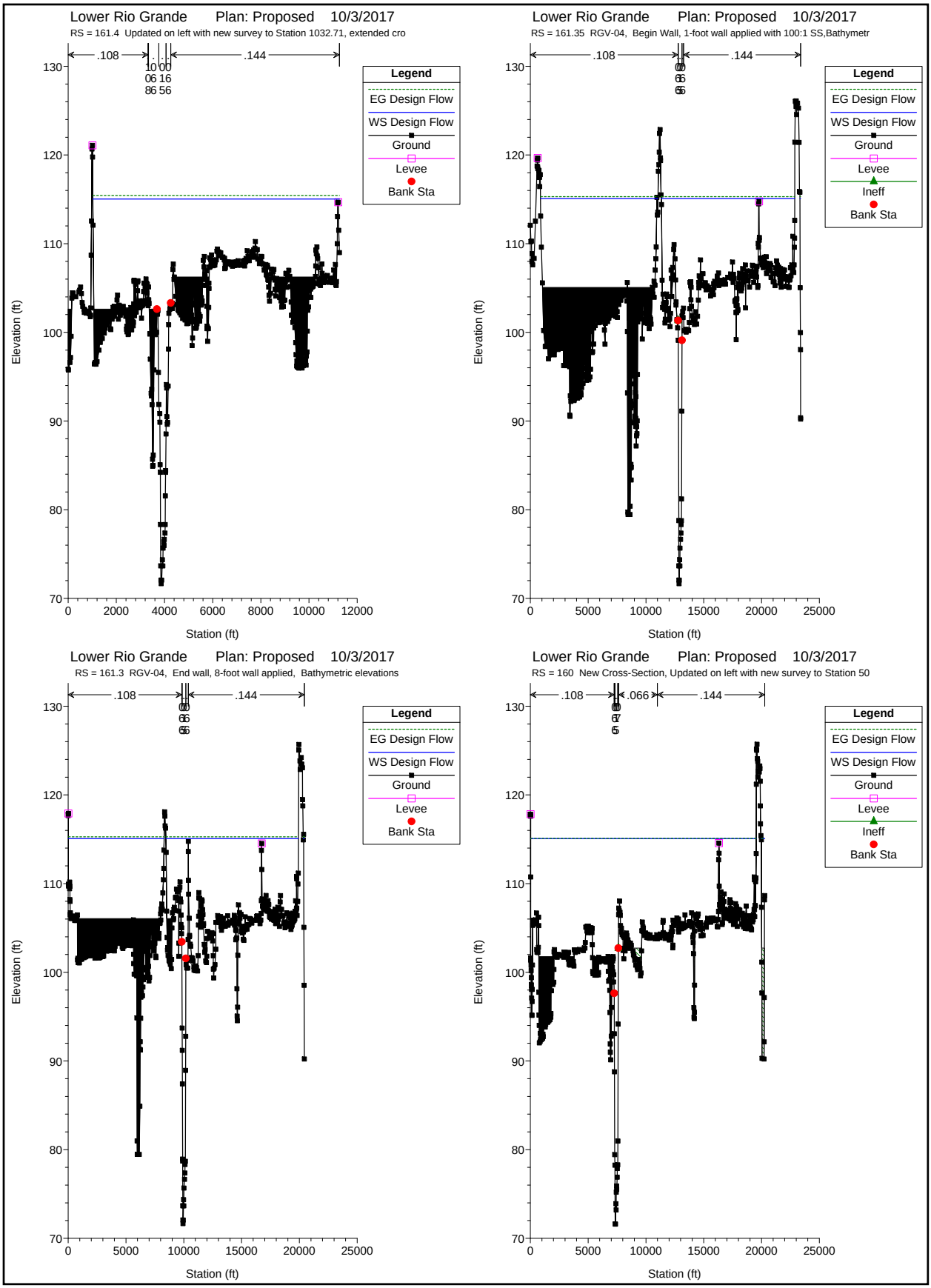

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 170.26 RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations
.12
.12
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 170.02 RGV-04, Bathymetric elevations translated from IBWC 2008 Cross-
.177
.131
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 169.9 RGV-04, End wall, New Section, Bathymetric elevations translate
.188
.066
.187
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 169.83 Added blocked obstruction not in original, Bathymetric elevatio
.188
.187
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

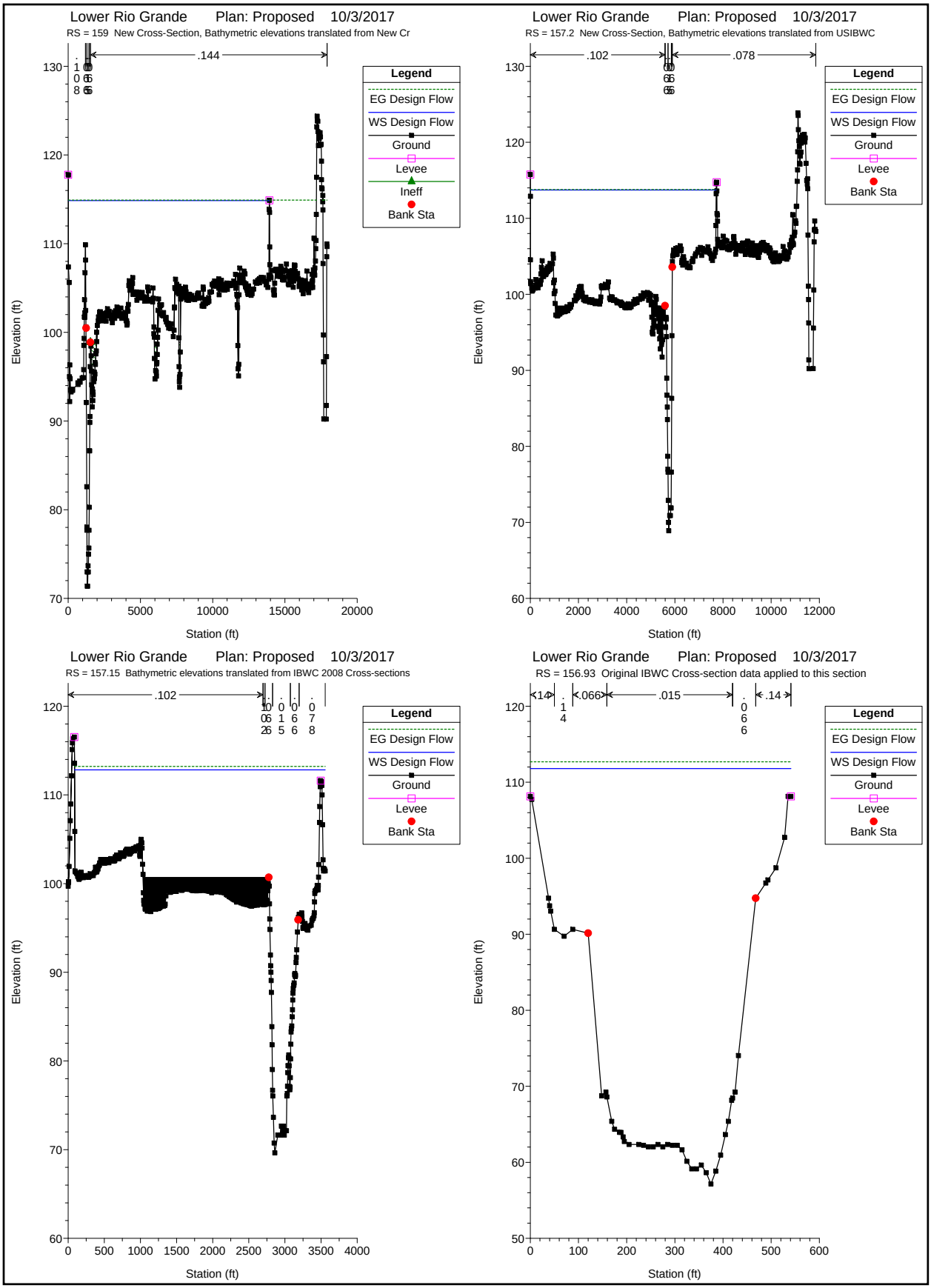

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 169.49 revised reach length to 1300, Bathymetric elevations translated
.066
.025
.085
.06
.06
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 169.14 Left bank elevations adjusted to 126.7 to match surface elevatio
.048
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 169.13 IS Anzalduas Dam
.048
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 169.12 Original IBWC Cross-section data applied to this section
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

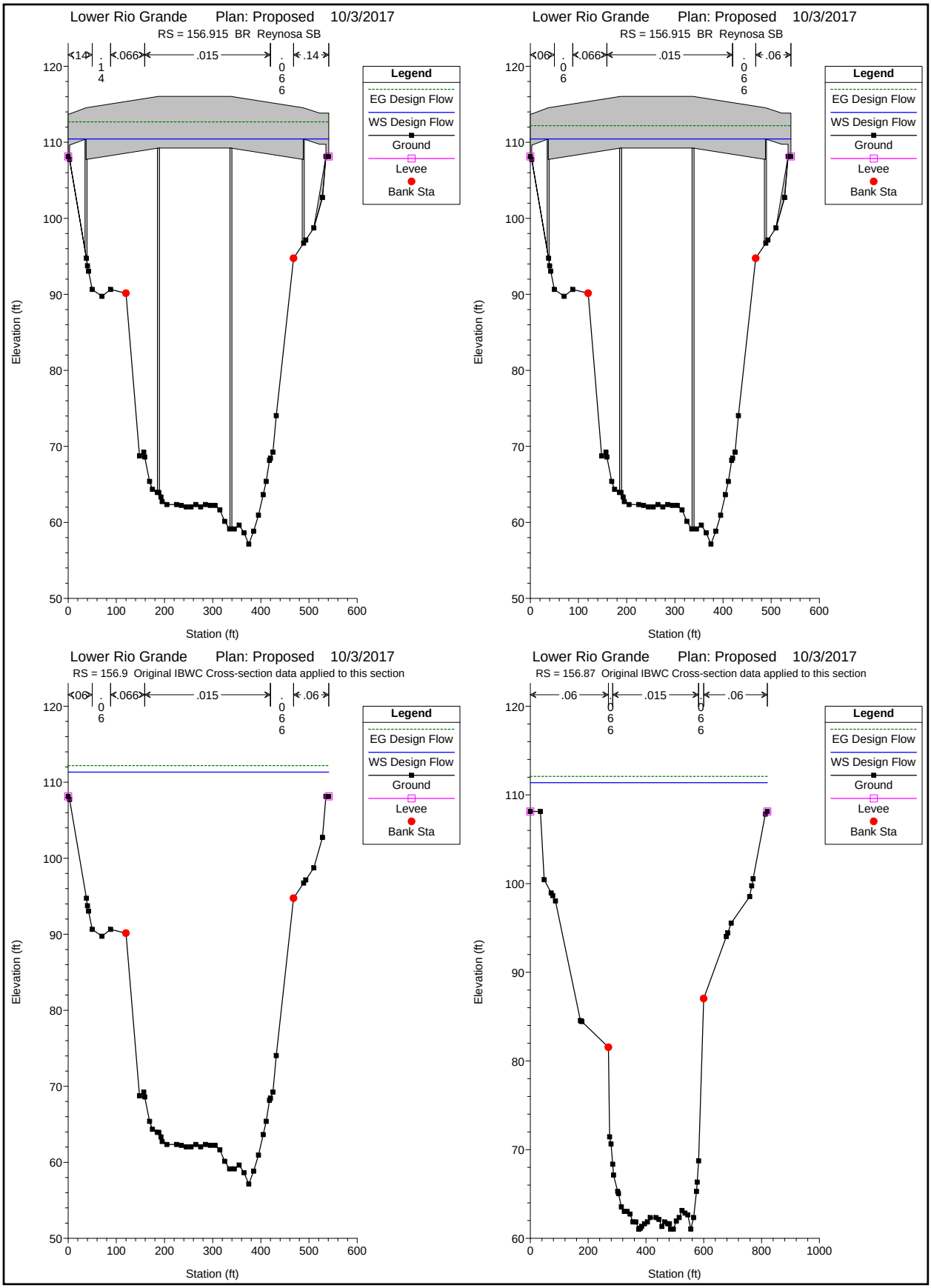

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 169.1 Original IBWC Cross-section data applied to this section
.14
.015
.14
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 168.85 Extended block obstruction, Bathymetric elevations translated fr
.2
.116
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 168.58 Bathymetric elevations translated from IBWC 2008 Cross-sections
.12
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 168.3 Extended block obstruction, Bathymetric elevations translated fr
.2
.116
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

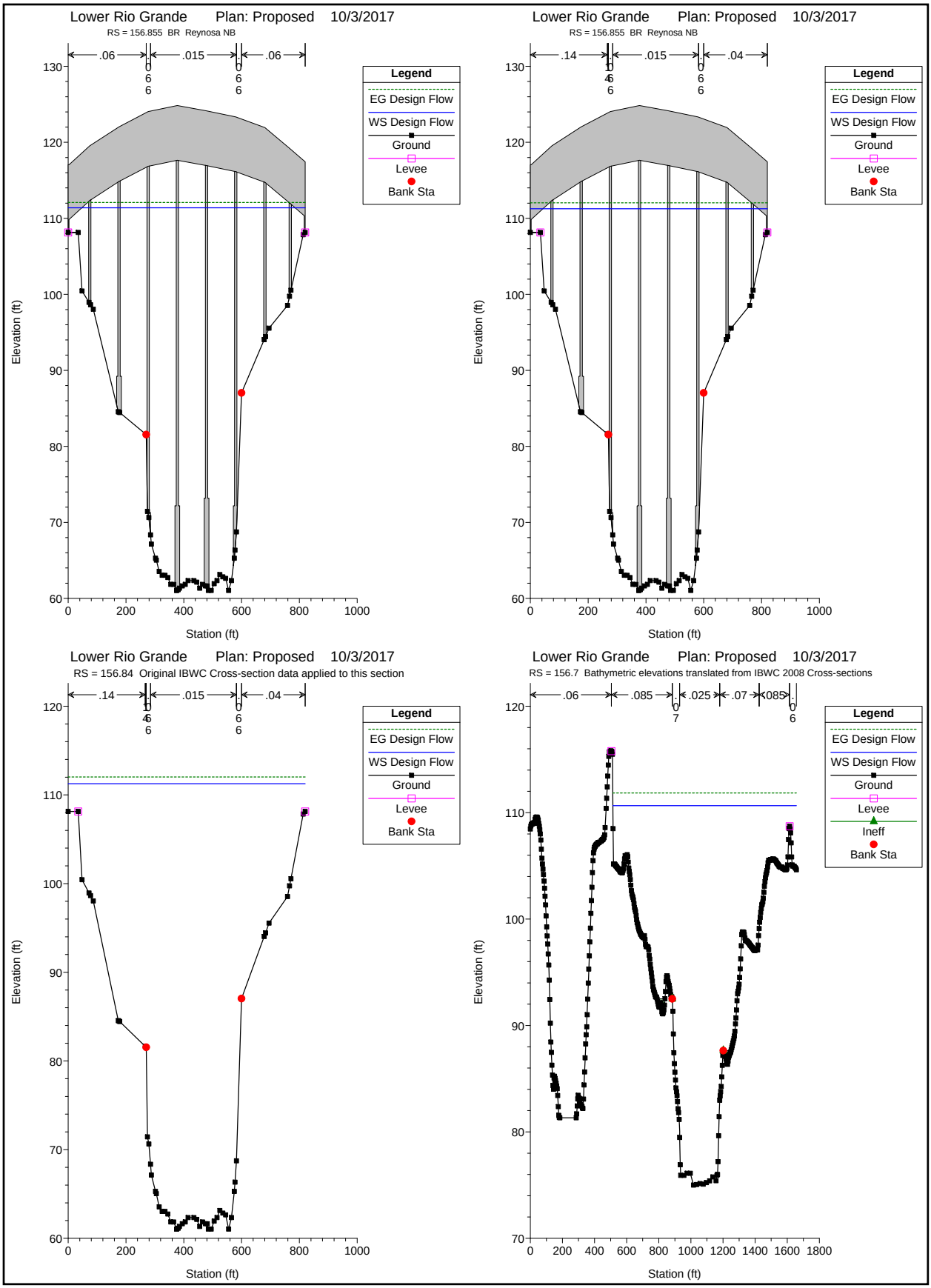

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 168 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.12
.12
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 167.4 Bathymetric elevations translated from IBWC 2008 Cross-sections
.106
.13
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 167 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 166.6 Bathymetric elevations translated from IBWC 2008 Cross-sections
.118
.132
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

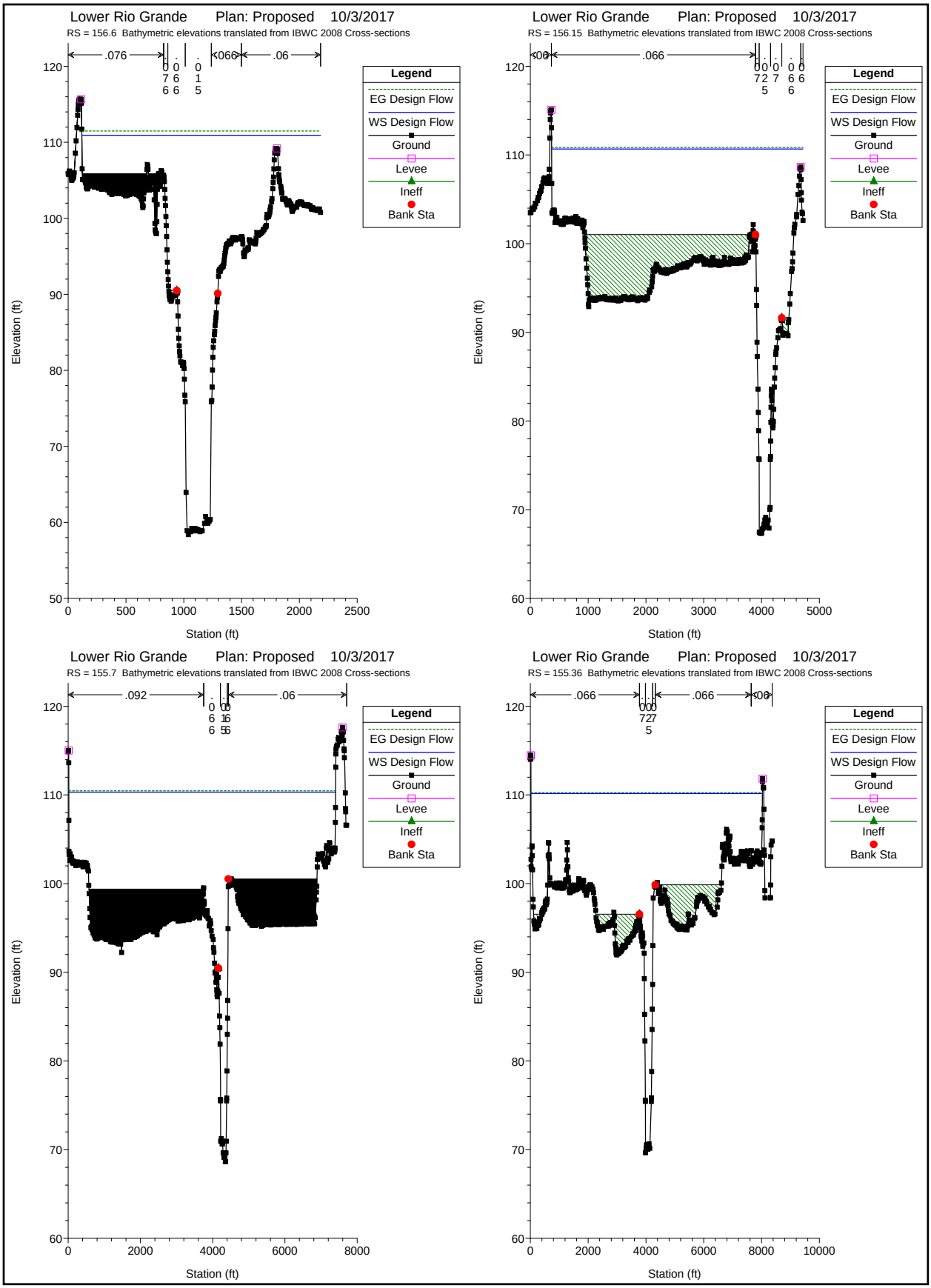

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 166 New Cross-Section, Bathymetric elevations translated from Correc
.118
.132
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 165 New Cross-Section, Bathymetric elevations translated from New Cr
.118
.132
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 163 New Cross-Section, Bathymetric elevations translated from New Cr
.12
.085
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 162.1 Extended block obstruction, Bathymetric elevations translated fr
.12
.12
.085
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

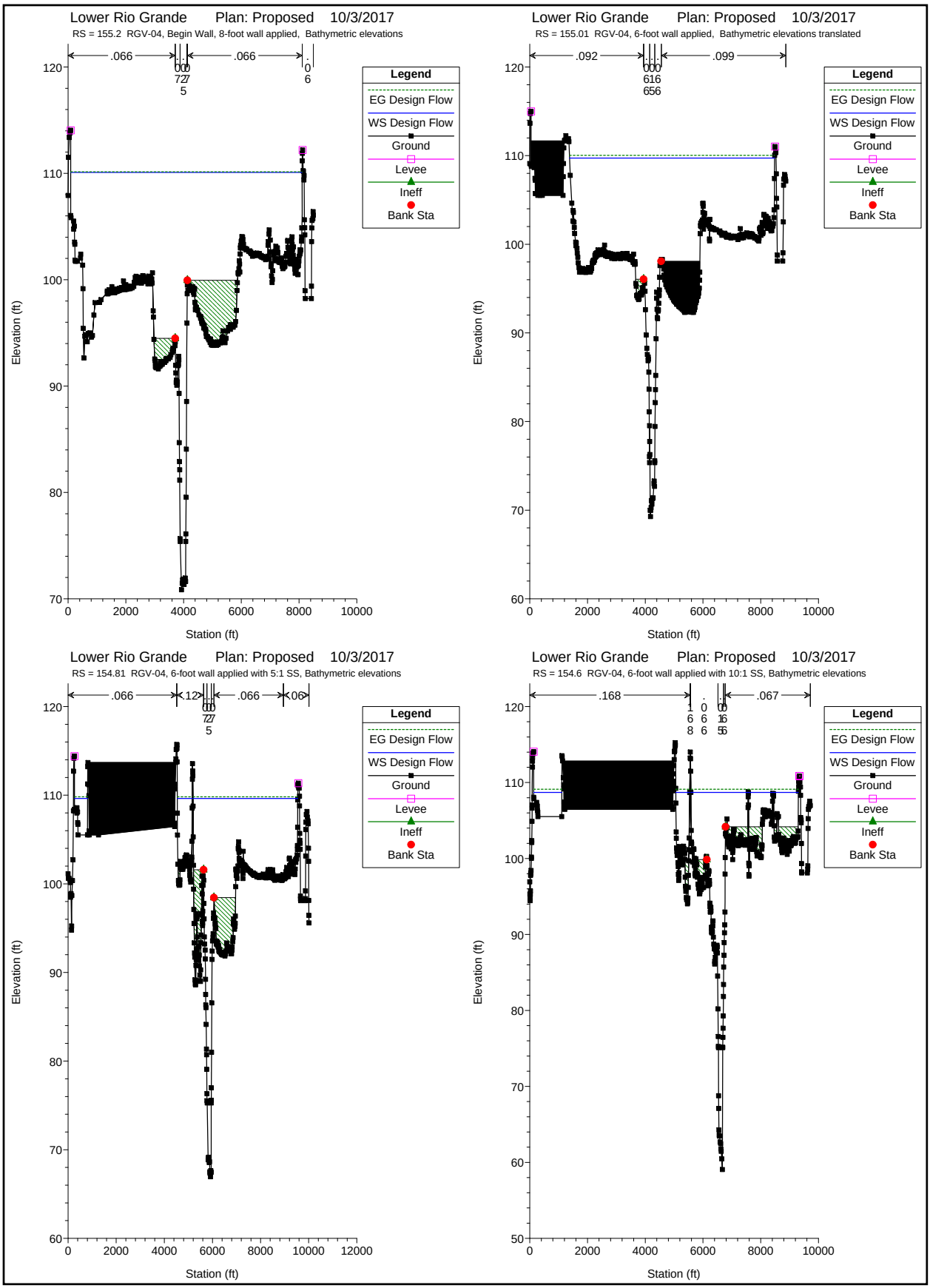

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 161.4 Updated on left with new survey to Station 1032.71, extended cro
.108
.144
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 161.35 RGV-04, Begin Wall, 1-foot wall applied with 100:1 SS,Bathymetr
.108
.144
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 161.3 RGV-04, End wall, 8-foot wall applied, Bathymetric elevations
.108
.144
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 160 New Cross-Section, Updated on left with new survey to Station 50
.108
.066
.144
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

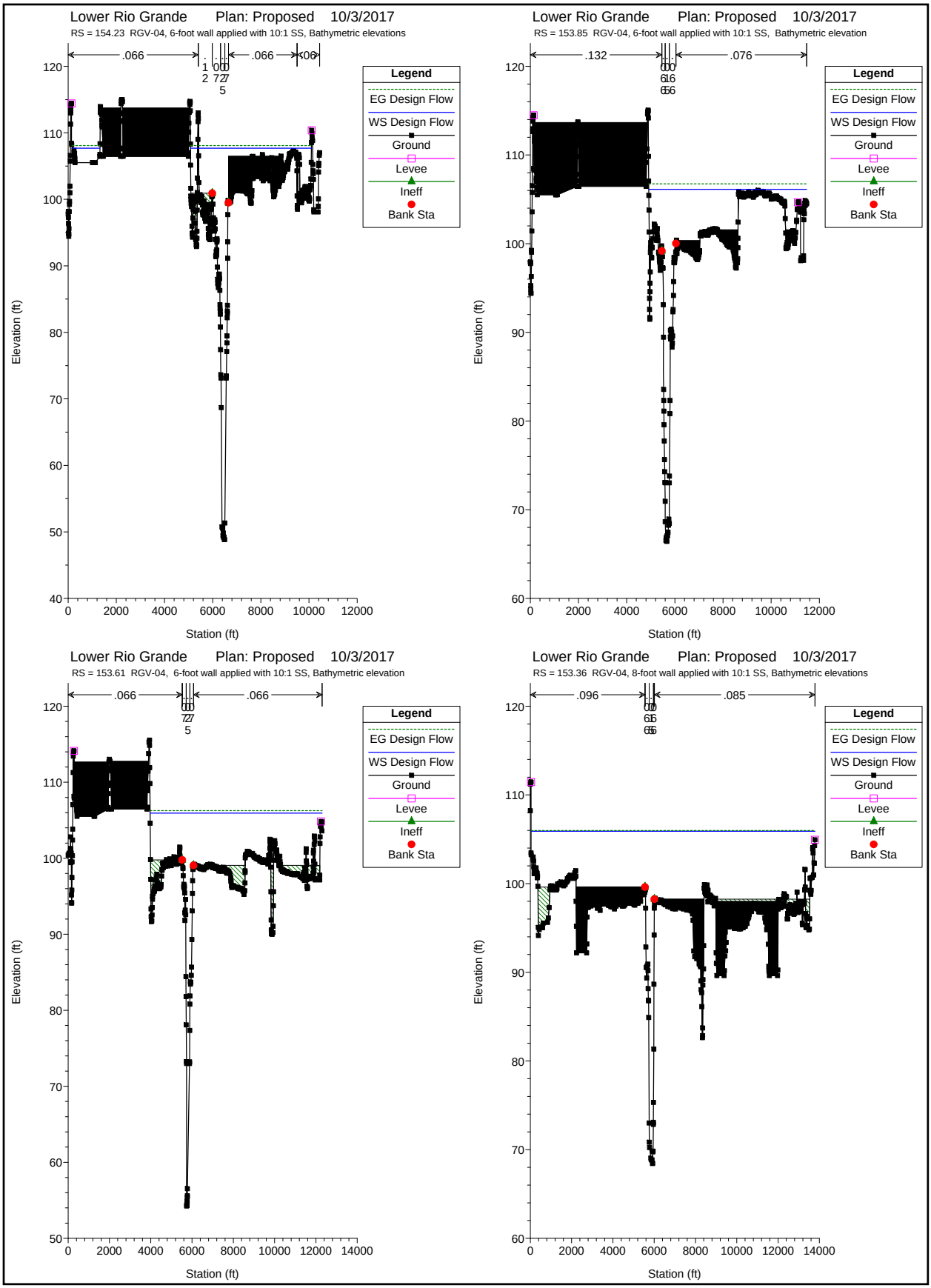

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 159 New Cross-Section, Bathymetric elevations translated from New Cr
.144
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 157.2 New Cross-Section, Bathymetric elevations translated from USIBWC
.102
.078
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 157.15 Bathymetric elevations translated from IBWC 2008 Cross-sections
.102
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.93 Original IBWC Cross-section data applied to this section
.14
.066
.015
.14
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

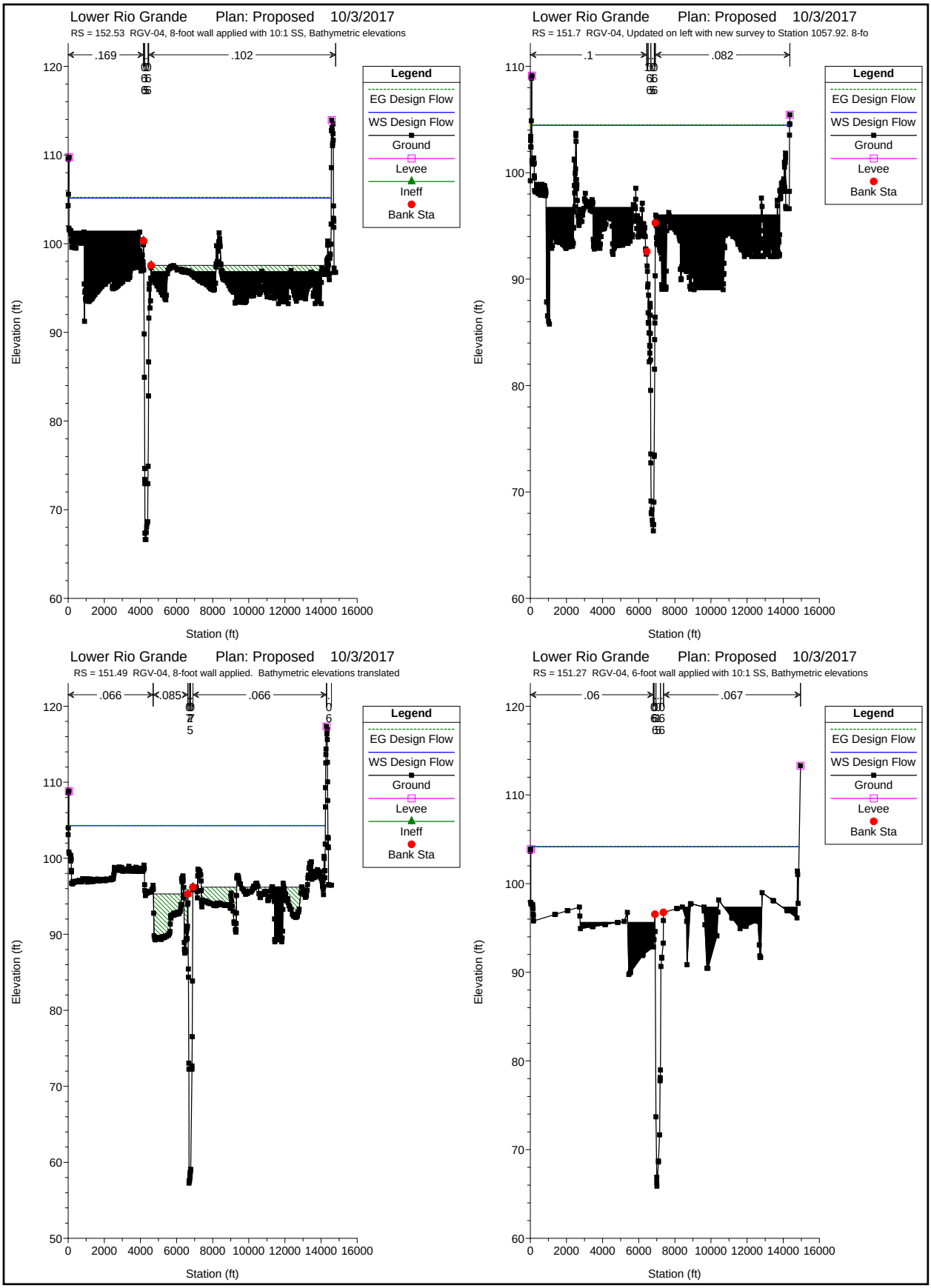

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.915 BR Reynosa SB
.14
.066
.015
.06
.14
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.915 BR Reynosa SB
.06
.066
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.9 Original IBWC Cross-section data applied to this section
.06
.066
.015
.06
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.87 Original IBWC Cross-section data applied to this section
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

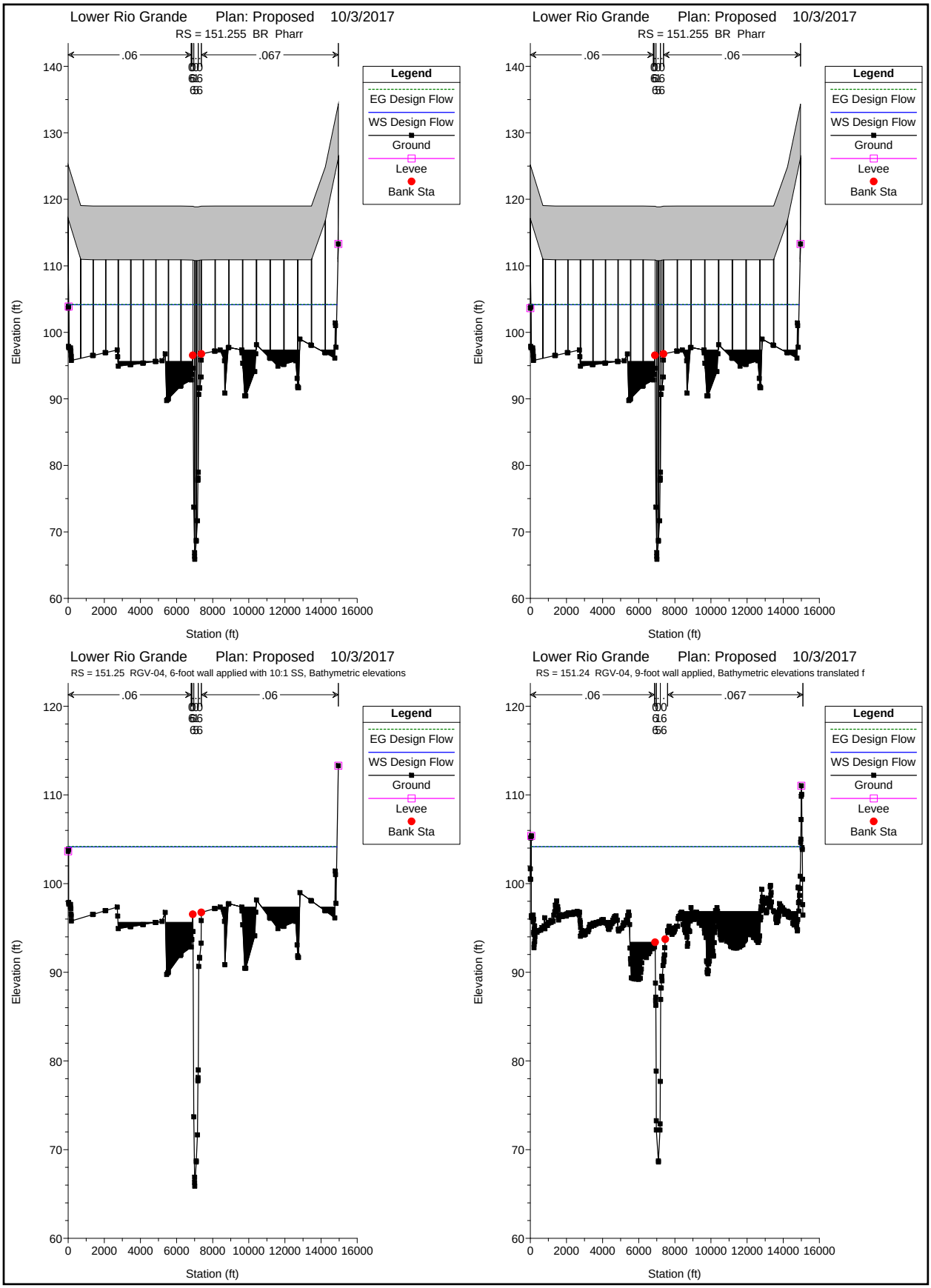

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.855 BR Reynosa NB
.06
.015
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.855 BR Reynosa NB
.14
.015
.04
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.84 Original IBWC Cross-section data applied to this section
.14
.015
.04
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.7 Bathymetric elevations translated from IBWC 2008 Cross-sections
.06
.085
.025
.07
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

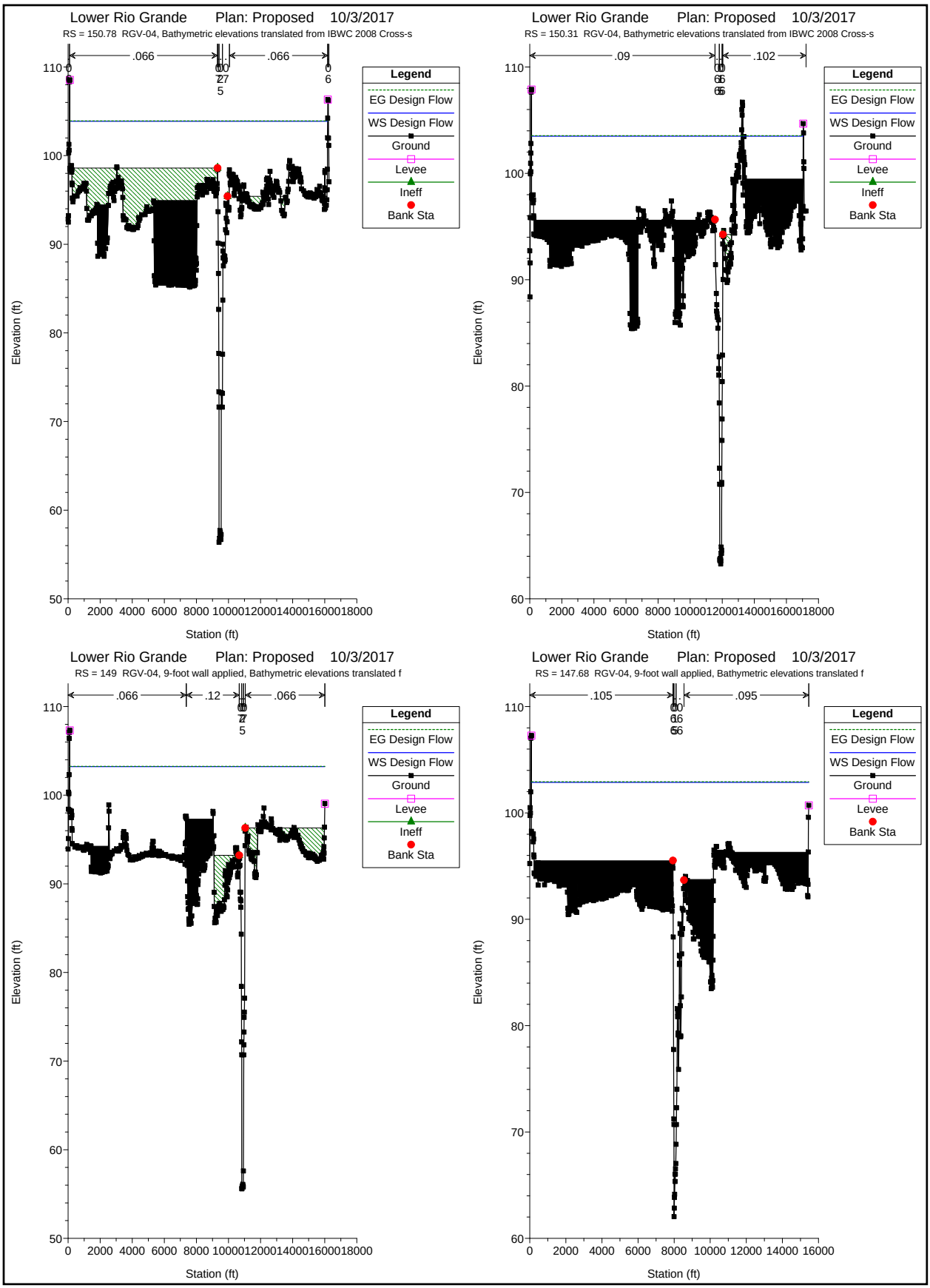

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.6 Bathymetric elevations translated from IBWC 2008 Cross-sections
.076
.066
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 156.15 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 155.7 Bathymetric elevations translated from IBWC 2008 Cross-sections
.092
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 155.36 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

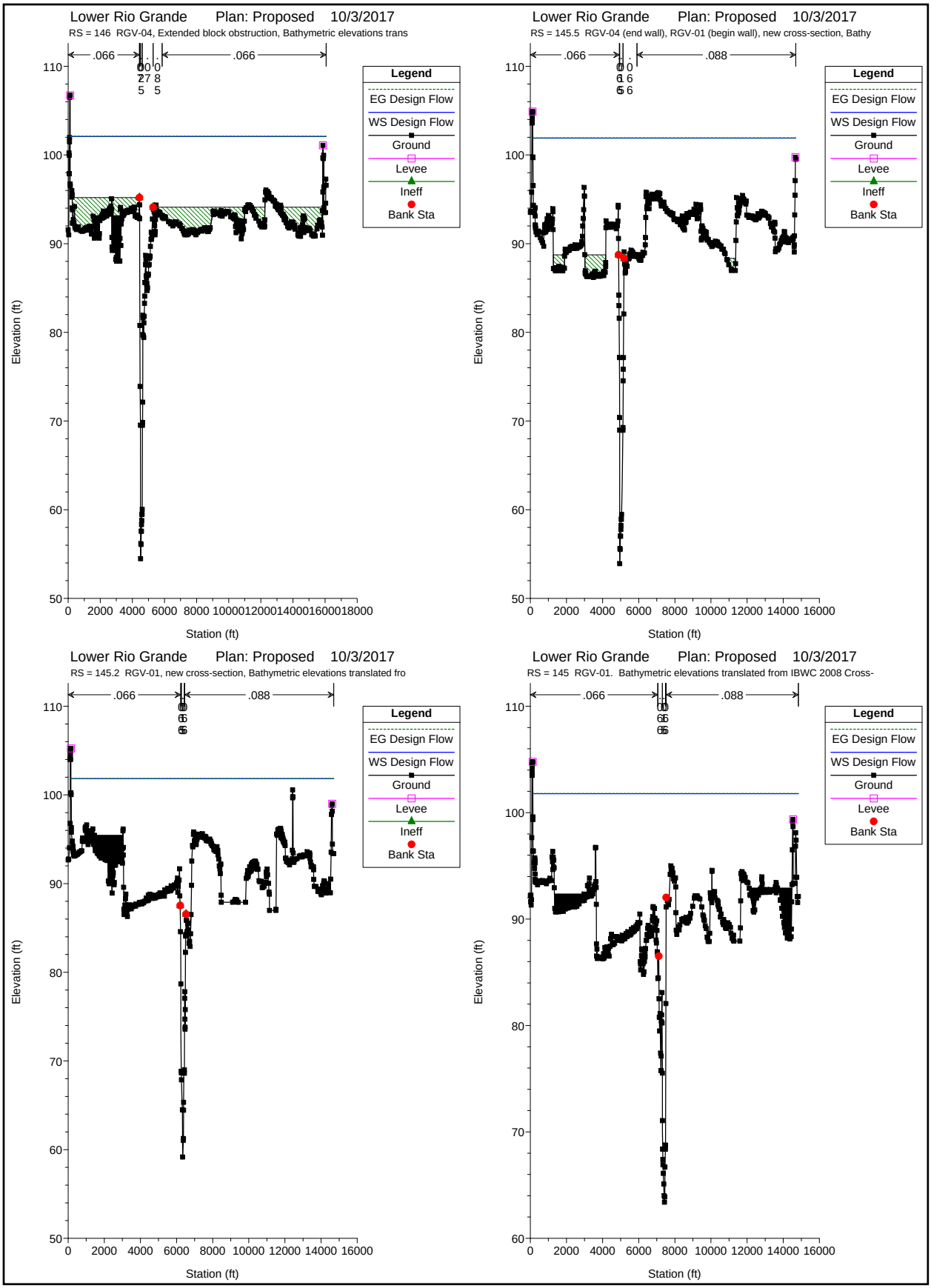

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 155.2 RGV-04, Begin Wall, 8-foot wall applied, Bathymetric elevations
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 155.01 RGV-04, 6-foot wall applied, Bathymetric elevations translated
.092
.099
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 154.81 RGV-04, 6-foot wall applied with 5:1 SS, Bathymetric elevations
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 154.6 RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations
.168
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

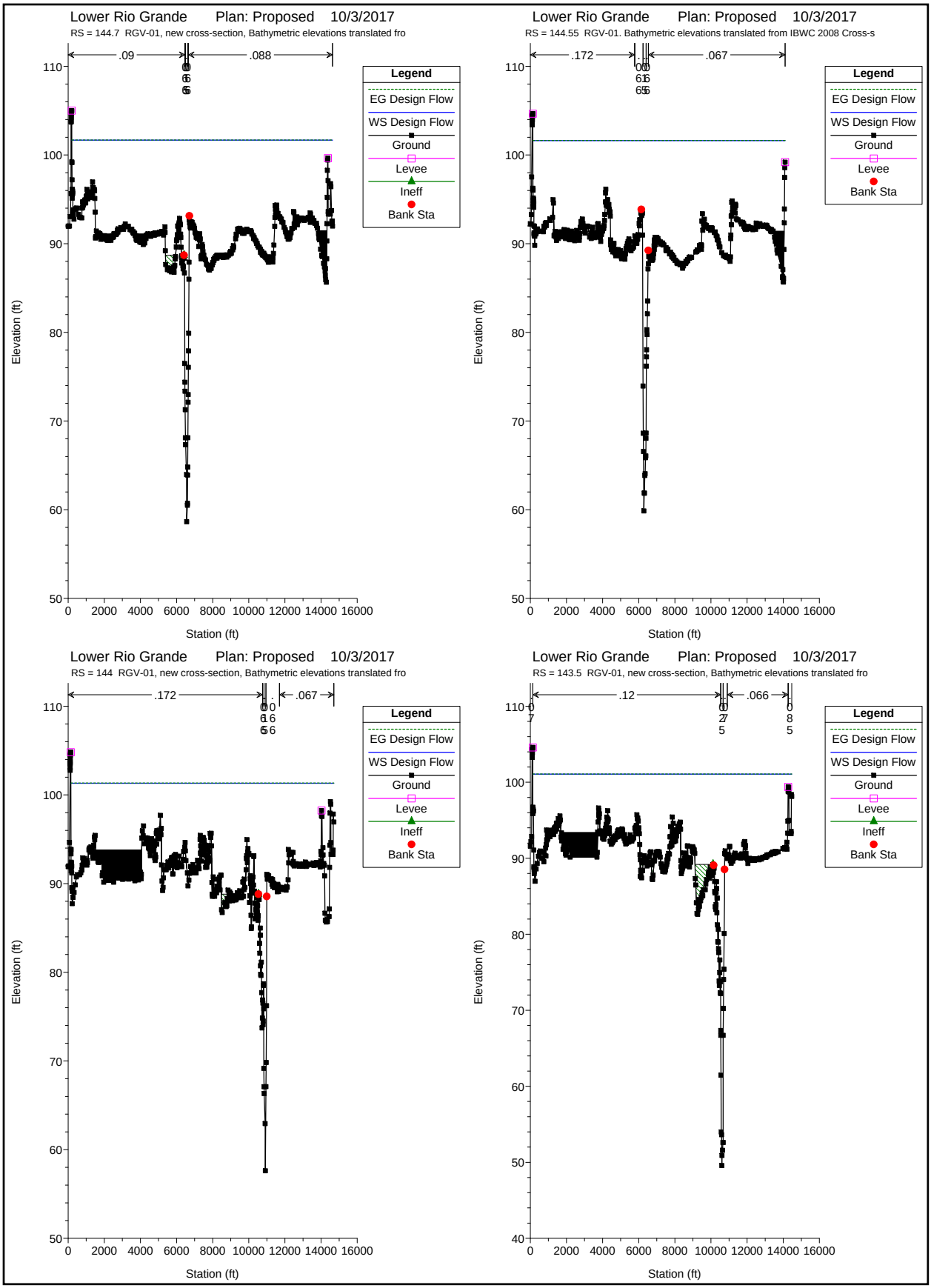

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 154.23 RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 153.85 RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevation
.132
.076
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 153.61 RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevation
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 153.36 RGV-04, 8-foot wall applied with 10:1 SS, Bathymetric elevations
.096
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

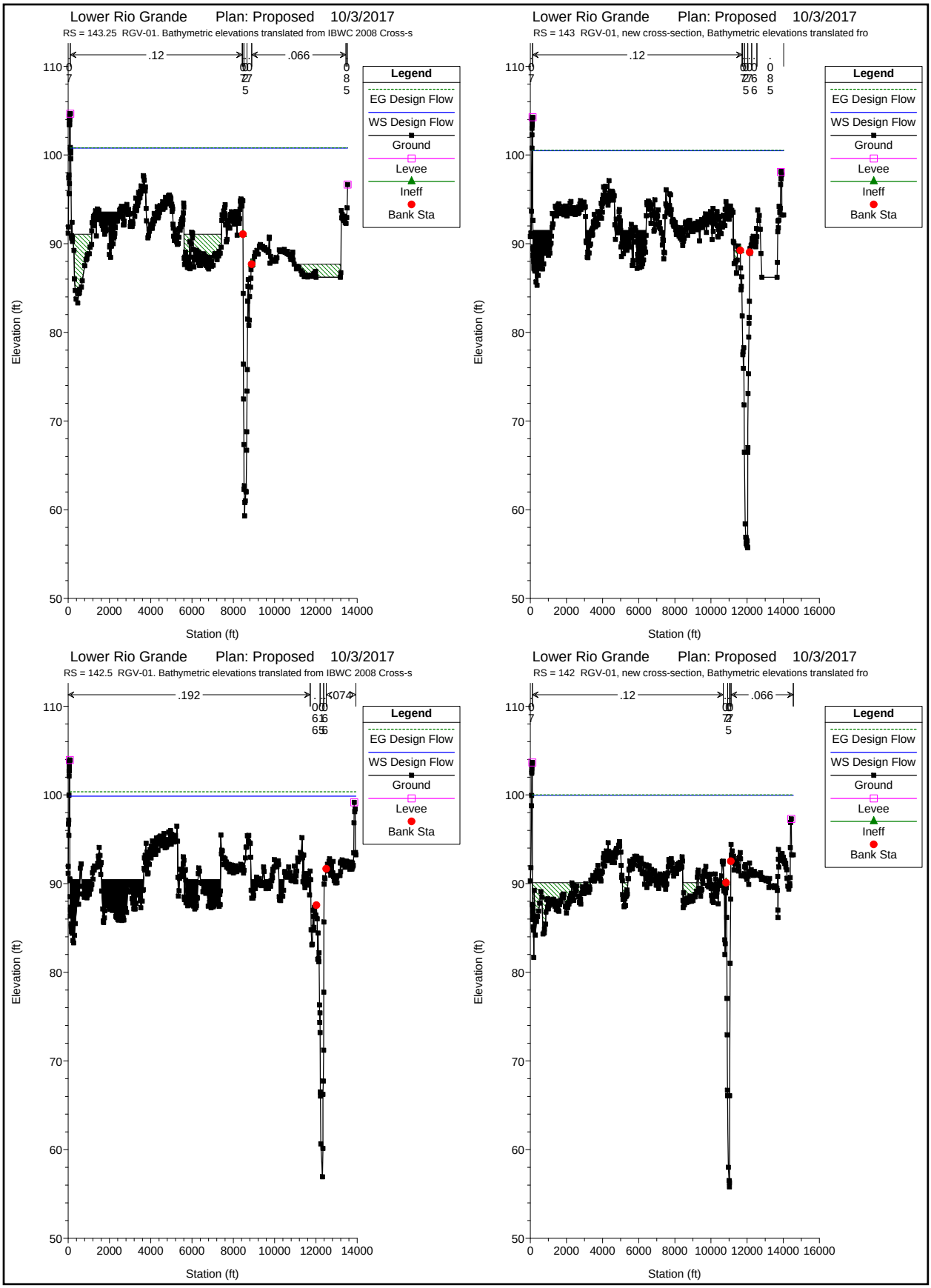

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 152.53 RGV-04, 8-foot wall applied with 10:1 SS, Bathymetric elevations
.169
.102
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 151.7 RGV-04, Updated on left with new survey to Station 1057.92. 8-fo
.1
.082
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 151.49 RGV-04, 8-foot wall applied. Bathymetric elevations translated
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 151.27 RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations
.06
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

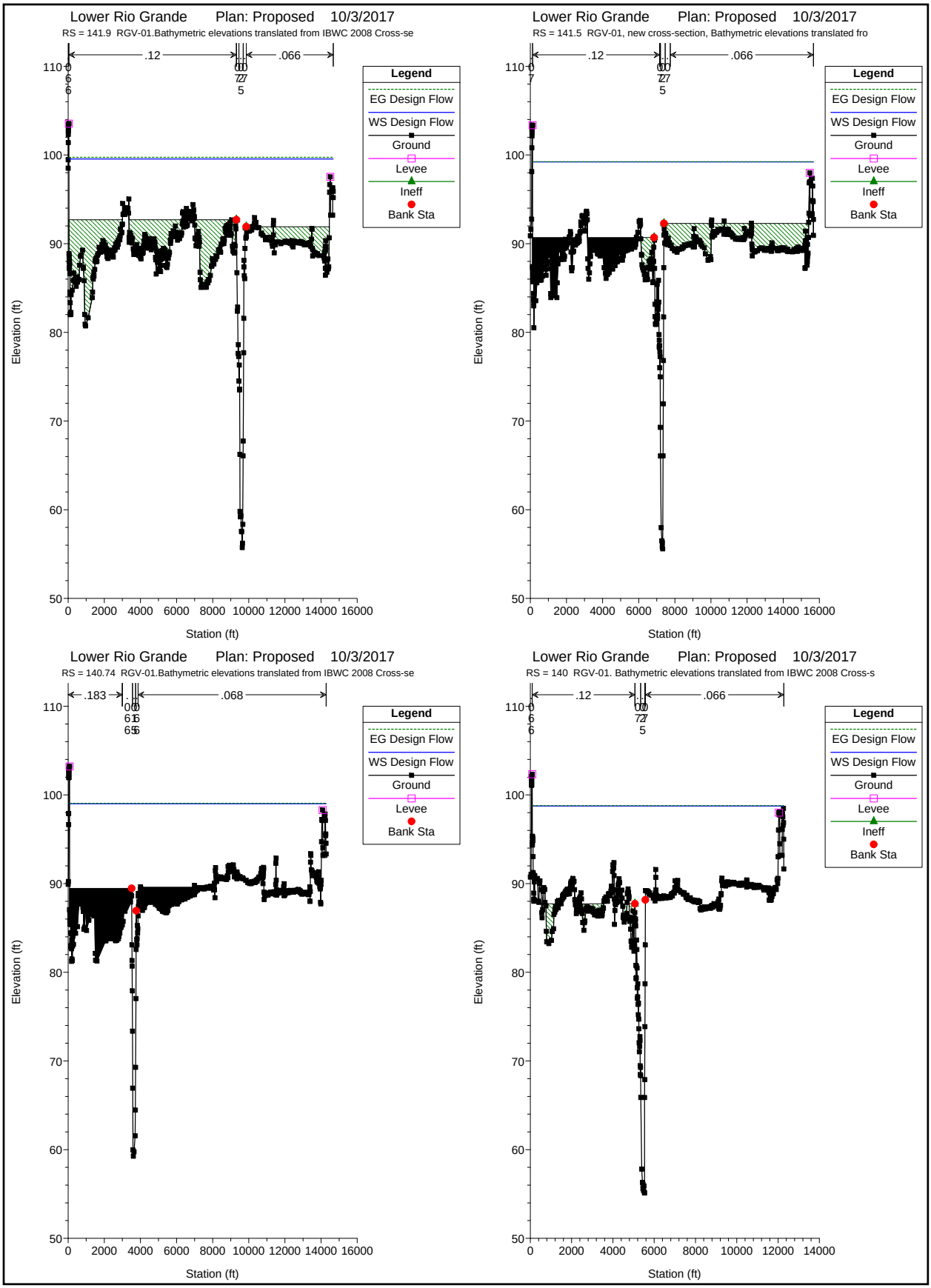

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 151.255 BR Pharr
.06
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 151.255 BR Pharr
.06
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 151.25 RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations
.06
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 151.24 RGV-04, 9-foot wall applied, Bathymetric elevations translated f
.06
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

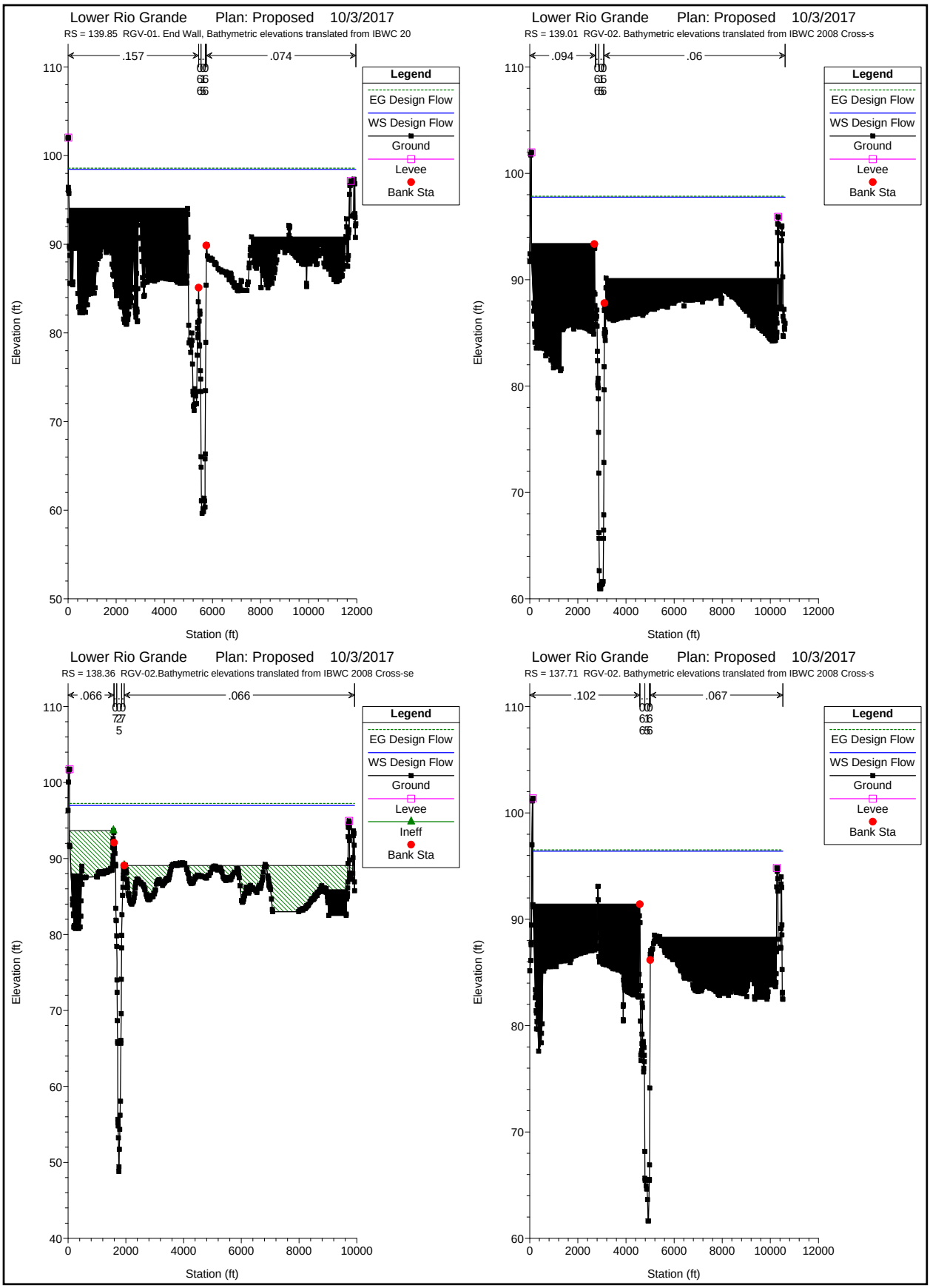

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 150.78 RGV-04, Bathymetric elevations translated from IBWC 2008 Cross-s
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 150.31 RGV-04, Bathymetric elevations translated from IBWC 2008 Cross-s
.09
.102
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 149 RGV-04, 9-foot wall applied, Bathymetric elevations translated f
.066
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 147.68 RGV-04, 9-foot wall applied, Bathymetric elevations translated f
.105
.095
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

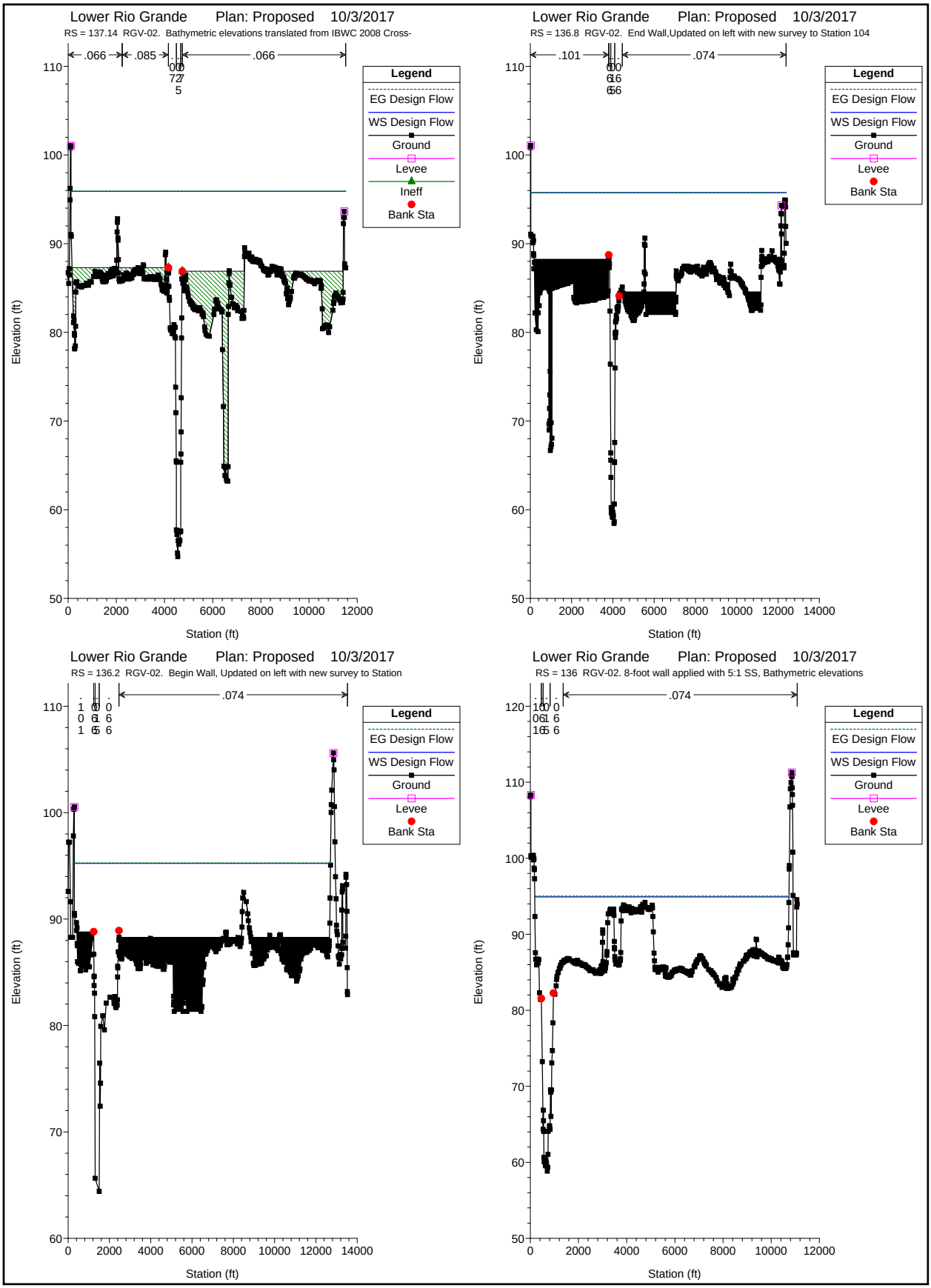

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 146 RGV-04, Extended block obstruction, Bathymetric elevations trans
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 145.5 RGV-04 (end wall), RGV-01 (begin wall), new cross-section, Bathy
.066
.088
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 145.2 RGV-01, new cross-section, Bathymetric elevations translated fro
.066
.088
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 145 RGV-01. Bathymetric elevations translated from IBWC 2008 Cross-
.066
.088
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

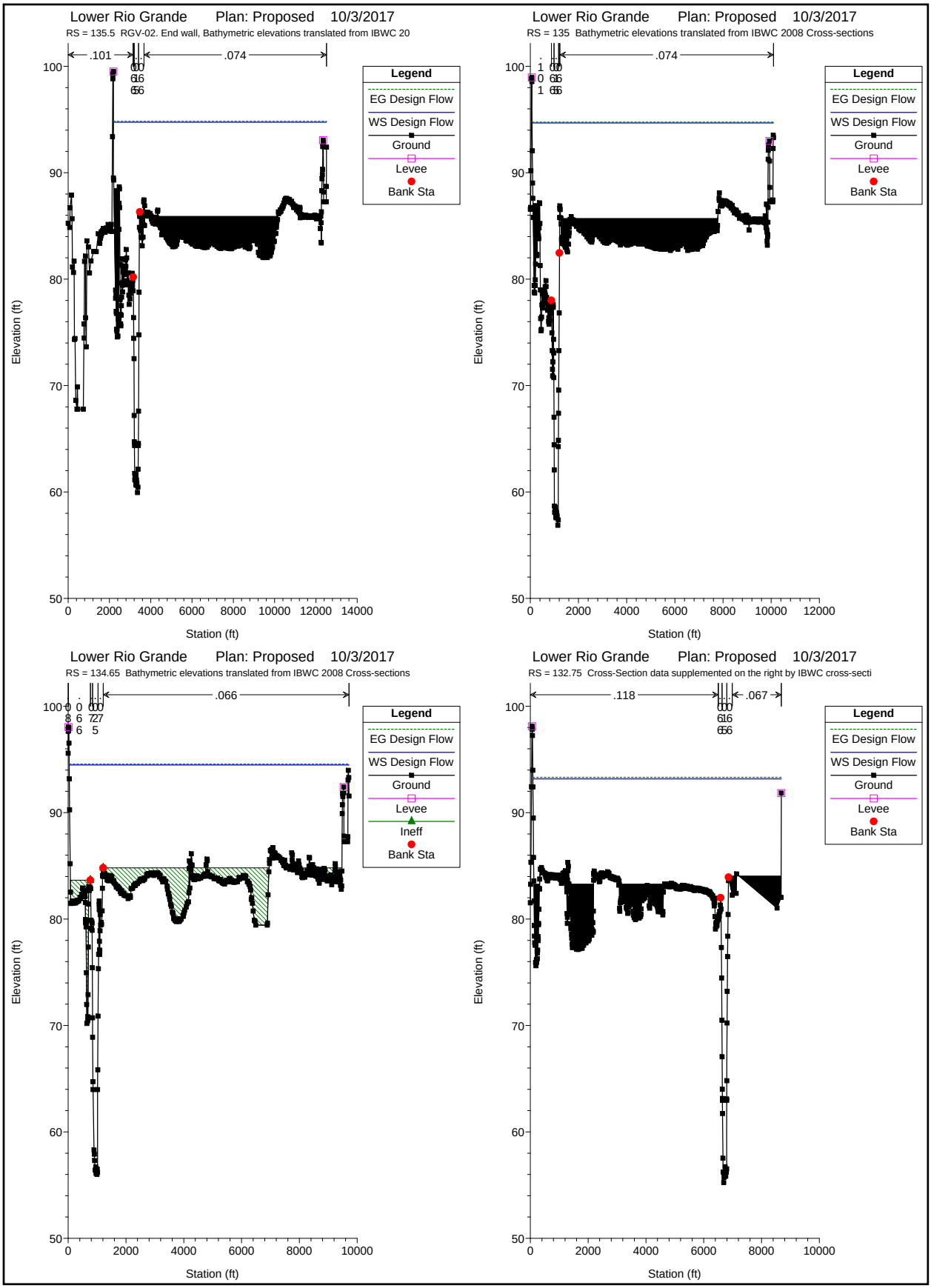

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 144.7 RGV-01, new cross-section, Bathymetric elevations translated fro
.09
.088
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 144.55 RGV-01. Bathymetric elevations translated from IBWC 2008 Cross-s
.172
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 144 RGV-01, new cross-section, Bathymetric elevations translated fro
.172
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 143.5 RGV-01, new cross-section, Bathymetric elevations translated fro
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

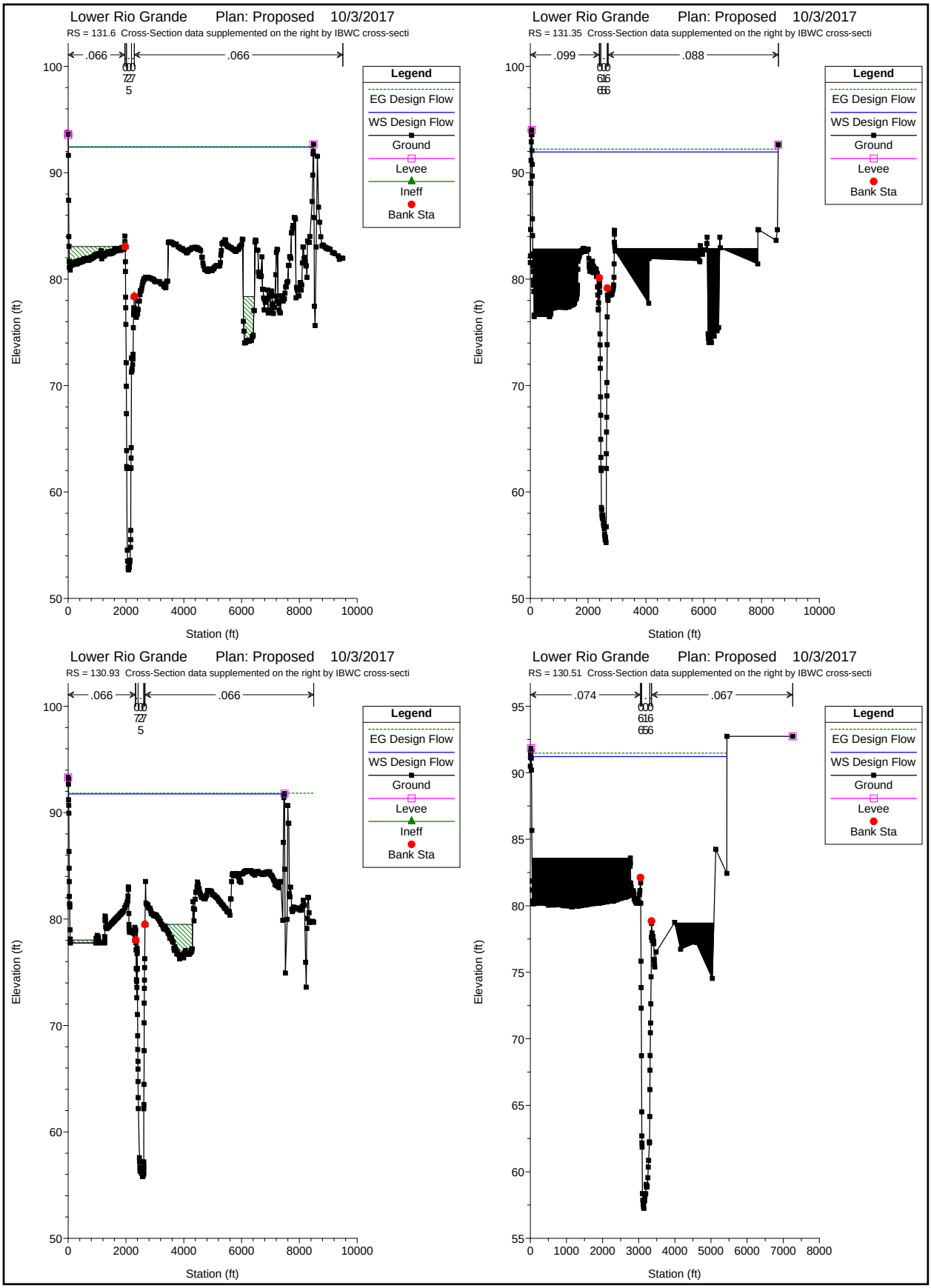

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 143.25 RGV-01. Bathymetric elevations translated from IBWC 2008 Cross-s
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 143 RGV-01, new cross-section, Bathymetric elevations translated fro
.12
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 142.5 RGV-01. Bathymetric elevations translated from IBWC 2008 Cross-s
.192
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 142 RGV-01, new cross-section, Bathymetric elevations translated fro
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

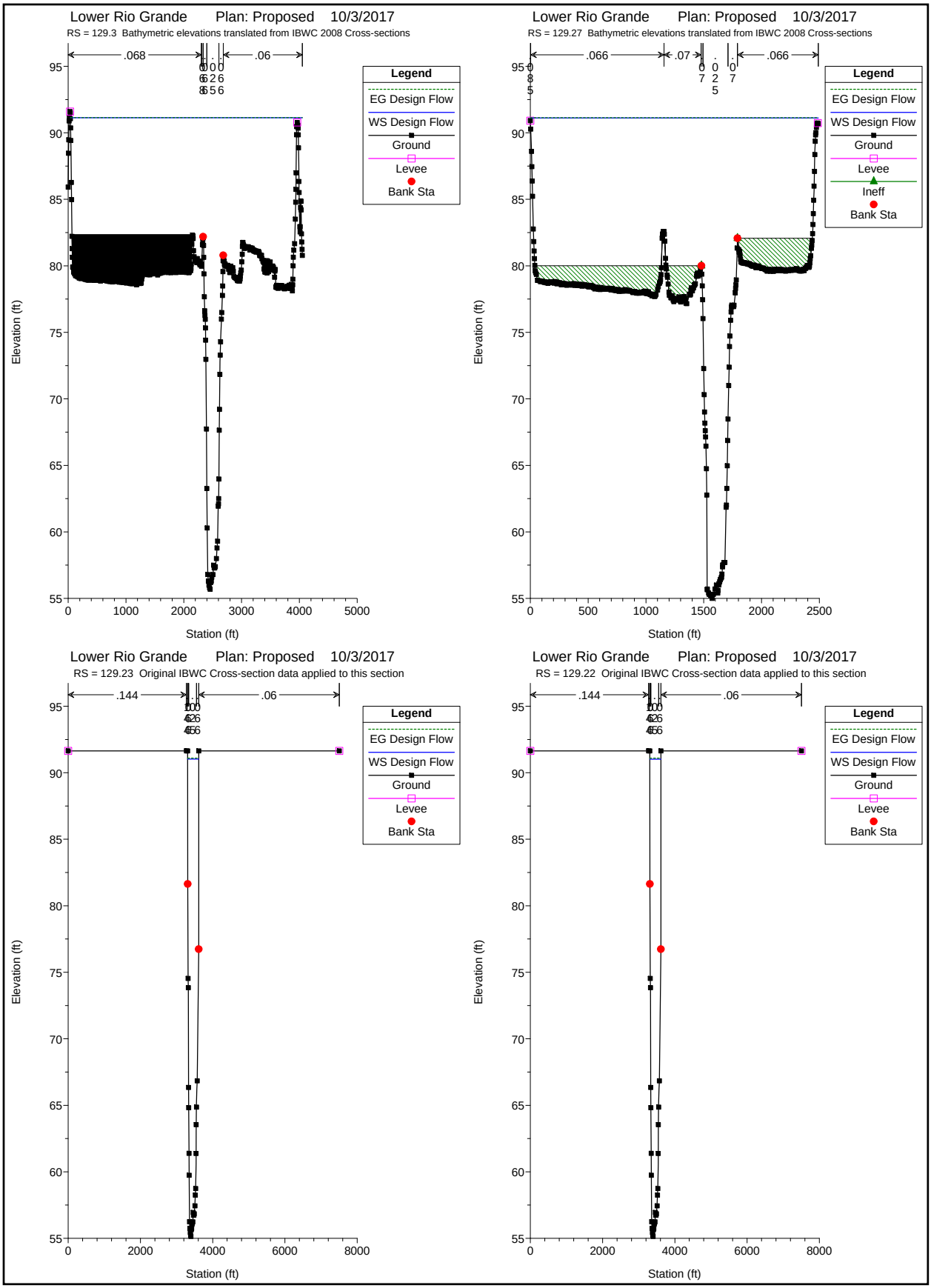

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 141.9 RGV-01.Bathymetric elevations translated from IBWC 2008 Cross-se
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 141.5 RGV-01, new cross-section, Bathymetric elevations translated fro
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 140.74 RGV-01.Bathymetric elevations translated from IBWC 2008 Cross-se
.183
.068
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 140 RGV-01. Bathymetric elevations translated from IBWC 2008 Cross-s
.12
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

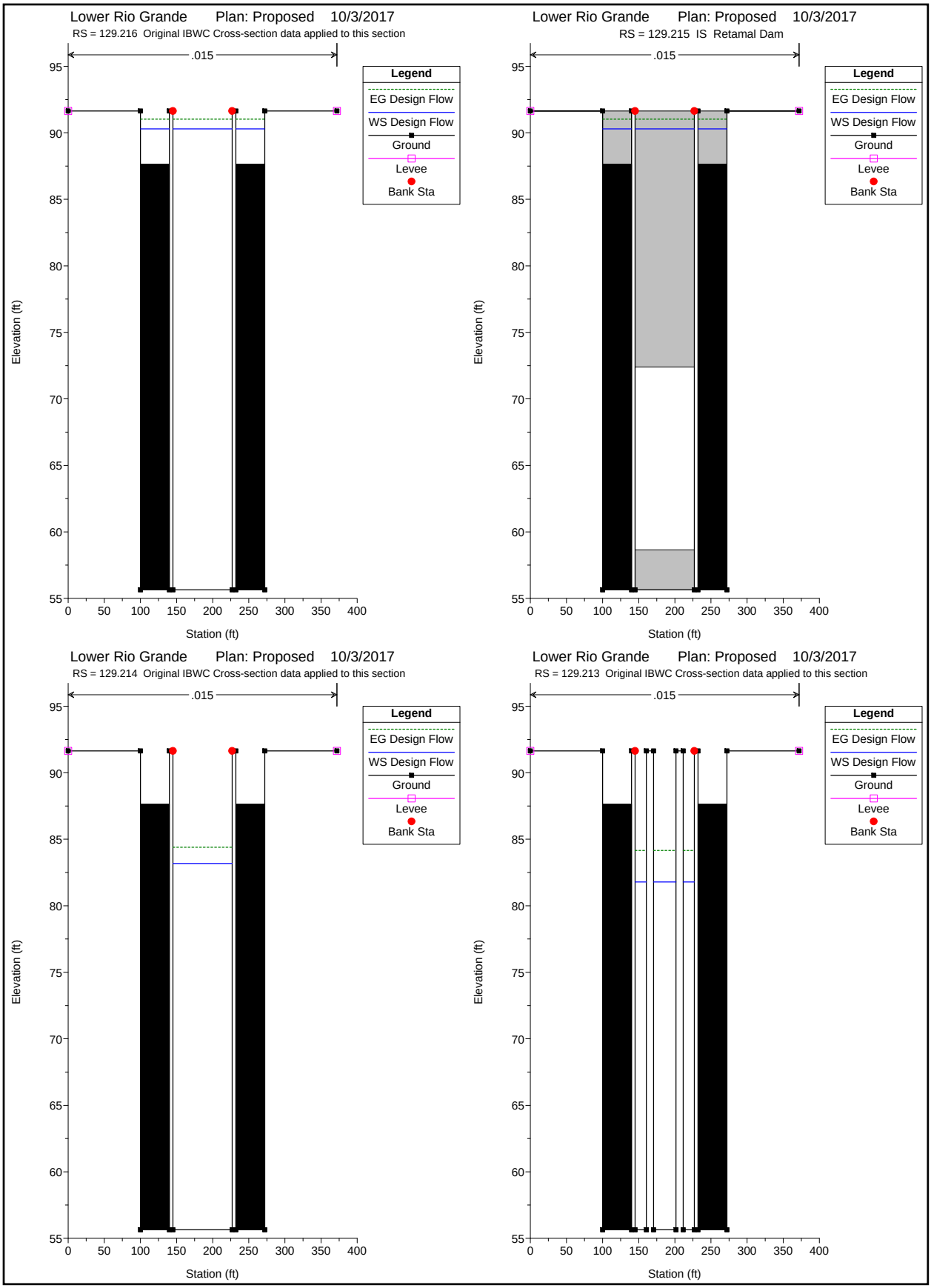

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 139.85 RGV-01. End Wall, Bathymetric elevations translated from IBWC 20
.157
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 139.01 RGV-02. Bathymetric elevations translated from IBWC 2008 Cross-s
.094
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 138.36 RGV-02.Bathymetric elevations translated from IBWC 2008 Cross-se
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 137.71 RGV-02. Bathymetric elevations translated from IBWC 2008 Cross-s
.102
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

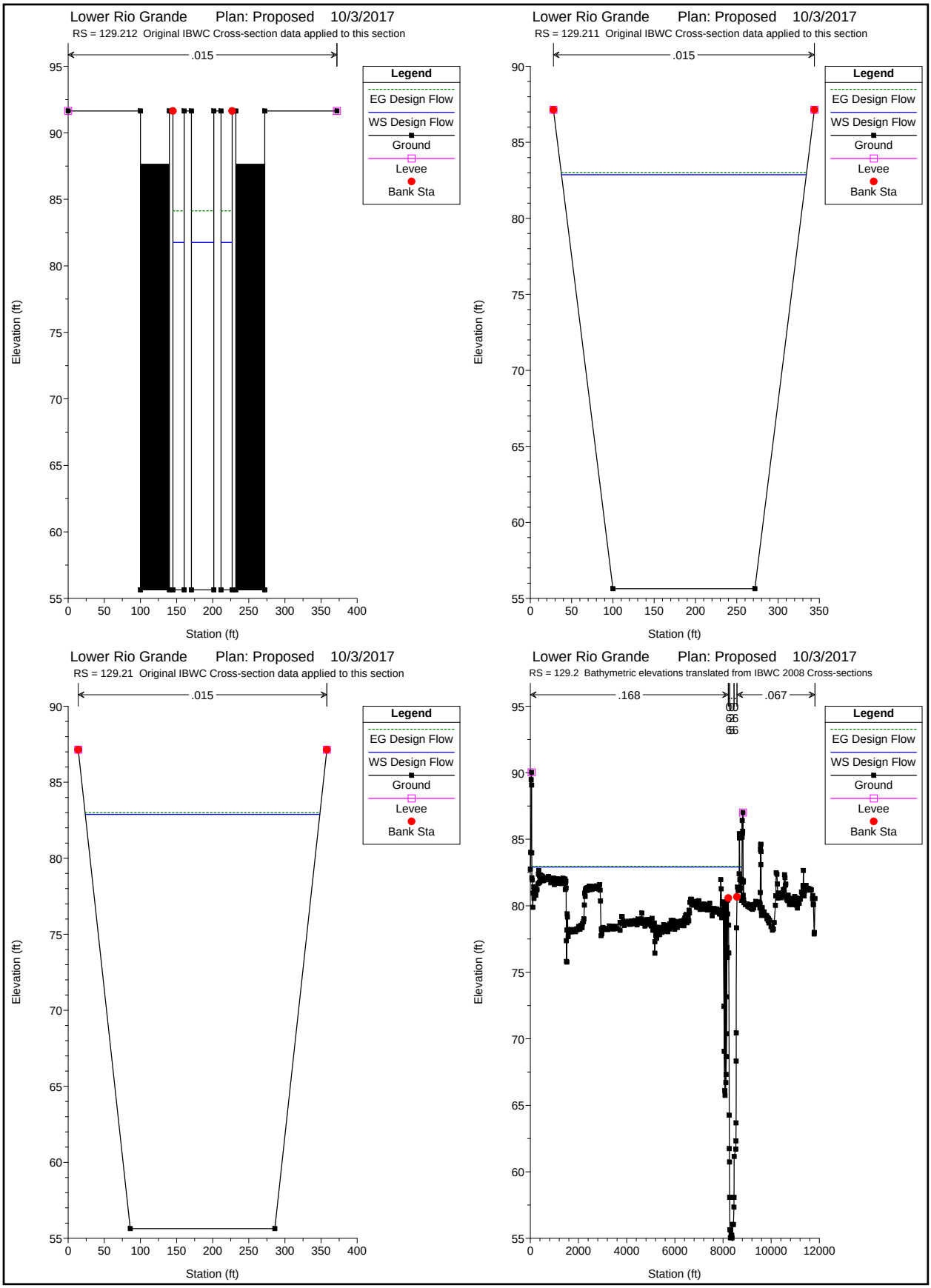

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 137.14 RGV-02. Bathymetric elevations translated from IBWC 2008 Cross-
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 136.8 RGV-02. End Wall,Updated on left with new survey to Station 104
.101
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 136.2 RGV-02. Begin Wall, Updated on left with new survey to Station
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 136 RGV-02. 8-foot wall applied with 5:1 SS, Bathymetric elevations
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

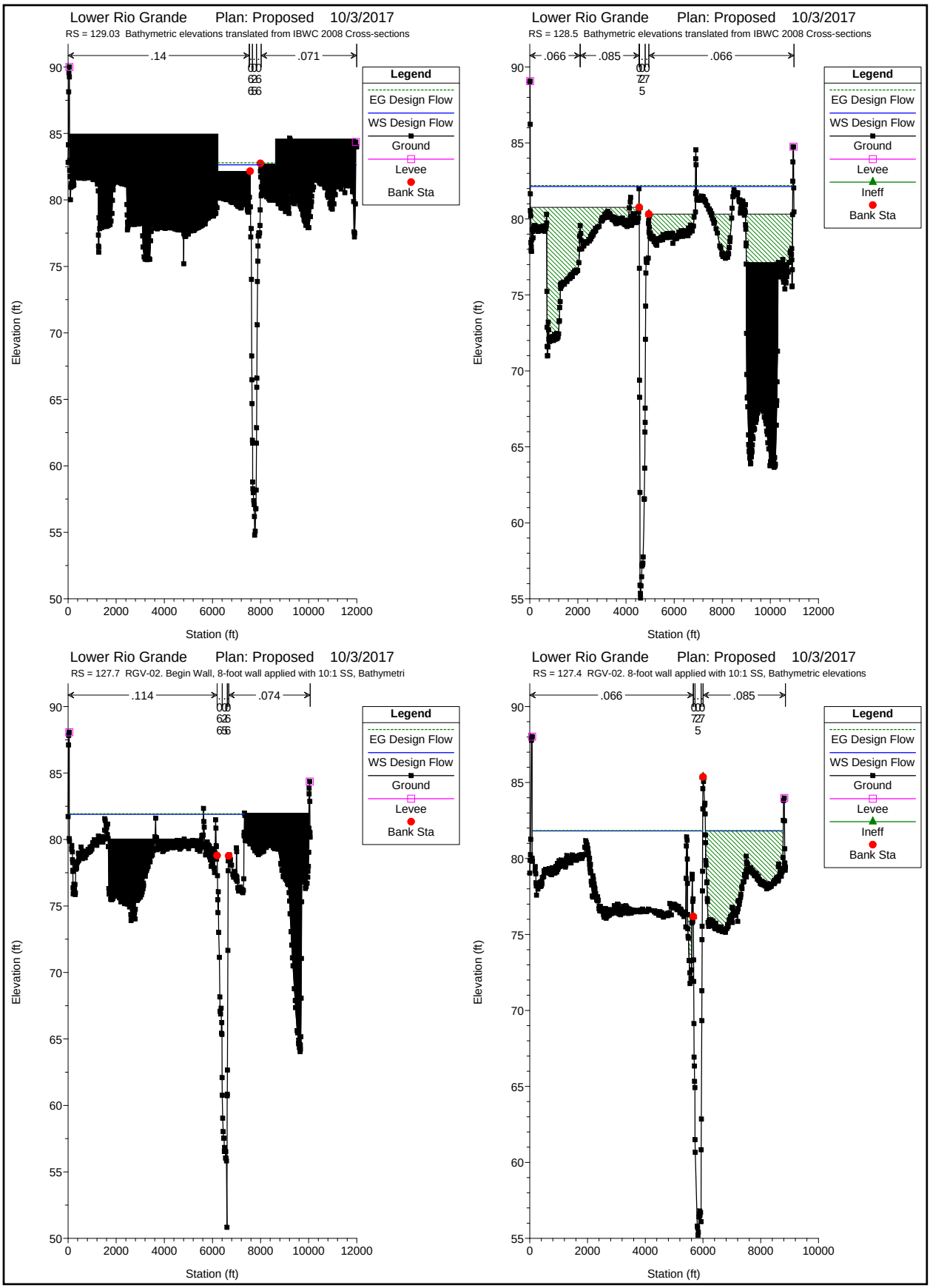

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 135.5 RGV-02. End wall, Bathymetric elevations translated from IBWC 20
.101
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 135 Bathymetric elevations translated from IBWC 2008 Cross-sections
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 134.65 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 132.75 Cross-Section data supplemented on the right by IBWC cross-secti
.118
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

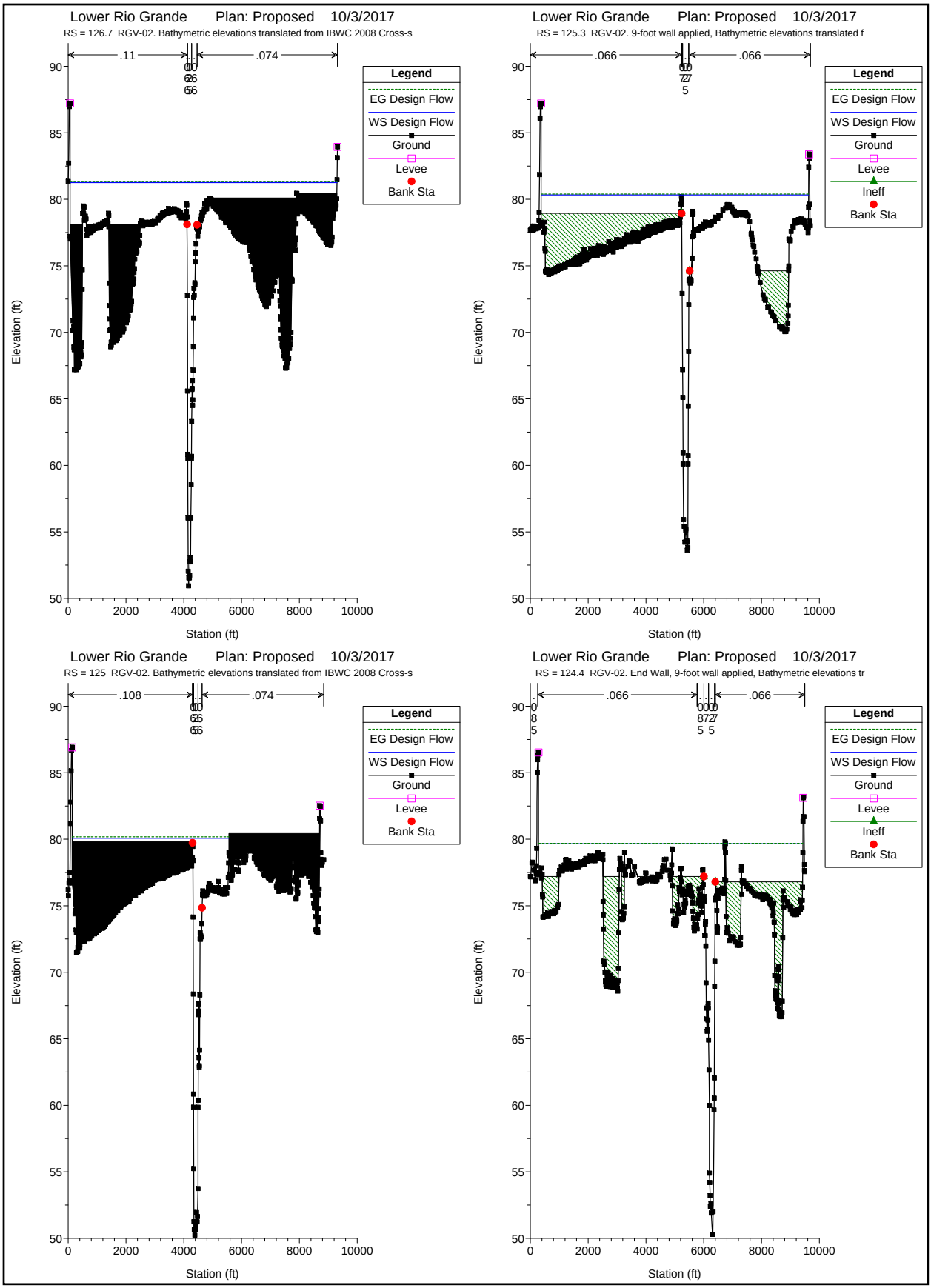

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 131.6 Cross-Section data supplemented on the right by IBWC cross-secti
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 131.35 Cross-Section data supplemented on the right by IBWC cross-secti
.099
.088
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 130.93 Cross-Section data supplemented on the right by IBWC cross-secti
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 130.51 Cross-Section data supplemented on the right by IBWC cross-secti
.074
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

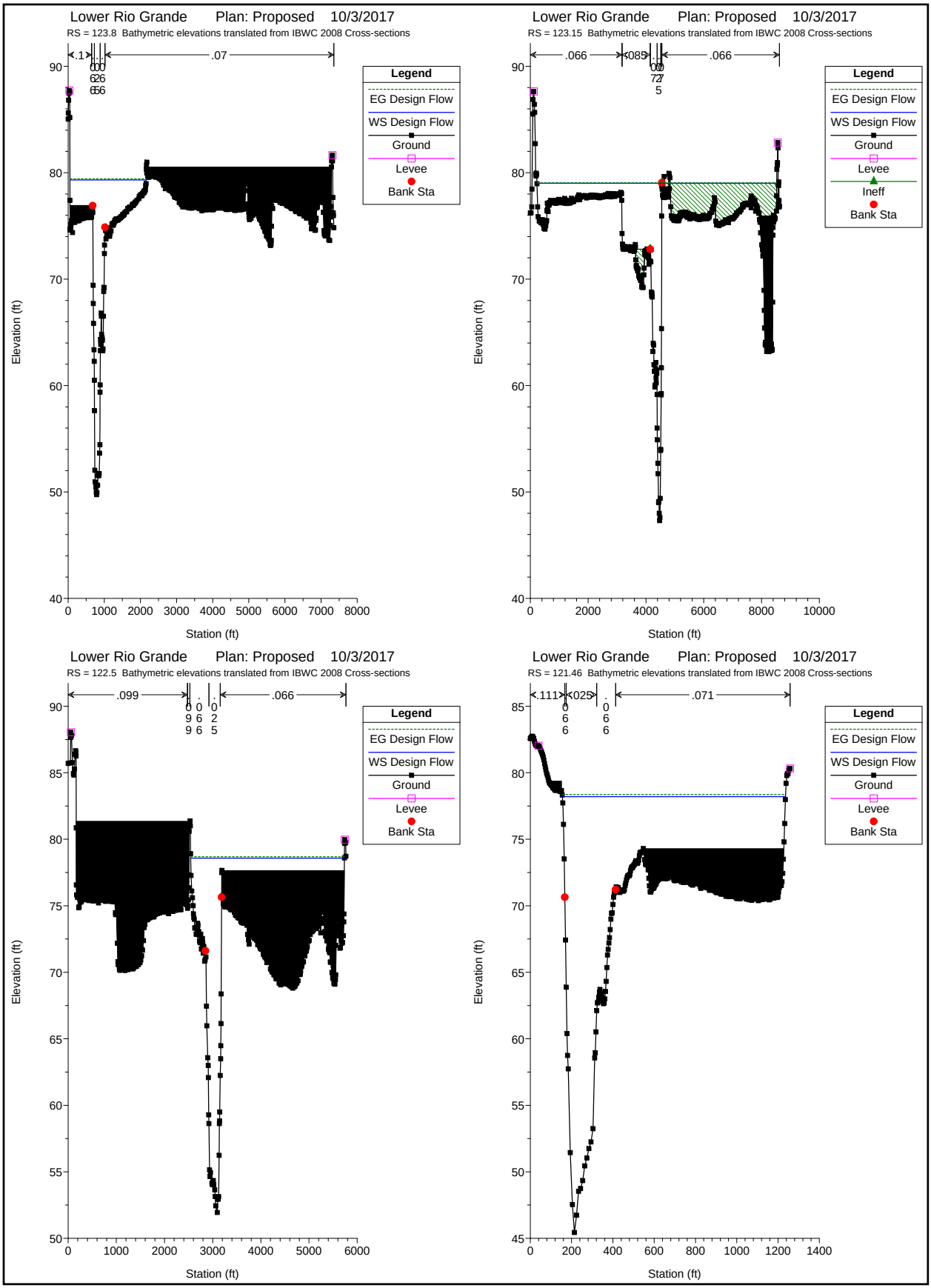

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.3 Bathymetric elevations translated from IBWC 2008 Cross-sections
.068
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.27 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.07
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.23 Original IBWC Cross-section data applied to this section
.144
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.22 Original IBWC Cross-section data applied to this section
.144
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

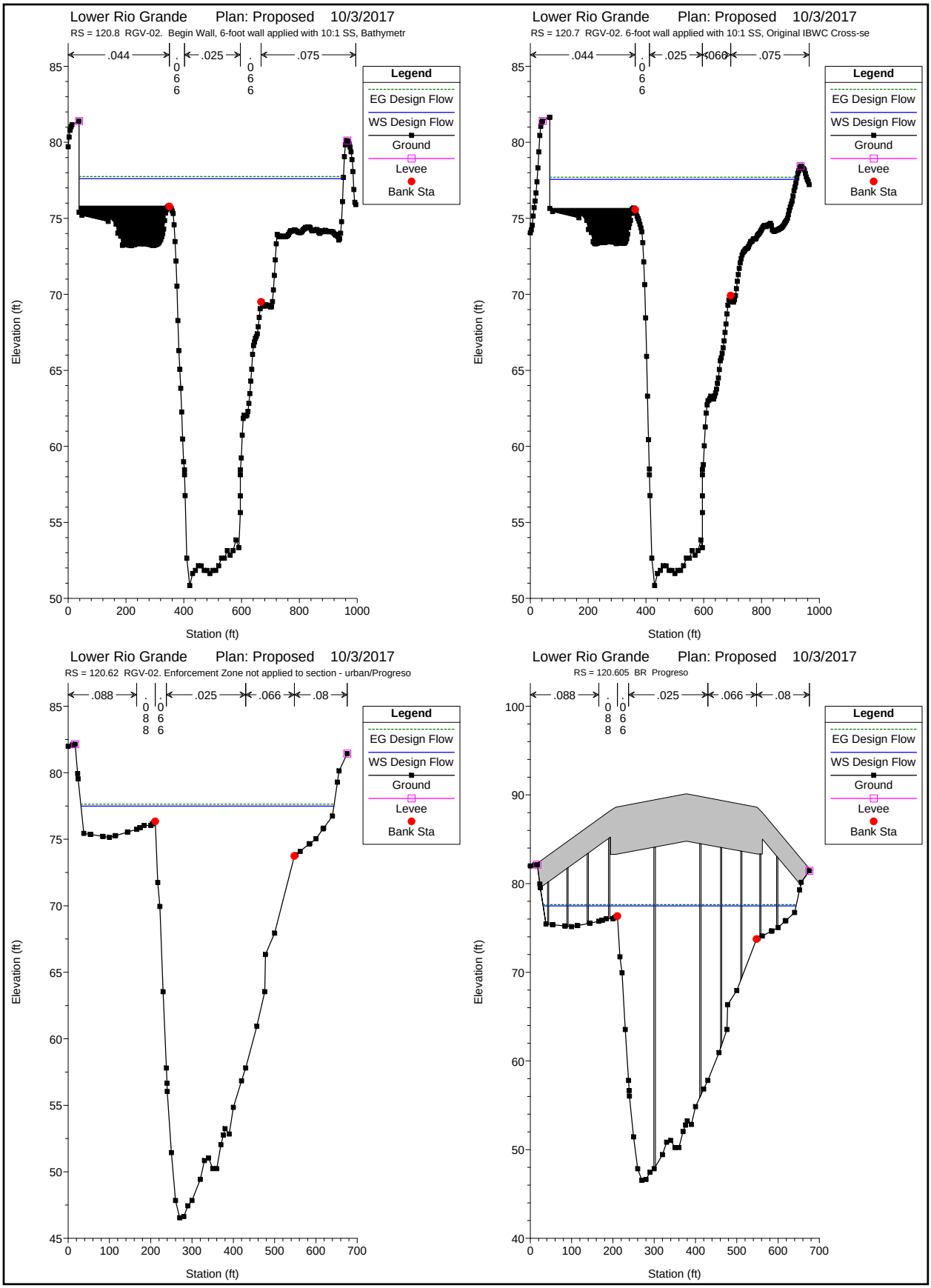

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.216 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.215 IS Retamal Dam
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.214 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.213 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

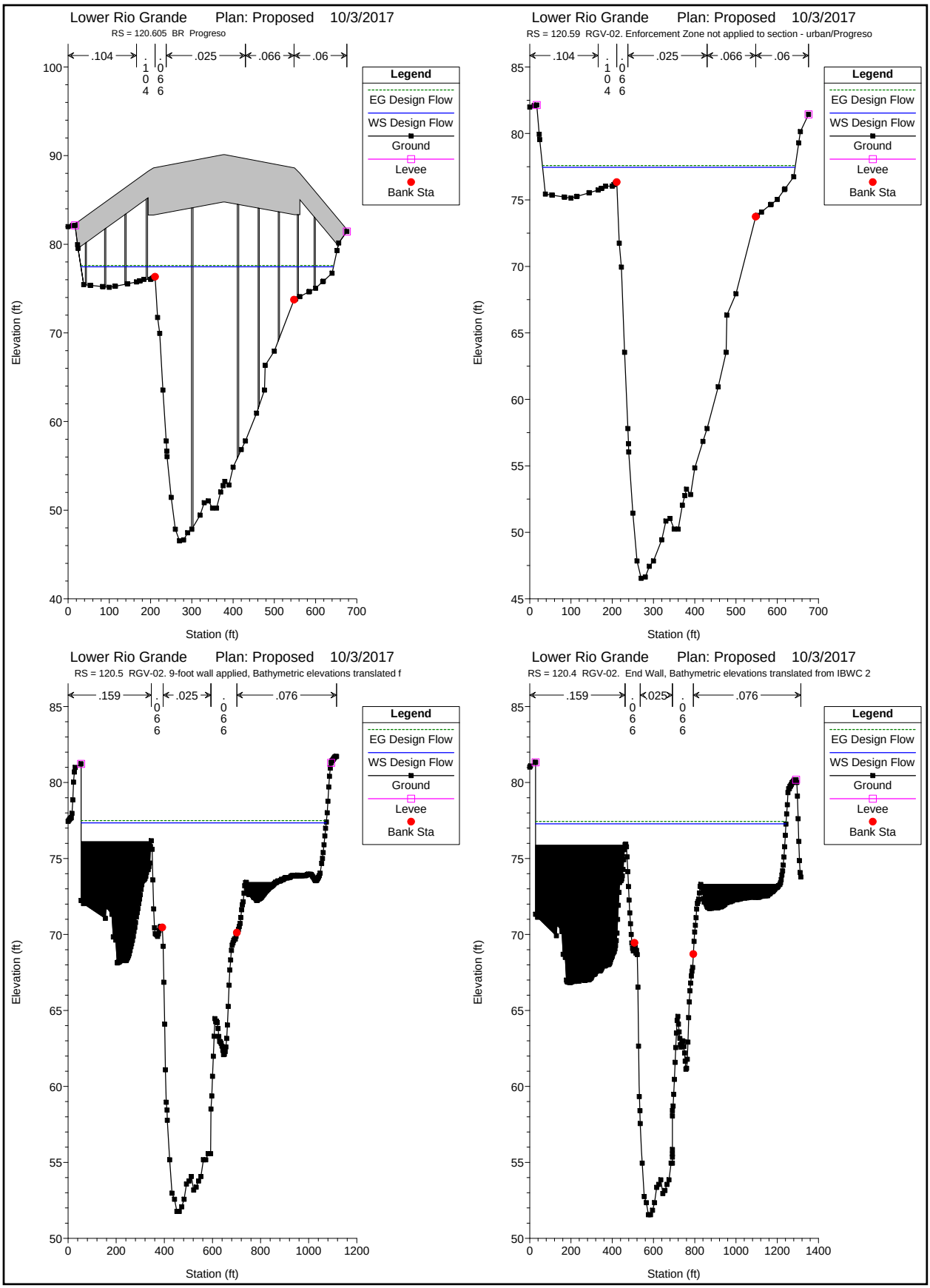

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.212 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.211 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.21 Original IBWC Cross-section data applied to this section
.015
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.2 Bathymetric elevations translated from IBWC 2008 Cross-sections
.168
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

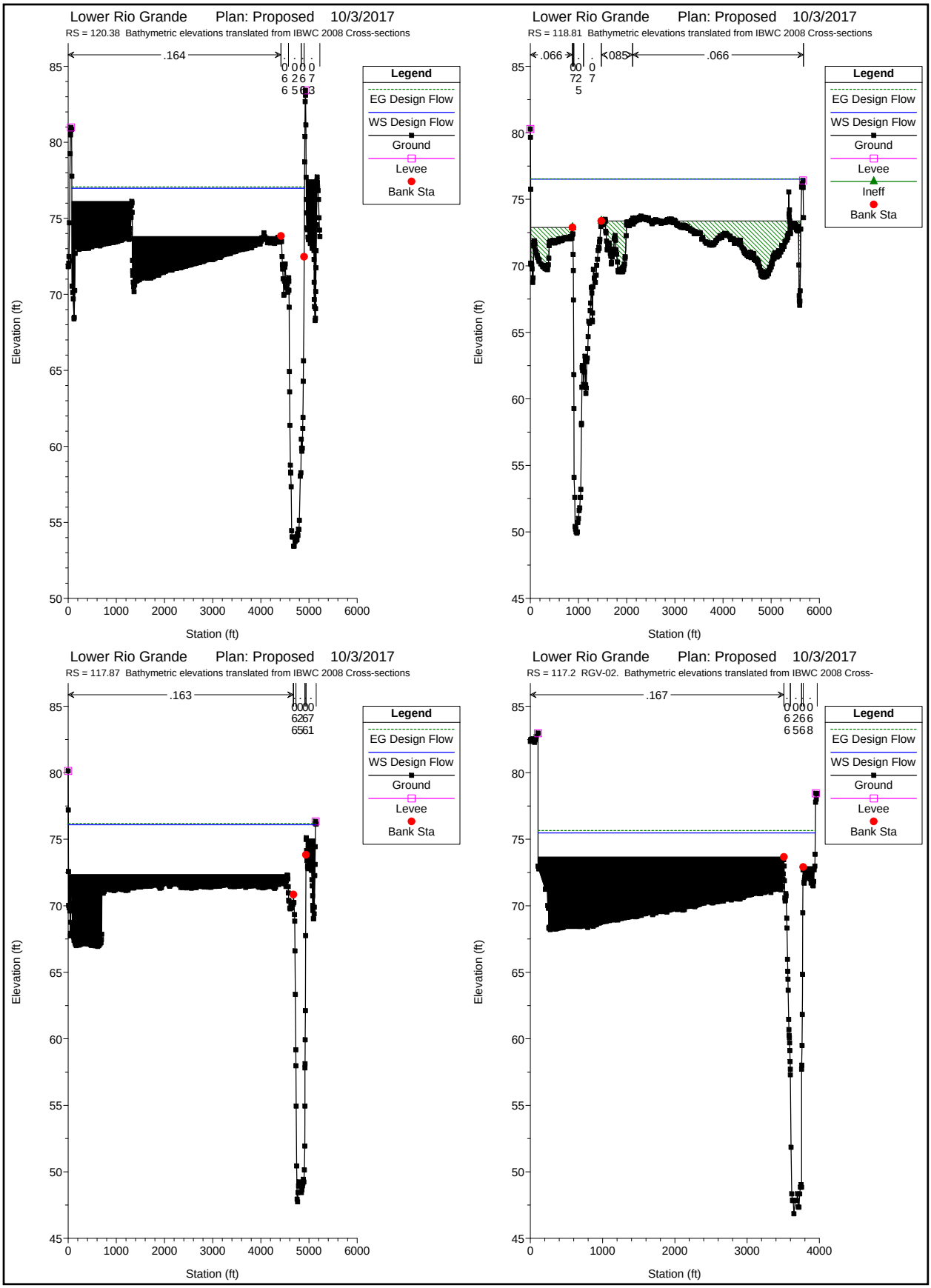

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 129.03 Bathymetric elevations translated from IBWC 2008 Cross-sections
.14
.071
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 128.5 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 127.7 RGV-02. Begin Wall, 8-foot wall applied with 10:1 SS, Bathymetri
.114
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 127.4 RGV-02. 8-foot wall applied with 10:1 SS, Bathymetric elevations
.066
.085
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

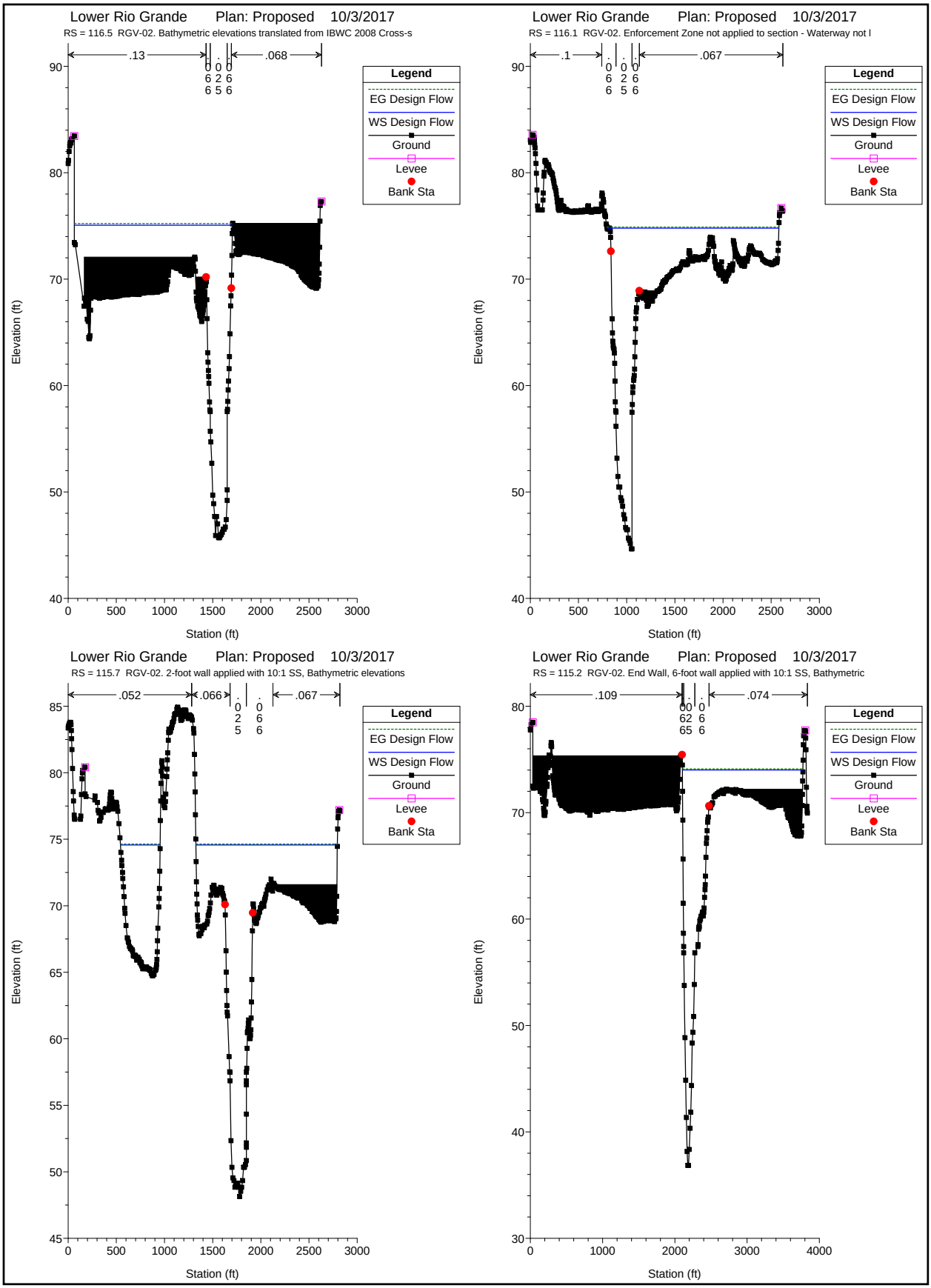

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 126.7 RGV-02. Bathymetric elevations translated from IBWC 2008 Cross-s
.11
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 125.3 RGV-02. 9-foot wall applied, Bathymetric elevations translated f
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 125 RGV-02. Bathymetric elevations translated from IBWC 2008 Cross-s
.108
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 124.4 RGV-02. End Wall, 9-foot wall applied, Bathymetric elevations tr
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

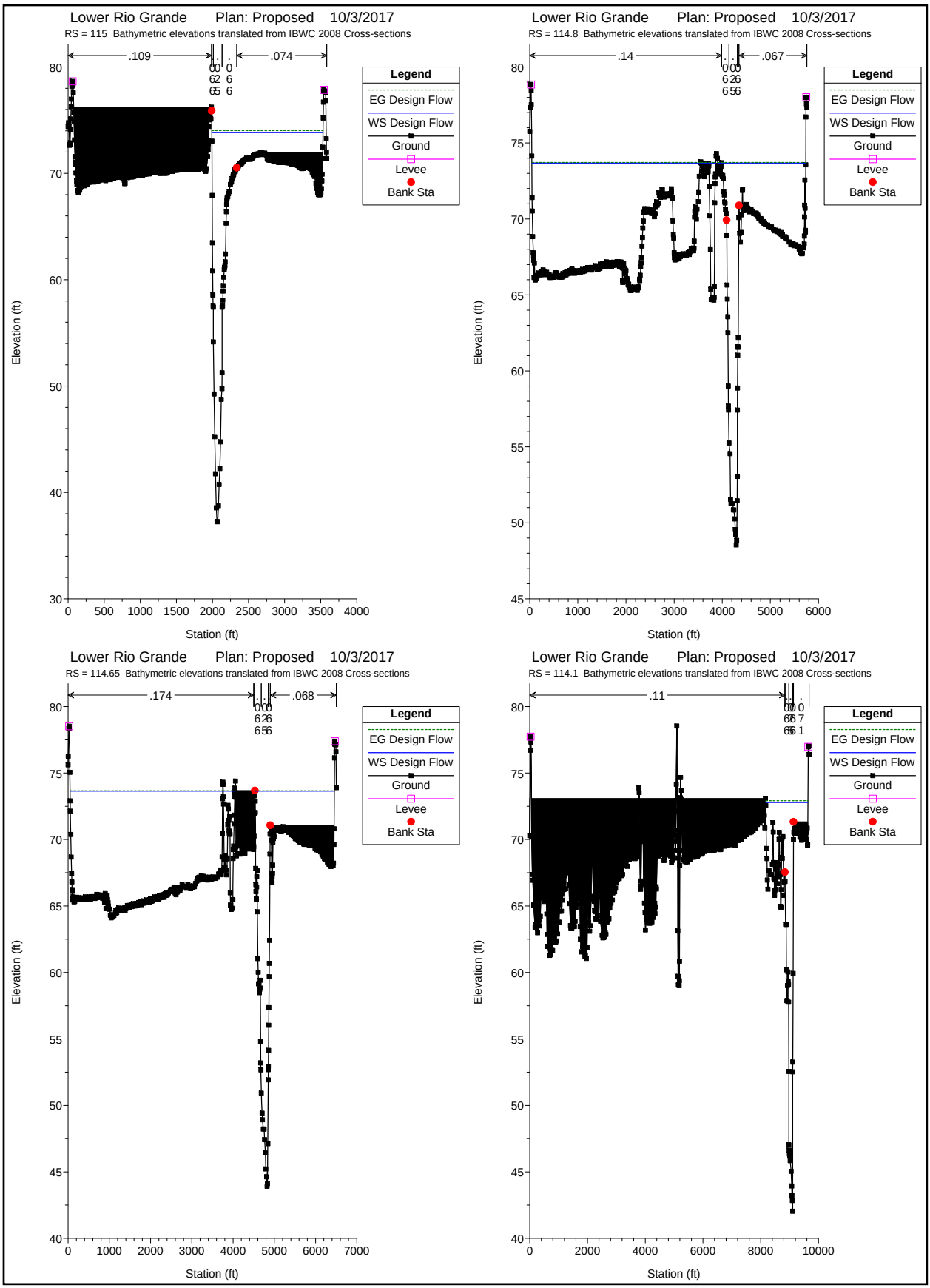

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 123.8 Bathymetric elevations translated from IBWC 2008 Cross-sections
.1
.07
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 123.15 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 122.5 Bathymetric elevations translated from IBWC 2008 Cross-sections
.099
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 121.46 Bathymetric elevations translated from IBWC 2008 Cross-sections
.111
.025
.071
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

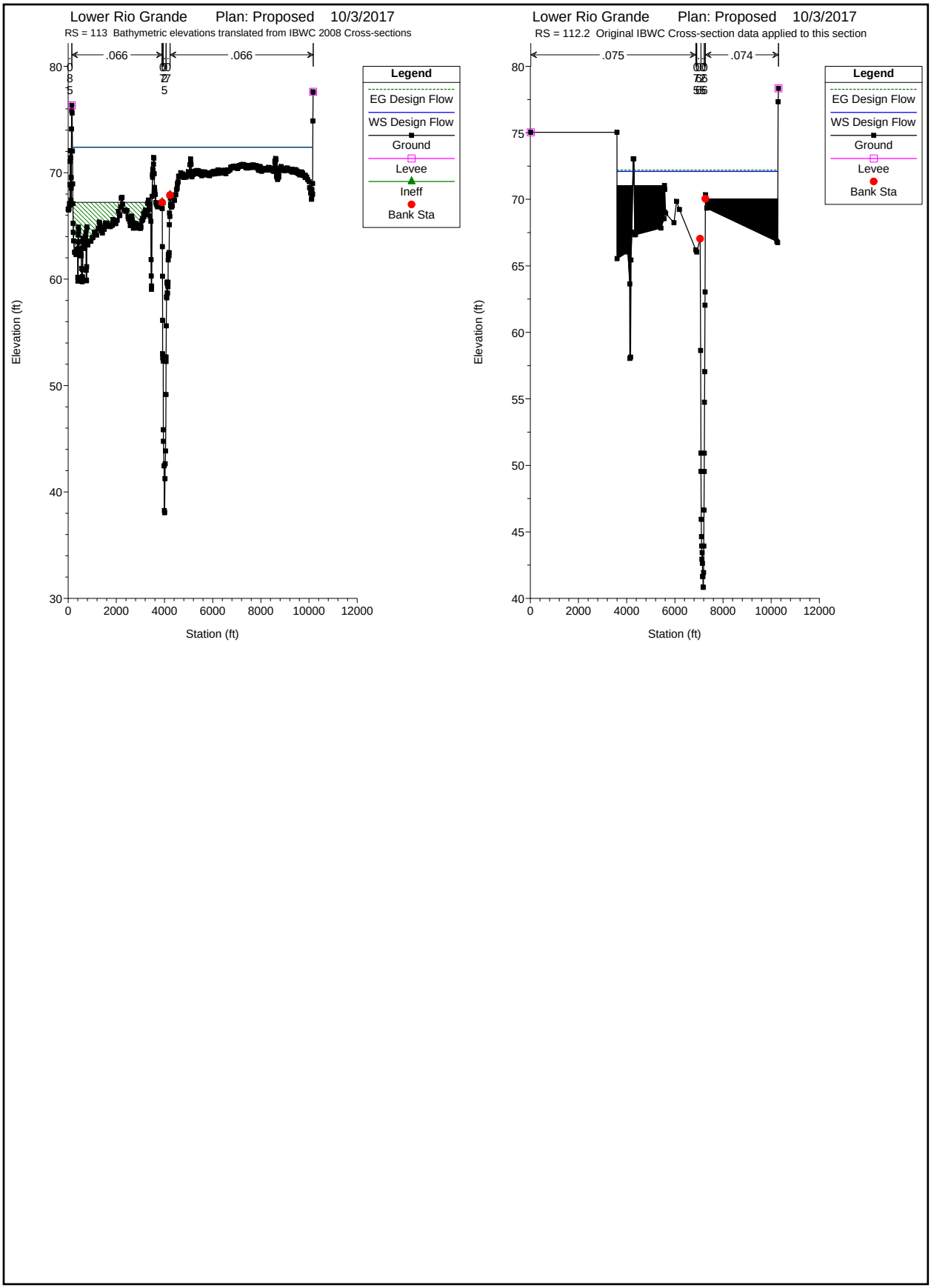

Lower Rio Grande Plan: Proposed 10/3/2017
RS = 120.8 RGV-02. Begin Wall, 6-foot wall applied with 10:1 SS, Bathymetr
.044
.066
.025
.066
.075
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 120.7 RGV-02. 6-foot wall applied with 10:1 SS, Original IBWC Cross-se
.044
.066
.025
.060
.075
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 120.62 RGV-02. Enforcement Zone not applied to section - urban/Progreso
.088
.088
.066
.025
.066
.08
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 120.605 BR Progreso
.088
.088
.066
.025
.066
.08
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Proposed 10/3/2017
RS = 120.605 BR Progreso
.104
.104
.066
.025
.066
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 120.59 RGV-02. Enforcement Zone not applied to section - urban/Progreso
.104
.104
.066
.025
.066
.06
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 120.5 RGV-02. 9-foot wall applied, Bathymetric elevations translated f
.159
.066
.025
.066
.076
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 120.4 RGV-02. End Wall, Bathymetric elevations translated from IBWC 2
.159
.066
.025
.066
.076
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Proposed 10/3/2017
RS = 120.38 Bathymetric elevations translated from IBWC 2008 Cross-sections
.164
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 118.81 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.085
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 117.87 Bathymetric elevations translated from IBWC 2008 Cross-sections
.163
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 117.2 RGV-02. Bathymetric elevations translated from IBWC 2008 Cross-
.167
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Proposed 10/3/2017
RS = 116.5 RGV-02. Bathymetric elevations translated from IBWC 2008 Cross-s
.13
.0266
.0256
.068
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 116.1 RGV-02. Enforcement Zone not applied to section - Waterway not l
.1
.0266
.0256
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 115.7 RGV-02. 2-foot wall applied with 10:1 SS, Bathymetric elevations
.052
.066
.0256
.0266
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 115.2 RGV-02. End Wall, 6-foot wall applied with 10:1 SS, Bathymetric
.109
.0266
.0256
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Proposed 10/3/2017
RS = 115 Bathymetric elevations translated from IBWC 2008 Cross-sections
.109
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 114.8 Bathymetric elevations translated from IBWC 2008 Cross-sections
.14
.067
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 114.65 Bathymetric elevations translated from IBWC 2008 Cross-sections
.174
.068
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 114.1 Bathymetric elevations translated from IBWC 2008 Cross-sections
.11
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Lower Rio Grande Plan: Proposed 10/3/2017
RS = 113 Bathymetric elevations translated from IBWC 2008 Cross-sections
.066
.066
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Lower Rio Grande Plan: Proposed 10/3/2017
RS = 112.2 Original IBWC Cross-section data applied to this section
.075
.074
Legend
EG Design Flow
WS Design Flow
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

HEC-RAS Plan: Proposed River: Rio Grande Reach: Lower Reach Profile: Design Flow

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	186	235000.00	85.94	134.48	122.25	134.57	0.000056	4.28	181529.90	10519.00	0.12
Lower Reach	185	235000.00	74.90	134.36	122.19	134.40	0.000099	2.56	166008.80	11527.85	0.08
Lower Reach	184	235000.00	86.64	133.72	123.67	134.15	0.000062	7.68	130966.70	8180.60	0.24
Lower Reach	183.2	235000.00	89.30	133.67	121.45	133.72	0.000066	3.42	187710.40	12242.90	0.10
Lower Reach	182.4	235000.00	81.47	133.40	122.57	133.49	0.000038	4.61	238081.90	15447.47	0.14
Lower Reach	181.35	235000.00	93.63	133.19	118.93	133.22	0.000042	2.82	215238.80	11846.42	0.09
Lower Reach	180.32	235000.00	88.56	132.90	120.12	133.00	0.000049	4.34	177360.90	10009.61	0.13
Lower Reach	180.3	235000.00	88.48	132.77	122.24	132.94	0.000120	5.61	159921.70	9900.86	0.16
Lower Reach	179.4	235000.00	86.78	132.47	117.34	132.51	0.000060	2.81	203313.80	11058.82	0.08
Lower Reach	178.5	235000.00	89.55	132.00	118.73	132.08	0.000104	4.28	203818.20	11138.90	0.13
Lower Reach	177.7	235000.00	88.45	131.48	119.10	131.54	0.000184	3.36	165070.50	9730.14	0.10
Lower Reach	176.8	235000.00	88.84	130.08	120.16	130.76	0.000158	9.07	141952.70	8731.01	0.27
Lower Reach	175.6	235000.00	90.39	129.72	116.78	129.80	0.000087	3.86	157338.30	9060.02	0.12
Lower Reach	174.6	235000.00	87.41	128.85	118.76	129.45	0.000071	8.44	183042.60	11948.80	0.25
Lower Reach	174.2	235000.00	86.71	129.10	113.94	129.12	0.000048	2.10	209541.70	11255.36	0.07
Lower Reach	174	235000.00	86.00	129.01	114.93	129.05	0.000041	3.48	208480.30	11123.97	0.11
Lower Reach	172	235000.00	76.31	128.79	115.90	128.87	0.000044	4.13	196378.00	11811.36	0.12
Lower Reach	171.8	235000.00	76.31	128.45	116.04	128.58	0.000089	4.55	140317.10	8995.86	0.14
Lower Reach	171.15	235000.00	73.72	128.18	114.61	128.38	0.000091	5.90	138439.00	7471.84	0.17
Lower Reach	170.5	235000.00	75.96	124.18	118.77	127.58	0.000295	17.16	66520.06	4923.44	0.52
Lower Reach	170.26	235000.00	77.47	125.46	116.54	125.77	0.001401	6.55	70242.70	4951.62	0.21
Lower Reach	170.02	235000.00	89.64	121.79	112.24	124.50	0.000273	15.55	73221.61	5346.98	0.49
Lower Reach	169.9	235000.00	89.64	122.23	114.19	124.17	0.000210	13.68	80427.88	5465.99	0.43
Lower Reach	169.83	130000.00	100.84	122.96	114.80	123.58	0.000960	8.11	50278.00	3857.55	0.31
Lower Reach	169.49	130000.00	84.30	122.63	103.20	122.91	0.000282	4.93	39425.14	2516.37	0.16
Lower Reach	169.14	130000.00	84.64	122.07	97.06	122.75	0.000043	6.63	19605.81	523.80	0.19
Lower Reach	169.13	Inl Struct									
Lower Reach	169.12	130000.00	72.14	120.66	84.56	121.07	0.000019	5.11	25416.73	523.80	0.13
Lower Reach	169.1	130000.00	83.64	120.56	95.38	121.05	0.000030	5.64	23037.45	658.45	0.17
Lower Reach	168.85	130000.00	71.64	120.64	94.09	120.87	0.000711	4.62	62154.06	5483.22	0.14
Lower Reach	168.58	130000.00	69.86	119.97	96.46	120.08	0.000365	3.68	75075.26	6382.42	0.11
Lower Reach	168.3	130000.00	79.02	118.97	99.09	119.16	0.001176	4.43	63969.79	6762.84	0.15
Lower Reach	168	130000.00	76.54	118.02	98.92	118.08	0.000384	2.80	79342.66	7173.41	0.09
Lower Reach	167.4	130000.00	77.24	117.38	102.41	117.57	0.000214	5.13	90135.16	8282.78	0.16
Lower Reach	167	130000.00	71.28	117.04	99.15	117.11	0.000175	3.12	86141.69	9835.39	0.11
Lower Reach	166.6	130000.00	73.61	116.69	98.82	116.78	0.000144	3.89	132542.80	11568.08	0.12
Lower Reach	166	130000.00	71.28	116.33	99.68	116.48	0.000275	4.48	98849.09	11709.48	0.15
Lower Reach	165	130000.00	70.77	116.08	107.37	116.13	0.000124	3.31	153023.80	15020.67	0.11
Lower Reach	163	130000.00	70.26	115.94	102.35	115.95	0.000102	1.71	158618.50	14406.34	0.05
Lower Reach	162.1	130000.00	72.94	115.62	96.63	115.64	0.000125	2.11	126087.30	11944.56	0.07
Lower Reach	161.4	130000.00	71.66	115.03	97.27	115.43	0.000059	6.00	103453.90	10234.26	0.20
Lower Reach	161.35	130000.00	71.66	115.09	95.92	115.30	0.000034	5.24	221102.00	21779.94	0.16
Lower Reach	161.3	130000.00	71.66	115.08	95.81	115.28	0.000049	5.19	192632.20	19814.14	0.15
Lower Reach	160	130000.00	71.60	115.07	94.33	115.10	0.000040	2.68	226727.90	19804.56	0.08
Lower Reach	159	130000.00	71.38	114.87	100.41	114.92	0.000100	3.39	173708.20	13911.91	0.10
Lower Reach	157.2	130000.00	68.90	113.72	102.89	113.79	0.000144	3.72	103370.70	7714.59	0.12
Lower Reach	157.15	130000.00	69.64	112.83	93.60	113.21	0.000263	6.15	49694.32	3468.36	0.19
Lower Reach	156.93	125000.00	57.14	111.80	80.83	112.68	0.000190	7.64	18899.99	541.00	0.20
Lower Reach	156.915	Bridge									
Lower Reach	156.9	125000.00	57.14	111.33	80.83	112.18	0.000189	7.57	18646.78	541.00	0.20
Lower Reach	156.87	125000.00	61.04	111.38	80.12	112.09	0.000088	7.14	24126.52	819.90	0.18
Lower Reach	156.855	Bridge									
Lower Reach	156.84	125000.00	61.04	111.26	80.12	112.03	0.000093	7.31	24033.55	819.90	0.19
Lower Reach	156.7	125000.00	75.00	110.65	95.13	111.84	0.000570	9.67	20003.95	1143.08	0.30
Lower Reach	156.6	125000.00	58.38	110.93	82.38	111.49	0.000204	6.67	30588.35	2064.55	0.18
Lower Reach	156.15	125000.00	67.33	110.67	91.61	110.84	0.000254	4.38	52101.53	4348.38	0.14
Lower Reach	155.7	125000.00	68.64	110.31	95.25	110.46	0.000128	4.88	82816.02	7384.24	0.15
Lower Reach	155.36	125000.00	69.65	110.15	92.56	110.26	0.000067	3.87	92660.39	8006.98	0.13
Lower Reach	155.2	125000.00	70.85	110.09	97.30	110.15	0.000109	3.03	90386.20	8016.24	0.10
Lower Reach	155.01	125000.00	69.28	109.73	95.38	110.03	0.000085	5.46	80427.78	7103.42	0.19
Lower Reach	154.81	125000.00	66.95	109.63	94.22	109.82	0.000354	4.78	53322.38	5521.79	0.16
Lower Reach	154.6	125000.00	59.06	108.70	92.52	109.11	0.000653	5.89	37759.89	5177.83	0.21
Lower Reach	154.23	125000.00	48.83	107.69	78.20	108.09	0.000597	5.47	34711.81	6115.60	0.18
Lower Reach	153.85	125000.00	66.44	106.13	91.35	106.74	0.001086	7.16	34602.52	6557.42	0.26
Lower Reach	153.61	125000.00	54.25	105.93	90.14	106.26	0.000179	5.92	62164.88	8332.73	0.22
Lower Reach	153.36	125000.00	68.44	105.90	92.55	105.99	0.000205	3.87	103143.10	13757.59	0.14
Lower Reach	152.53	125000.00	66.64	105.14	91.80	105.22	0.000366	3.81	100592.10	14517.75	0.14
Lower Reach	151.7	125000.00	66.34	104.46	91.49	104.50	0.000157	2.85	120844.20	14263.72	0.10
Lower Reach	151.49	125000.00	57.26	104.29	86.84	104.32	0.000127	2.66	114987.30	14194.00	0.08
Lower Reach	151.27	125000.00	65.88	104.15	89.82	104.19	0.000095	2.81	117299.90	14880.75	0.10
Lower Reach	151.255	Bridge									
Lower Reach	151.25	125000.00	65.88	104.14	89.83	104.18	0.000089	2.72	117129.90	14880.65	0.10
Lower Reach	151.24	125000.00	68.61	104.15	96.73	104.17	0.000078	2.07	129102.80	14909.94	0.08
Lower Reach	150.78	125000.00	56.38	103.89	84.99	103.92	0.000137	2.48	111598.30	16072.92	0.09
Lower Reach	150.31	125000.00	63.27	103.49	91.80	103.54	0.000176	3.01	123715.80	16857.99	0.11

HEC-RAS Plan: Proposed River: Rio Grande Reach: Lower Reach Profile: Design Flow (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	149	125000.00	55.60	103.23	87.32	103.25	0.000090	2.11	138549.80	15899.08	0.07
Lower Reach	147.68	125000.00	62.04	102.88	89.24	102.93	0.000199	2.88	121255.80	15375.43	0.11
Lower Reach	146	125000.00	54.47	102.09	89.73	102.11	0.000097	1.63	131480.30	15945.81	0.06
Lower Reach	145.5	125000.00	53.91	101.90	84.69	101.93	0.000047	2.67	161458.60	14557.67	0.08
Lower Reach	145.2	125000.00	59.17	101.84	91.21	101.85	0.000060	2.16	156939.30	14546.83	0.07
Lower Reach	145	125000.00	63.40	101.78	90.90	101.80	0.000049	1.92	164050.00	14701.01	0.06
Lower Reach	144.7	125000.00	58.64	101.68	93.08	101.69	0.000080	2.15	157143.30	14432.61	0.07
Lower Reach	144.55	125000.00	59.86	101.62	92.66	101.64	0.000072	2.27	156051.00	13961.21	0.08
Lower Reach	144	125000.00	57.62	101.32	92.00	101.34	0.000209	1.57	143253.20	14557.66	0.05
Lower Reach	143.5	125000.00	49.57	101.07	83.88	101.09	0.000124	1.49	146529.50	14332.24	0.05
Lower Reach	143.25	125000.00	59.30	100.78	91.09	100.81	0.000100	2.21	135333.90	13429.40	0.08
Lower Reach	143	125000.00	55.70	100.48	82.44	100.52	0.000178	2.66	127051.40	13895.23	0.09
Lower Reach	142.5	125000.00	56.94	99.85	88.24	100.35	0.000107	7.13	123476.60	13855.87	0.26
Lower Reach	142	125000.00	55.80	99.96	93.43	100.00	0.000156	3.13	134588.20	14444.38	0.10
Lower Reach	141.9	125000.00	55.73	99.55	83.09	99.74	0.000104	4.80	112470.70	14636.03	0.17
Lower Reach	141.5	125000.00	55.58	99.22	86.65	99.24	0.000180	1.84	126101.20	15548.36	0.07
Lower Reach	140.74	125000.00	59.26	99.00	92.32	99.05	0.000083	3.49	136467.40	14202.62	0.11
Lower Reach	140	125000.00	55.10	98.75	80.89	98.78	0.000090	2.40	130037.00	12185.27	0.08
Lower Reach	139.85	125000.00	59.64	98.46	86.22	98.59	0.000211	4.71	94843.66	11951.18	0.15
Lower Reach	139.01	125000.00	60.94	97.77	84.99	97.85	0.000211	3.65	79330.20	10546.30	0.13
Lower Reach	138.36	125000.00	48.80	96.99	92.44	97.25	0.000162	6.28	75800.34	9871.40	0.23
Lower Reach	137.71	125000.00	61.64	96.40	85.40	96.52	0.000267	4.26	77120.89	10386.66	0.15
Lower Reach	137.14	125000.00	54.70	95.90	82.69	95.93	0.000120	2.29	107573.50	11403.80	0.08
Lower Reach	136.8	125000.00	58.44	95.75	87.85	95.78	0.000121	2.53	117831.60	12360.48	0.09
Lower Reach	136.2	125000.00	64.41	95.23	85.41	95.27	0.000213	2.34	95881.45	12408.85	0.10
Lower Reach	136	125000.00	58.84	94.92	78.39	95.02	0.000123	3.74	94668.04	10558.10	0.12
Lower Reach	135.5	125000.00	59.94	94.74	88.08	94.83	0.000137	4.16	98777.00	10322.14	0.14
Lower Reach	135	125000.00	56.87	94.67	82.48	94.76	0.000134	3.90	98105.20	10020.30	0.13
Lower Reach	134.65	125000.00	56.00	94.47	87.48	94.57	0.000086	4.07	98535.66	9683.39	0.15
Lower Reach	132.75	125000.00	55.23	93.17	86.81	93.32	0.000250	5.22	88359.84	8595.28	0.17
Lower Reach	131.6	125000.00	52.70	92.41	83.35	92.45	0.000106	2.87	96864.00	8484.79	0.10
Lower Reach	131.35	125000.00	55.24	91.95	85.86	92.21	0.000181	6.24	83807.36	8513.89	0.20
Lower Reach	130.93	125000.00	55.80	91.76	82.62	91.82	0.000126	3.37	85470.06	7468.67	0.11
Lower Reach	130.51	125000.00	57.25	91.21	82.62	91.47	0.000226	6.06	57688.75	5414.95	0.20
Lower Reach	129.3	20000.00	55.69	91.14	64.28	91.14	0.000010	0.93	44259.83	4011.31	0.03
Lower Reach	129.27	20000.00	55.00	91.12	63.97	91.13	0.000016	1.27	30543.06	2490.42	0.04
Lower Reach	129.23	20000.00	55.14	91.02	63.74	91.10	0.000040	2.21	9066.98	308.90	0.07
Lower Reach	129.22	20000.00	55.14	91.02	63.74	91.10	0.000040	2.21	9066.10	308.90	0.07
Lower Reach	129.216	20000.00	55.64	90.30	67.92	91.03	0.000097	6.91	3054.66	162.00	0.21
Lower Reach	129.215	Inl Struct									
Lower Reach	129.214	20000.00	55.64	83.18	67.92	84.40	0.000191	8.86	2258.03	82.00	0.30
Lower Reach	129.213	20000.00	55.64	81.79	70.42	84.16	0.001074	12.33	1621.48	62.00	0.43
Lower Reach	129.212	20000.00	55.64	81.76	70.42	84.13	0.001077	12.35	1619.35	62.00	0.43
Lower Reach	129.211	20000.00	55.64	82.87	62.88	83.02	0.000018	3.14	6377.34	296.46	0.12
Lower Reach	129.21	20000.00	55.64	82.88	62.24	83.00	0.000014	2.80	7144.21	324.53	0.11
Lower Reach	129.2	20000.00	55.04	82.91	63.09	82.95	0.000072	1.98	35048.28	8700.73	0.08
Lower Reach	129.03	20000.00	54.78	82.64	65.09	82.79	0.000324	3.09	7103.14	1776.71	0.14
Lower Reach	128.5	20000.00	55.05	82.14	64.68	82.20	0.000136	2.31	22351.03	10887.57	0.10
Lower Reach	127.7	20000.00	50.83	81.89	63.50	81.94	0.000095	1.89	24386.18	7270.93	0.08
Lower Reach	127.4	20000.00	55.20	81.82	63.58	81.84	0.000046	1.68	29449.05	8601.99	0.07
Lower Reach	126.7	20000.00	50.94	81.26	63.03	81.33	0.000183	2.49	22894.61	9237.46	0.11
Lower Reach	125.3	20000.00	53.62	80.34	62.68	80.39	0.000079	2.39	24896.86	9255.33	0.10
Lower Reach	125	20000.00	50.24	80.08	59.59	80.18	0.000191	2.81	10927.71	5422.02	0.11
Lower Reach	124.4	20000.00	50.30	79.66	60.86	79.70	0.000082	1.84	27271.26	9136.60	0.08
Lower Reach	123.8	20000.00	49.74	79.32	59.67	79.42	0.000151	2.65	11538.82	2111.61	0.11
Lower Reach	123.15	20000.00	47.30	79.01	59.92	79.05	0.000117	1.91	18461.69	8252.45	0.08
Lower Reach	122.5	20000.00	51.94	78.58	60.45	78.68	0.000092	2.65	10985.07	3189.83	0.10
Lower Reach	121.46	20000.00	45.44	78.21	59.55	78.36	0.000183	3.39	8635.75	1081.26	0.13
Lower Reach	120.8	20000.00	50.84	77.61	59.47	77.75	0.000154	3.02	8029.22	914.43	0.12
Lower Reach	120.7	20000.00	50.84	77.56	59.62	77.70	0.000187	3.07	7636.70	854.18	0.12
Lower Reach	120.62	20000.00	46.54	77.49	58.15	77.63	0.000159	2.96	7256.22	612.56	0.12
Lower Reach	120.605	Bridge									
Lower Reach	120.59	20000.00	46.54	77.46	58.15	77.59	0.000160	2.97	7233.35	612.25	0.12
Lower Reach	120.5	20000.00	51.77	77.34	61.05	77.49	0.000164	3.18	7962.73	1019.05	0.13
Lower Reach	120.4	20000.00	51.55	77.28	61.40	77.44	0.000219	3.34	8146.05	1214.39	0.13
Lower Reach	120.38	20000.00	53.44	76.98	61.37	77.07	0.000162	2.47	18052.39	4831.67	0.11
Lower Reach	118.81	20000.00	49.90	76.52	59.77	76.54	0.000103	1.50	24286.69	5663.62	0.07
Lower Reach	117.87	20000.00	47.74	76.09	56.53	76.19	0.000099	2.81	23661.93	5128.75	0.11
Lower Reach	117.2	20000.00	46.84	75.48	56.42	75.66	0.000225	3.50	11860.16	3836.57	0.14
Lower Reach	116.5	20000.00	45.70	75.07	55.11	75.22	0.000129	3.20	10355.60	1641.88	0.12
Lower Reach	116.1	20000.00	44.66	74.78	55.86	74.89	0.000154	2.88	11004.65	1777.74	0.11
Lower Reach	115.7	20000.00	48.14	74.57	57.36	74.64	0.000106	2.47	13116.40	1880.79	0.10
Lower Reach	115.2	20000.00	36.85	74.00	52.23	74.11	0.000173	2.68	9576.30	1667.85	0.11
Lower Reach	115	20000.00	37.25	73.85	52.46	74.02	0.000407	3.40	7886.60	1539.87	0.15
Lower Reach	114.8	20000.00	48.55	73.68	58.69	73.72	0.000075	2.16	32950.76	5631.24	0.09

HEC-RAS Plan: Proposed River: Rio Grande Reach: Lower Reach Profile: Design Flow (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	114.65	20000.00	43.92	73.64	54.88	73.66	0.000061	1.59	40904.45	5907.60	0.07
Lower Reach	114.1	20000.00	42.04	72.78	53.90	72.91	0.000231	3.11	9725.84	1464.54	0.13
Lower Reach	113	20000.00	38.05	72.39	53.01	72.40	0.000048	1.23	38993.09	9982.95	0.05
Lower Reach	112.2	20000.00	40.84	72.10	52.36	72.20	0.000116	2.93	19131.64	6639.64	0.11

HEC-RAS HEC-RAS 5.0.3 September 2016
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Lower Rio Grande
Project File : LowerRioGrande.prj
Run Date and Time: 10/3/2017 1:23:43 PM

Project in English units

Project Description:
Rio Grande Valley, Texas Fence Replacement
US Army Corps of Engineers Fort
Worth District
This model is not for public release until final
approval.
Last run date: October 3, 2017
HEC-RAS Version 5.0.3
The following
information was provided on the base model used for the duplicate effective
plan:
MARCH 2007

AN ADDITIONAL 70 XSECS THAT WERE SURVEYED ON MARCH 2007
WERE ADDED TO THE IBWC'S 2003 HECRAS BACKWATER MODEL. THE EARLIER 2003 MODEL'S
GEOMETRY WAS CONVERTED FROM 1929 DATUM TO CURRENT NAVD 88 DATUM.
THIS MODEL
WAS PREPARED USING HEC-RAS VERSION 4.0. THE FINAL PLAN MODEL ADDRESSED ASBUILT
CHANGES TO THE 2003 MODEL'S BRIDGES AT HIDALGO REYNOSA AND
PROGRESO

January
2003 (Earlier Model)

CURRENT MAINTENANCE WITH CONTROLLED GROWTH

HEC-RAS BACKWATER MODEL OF THE RIO GRANDE,
FROM BELOW BROWNSVILLE TO PEÑITAS.

This model used HEC-RAS Version 3.1.1.
Newer versions may give slightly different results.

River sections generally
surveyed during 1990. A few sections were surveyed earlier. This version
contains 24 additional sections with respect to the 1992 model, that were
surveyed in 2001.

Some of the geometry data at the dams, bridges, and
floodway inlets were taken from construction drawings and other sources.

The
flow of 235,000 cfs represents an attenuated flow from 250,000 cfs at Rio
Grande City. An additional 5000 cfs attenuation in the flood peak is assumed
to occur between Anzalduas Dam and Retamal Dam. Flows have been input to
simulate this attenuation. Flow diversions at the Main Floodway in the United
States and the Mexican Floodway are 105,000 cfs at each one, as agreed with
Mexico in Minute No. 238.

Starting elevation at River Mile 28 does not
include storm surge or tidal effects.

All elevations are referenced to Mean
Sea Level Datum.

The following description for the corrected effective plan
by Michael Baker International July 2017:
July 2017

The duplicate
effective river reach and cross-sections were re-cut using the 2008
IBWC-provided surface integrated with 2017 survey data (at cross-sections
145-139.85, 161.4- 160, and 155.2-135.5).

Reach lengths were approximated
between structures based on the duplicate effective model, then cross-sections,
and cross-section configurations were approximated using USIBWC-provided
hardcopy maps. Reach lengths for 169.83 and 169.49 were revised to 1300 feet,
and for 167.4 and 167 were revised to 2500 feet. Applied reach lengths were
imported from GeoRAS and not copied from Duplicate Effective Model, and the
reach was truncated at cross-section 112.2.

Cross-sections 186, 169.14,
169.12, 169.1, 156.93, 156.9, 156.87, 156.84, 151.27, 151.25, 129.23, 129.22,
129.216, 129.214, 129.213, 129.212, 129.211, 129.21, 120.62, 120.59, and 112.2;
and structures at river stations at 169.13, 156.915, 156.855, 151.255, 129.215,
and 120.605 were duplicated from the USIBWC 2008 model, except 169.14 was
elevated on the left bank to match the surface elevations.

Manning's
n-values, Contraction and expansion coefficients, blocked obstructions, levees,
and ineffective flow areas were approximated following associated duplicate
effective sections. Bathymetric stations and elevations were translated from
the associated duplicate effective cross-sections by graphical interpretations.

New cross-sections were placed at the beginning and ending of the proposed
floodwall. New cross-sections (excluding interpolated sections) include
180.32, 174, 172, 169.9, 166, 165, 163, 161.35, 161.3, 160, 159, 157.2, 155.2,
145.5, 145.2, 144.7, 144, 143.5, 143, 142, 141.5, 136.8, 136.2, 136, and 135.5.
Cross-sections 155.01, 154.6, 154.23, and 153.85 were extended on the left
bank to the levee. Bathymetric elevations, n-values, blocked obstructions,
levees, and ineffective flow areas for these new sections were placed based on
similar upstream or downstream cross-sections.

Cross-section 159.16 was
removed due to conflicts with new cross-sections and cross-sections downstream
of 112.2 were eliminated.

Control System Group: United States / State Plane
1983
Zone: Texas South 4205 (GROUND)
Datum Transformation: NAD 1983 (Conus)
(Molodensky)
Geoid Model: GEOID12B
Units: US Survey Feet
Vertical Datum:
NAVD88

The corrected effective and proposed flow boundary condition matches
the water surface elevation of the duplicate effective at cross-section 112.2
(72.10 ft)

Proposed cross-sections with 150-foot enforcement zone
cross-section: 180.32 - 169.9, 161.35 (not standard 150' section), 161.3, 155.2
- 145.67* (151.27 and 151.25 not standard 150' sections), 145.5 - 139.85
(75-foot enforcement zone for RGV-01 cut from proposed surface), 139.57* -
135.5, 127.7 - 124.4, 120.8, 120.7, 120.5, 120.4, 117.2 - 115.2.

PLAN DATA

Plan Title: Proposed
Plan File : w:\Proj\160298_ATP\DRAINAGE\RGVPDR\Hydraulics\HEC RAS\Current\LowerRioGrande.p03

Geometry Title: Proposed
Geometry File : w:\Proj\160298_ATP\DRAINAGE\RGVPDR\Hydraulics\HEC RAS\Current\LowerRioGrande.g05

Flow Title : Design Flow
Flow File : w:\Proj\160298_ATP\DRAINAGE\RGVPDR\Hydraulics\HEC RAS\Current\LowerRioGrande.f01

Plan Description:
July 2017

The Duplicate Effective river reach and cross-sections were
re-cut using the 2008 IBWC-provided surface integrated with 2017 survey data
(at cross-sections 145-139.85).

Reach lengths were approximated between
structures based on the duplicate effective model, then cross-sections, and
cross-section configurations were approximated using USIBWC-provided hardcopy
maps. Reach lengths for 169.83 and 169.49 were revised to 1300 feet, and for
167.4 and 167 were revised to 2500 feet. Applied reach lengths were imported
from GeoRAS and not copied from Duplicate Effective Model, and the reach was
truncated at cross-section 112.2.

Cross-sections 186, 169.14, 169.12, 169.1,
156.93, 156.9, 156.87, 156.84, 151.27, 151.25, 129.23, 129.22, 129.216,
129.214, 129.213, 129.212, 129.211, 129.21, 120.62, 120.59, and 112.2; and
structures at river stations at 169.13, 156.915, 156.855, 151.255, 129.215, and
120.605 were duplicated from the USIBWC 2007 model.

Manning's n-values,
Contraction and expansion coefficients, blocked obstructions, levees, and
ineffective flow areas were approximated using engineering judgement.
Bathymetric elevations were not obtained with the 2017 survey. Bathymetric
stations and elevations were translated from the associated duplicate effective
cross-sections using engineering judgement.

New cross-sections were placed
at the begining and ending of the proposed floodwall. New cross-sections
include 180.32, 169.9, 161.35, 161.3, and 155.2. Bathymetric elevations,
n-values, blocked obstructions, levees, and ineffective flow areas for these
new sections were placed based on similar upstream or downstream
cross-sections.

Cross-section 159.16 was removed due to conflicts with new
cross-sections.
This model was prepared using HEC-RAS Version 5.0.3.

Coordinate system NAD 1983 State Plane Texas South FIPS 4205 Feet, Lambert
Conformal Conic projection.

Plan Summary Information:
Number of: Cross Sections = 234 Multiple Openings = 0
Culverts = 0 Inline Structures = 2
Bridges = 4 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Design Flow
Flow File : w:\Proj\160298_ATP\DRAINAGE\RGVPDR\Hydraulics\HEC RAS\Current\LowerRioGrande.f01

Flow Data (cfs)

River	Reach	RS	Design Flow
Rio Grande	Lower Reach	186	235000
Rio Grande	Lower Reach	169.83	130000
Rio Grande	Lower Reach	156.93	125000
Rio Grande	Lower Reach	129.3	20000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Rio Grande	Lower Reach	Design Flow		Known WS = 72.1

Inline Structure Gate Openings
River = Rio Grande
Reach = Lower Reach RS = 169.13
Gate = Gate #1

# Open	Open Ht
34.75	6

River = Rio Grande
Reach = Lower Reach RS = 129.215
Gate = Gate #1

# Open	Open Ht
13.75	1

GEOMETRY DATA

Geometry Title: Proposed
Geometry File : w:\Proj\160298_ATP\DRAINAGE\RGVPDR\Hydraulics\HEC RAS\Current\LowerRioGrande.g05

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 186

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	125.24	4	124.94	20	118.94	39	118.44	53	118.64
56	116.94	64	116.94	72	118.94	81	118.54	101	117.94
743	116.94	2095	117.64	2115	117.61	2134	119.86	2141	117.84
2147	113.94	2161	102.98	2169	96.64	2179	89.94	2189	87.94
2199	86.94	2209	86.64	2219	85.94	2239	87.94	2249	89.64
2259	90.44	2269	90.94	2279	91.94	2289	92.74	2299	93.64
2309	93.64	2329	95.64	2349	95.64	2359	95.94	2369	96.64
2379	96.94	2389	96.74	2399	96.94	2409	97.64	2419	97.94
2439	99.94	2449	99.94	2459	101.94	2462	102.98	2465	103.56
2497	109.74	2514	117.74	2526	118.11	2567	117.04	2576	117.08
2623	115.34	4197	113.74	4239	114.74	4255	119.24	4263	118.54
4270	119.24	4276	117.24	4288	116.74	4523	118.24	4528	120.24
4534	119.74	6507	116.44	6541	119.44	6563	118.74	6819	119.14
6847	119.74	9100	117.74	9111	121.14	9125	120.94	10226	120.54
10519	125.94								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.114	2141	.066	2161	.015	2465	.066	2514	.062

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2141 2514 850 1950 1075 .1 .3
Left Levee Station= 0 Elevation= 125.04
Right Levee Station= 10519 Elevation= 125.94

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	134.57	Element	0.114	0.029	0.062
Vel Head (ft)	0.09	Wt. n-Val.	850.00	1950.00	1075.00
W.S. Elev (ft)	134.48	Reach Len. (ft)	36478.95	14048.49	131002.50
Crit W.S. (ft)	122.25	Flow Area (sq ft)	36478.95	14048.49	131002.50
E.G. Slope (ft/ft)	0.000056	Area (sq ft)	23490.14	60110.57	151399.30
Q Total (cfs)	235000.00	Flow (cfs)	2141.00	373.00	8005.00
Top Width (ft)	10519.00	Top Width (ft)	0.64	4.28	1.16
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)	17.04	37.66	16.37
Max Chl Dpth (ft)	48.54	Hydr. Depth (ft)	3137148.0	8027868.0	20219630.0
Conv. Total (cfs)	31384650.0	Conv. (cfs)	2152.48	385.94	8015.76
Length Wtd. (ft)	1250.18	Wetted Per. (ft)	0.06	0.13	0.06
Min Ch El (ft)	85.94	Shear (lb/sq ft)	0.04	0.55	0.07
Alpha	3.33	Stream Power (lb/ft s)	333277.30	98804.70	350944.60
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	31175.63	3711.40	33909.89
C & E Loss (ft)	0.01	Cum SA (acres)			

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 185.50*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	123.96	9.9	124.57	21.45	124.62	37.95	124.29	54.45	124.29
75.9	124.11	89.1	124.12	103.95	124.31	120.46	124.05	128.71	124.16
184.81	123.86	221.11	124	245.86	123.96	292.06	124.1	303.61	124.54
308.56	125.88	316.81	128.82	325.06	130.83	327.5	129.93	342.17	122.81
347.06	121.14	349.37	120.85	381.28	120.42	388.61	120.75	399.52	120.44

```
  404.08  119.44  413.05  119.14  428.39  119.46  437.49  119.16   454.6  118.17
  461.29117.9901  471.71  117.71  481.49  117.74  523.04  117.54  545.03  117.65
  562.14  117.54  601.25  117.76  635.47  117.87  650.13  117.78  694.12  117.99
  716.12  117.91  750.34  118.15  755.23  118.27  801.66  118.31  808.99  118.17
  816.33  118.68  833.44  118.74  835.88  118.37  845.66  115.83  850.55  114.89
  857.88   114.3   870.1  114.57  879.88  115.05  887.21  115.16  894.54  114.55
  906.76  114.85   914.1  114.62  933.64  114.88  958.09   114.5  970.31  114.48
   992.3  114.65 1002.08   115.2 1011.86  114.43 1019.19  114.26 1024.08  114.49
 1043.63  114.74 1050.97  114.99 1082.74  115.42 1129.18  115.63 1138.95  115.49
 1151.17  115.69  1163.4  115.56 1173.17  115.73 1236.72  115.38 1248.94  115.25
 1270.94  115.35  1285.6  115.69 1305.16  115.77 1314.93  115.43 1354.03  115.56
 1363.81  115.31 1378.48  115.43 1388.25  115.02 1402.92  114.88  1429.8  114.95
 1454.25  114.77 1488.46   114.8 1495.79  114.71 1542.23  114.76 1561.79  114.87
 1569.12  114.74 1581.34  114.96 1615.56  115.11 1637.55  115.28 1649.77  115.21
 1693.77  115.35  1701.1  115.26 1730.43  115.34 1776.87   115.8 1791.53  116.26
 1811.09  115.98 1818.42  116.19 1845.31  116.48 1879.53  116.58 1894.18  116.06
 1901.52  116.18 1911.29     116  1928.4  116.07 1935.74  115.94 1952.85  116.07
 1960.18  115.87 1974.84   115.8  1994.4   115.9 2013.95  116.25  2033.5  115.86
 2094.61  116.34 2104.38  116.52 2114.16  116.45 2128.82  116.73 2143.49  116.56
 2155.71  116.87  2177.7  117.14 2185.04     117  2221.7  117.08 2238.81  117.22
 2246.14  116.96  2265.7  117.11 2295.02   116.8 2329.24  117.01 2339.02  116.65
 2353.68  116.49 2368.35  116.65 2385.46  117.05 2400.12  116.86 2414.79  117.46
 2419.68  117.23 2436.78  117.13 2441.67  117.28 2453.89  116.92 2475.89  116.85
 2502.76  116.92 2529.62  117.28 2539.39  117.26 2556.49  118.09 2578.47  118.43
 2593.12  118.16 2619.99  118.03 2627.31  118.17 2639.53  118.03 2666.38  118.32
 2676.15  118.14 2683.48   117.7 2698.14  117.39 2727.44  117.71 2734.76  117.68
 2776.28  117.98 2790.94  117.32 2798.26  116.73 2810.47  116.57 2822.68  116.89
 2832.45  116.69 2839.78  116.22  2847.1   116.5 2866.64  116.45 2873.97  116.78
 2895.95  116.75 2908.16  117.29 2913.04  117.23 2927.69  117.57  2939.9  117.35
    2957  117.61 2978.98  116.89  2986.3  117.06  3003.4  117.87 3015.61  117.47
 3022.93  117.52 3037.58  118.09 3069.34  118.09 3083.99   117.9 3091.31  118.03
 3101.08  117.46 3108.41  117.39 3115.73  116.61 3123.06  117.03 3135.26  116.73
  3142.6  116.82  3154.8  117.71 3164.57  117.84  3171.9  118.31 3179.22  119.12
 3193.87  118.85  3201.2  117.57 3218.29  117.99 3230.51  118.61 3242.71  118.56
 3259.81  118.25 3272.02  119.19 3281.78  118.79 3286.67  119.04    3294  118.72
 3301.32  118.88 3303.77   118.6 3311.09  116.34 3313.54  116.06 3328.19  116.59
 3340.39  117.62 3345.28  117.72 3367.26  117.59 3377.03  117.39 3391.68  117.74
 3401.45  116.93 3418.54  117.38 3423.42  117.79 3442.96  116.28 3455.17     117
  3462.5  116.95 3474.71  116.12 3484.48  116.18 3494.24  116.85 3511.34  116.65
 3523.55  117.06 3535.76  117.26 3550.41  118.52 3561.75  118.92 3572.39  118.47
 3584.21   117.2 3590.12  115.86 3598.12114.8935 3611.78   112.1 3615.72  111.76
 3625.57  109.98 3637.39  108.46  3649.2  106.56 3659.06  105.54  3668.9  103.81
 3674.81  101.94 3680.72  100.69 3690.57  100.48 3696.48  100.02 3704.36   98.96
 3711.7797.17587 3717.81   95.93 3720.81   95.87 3734.04    94.8 3746.06   94.16
 3759.88   92.74 3765.89   90.95 3770.28 90.2082 3774.3789.18606 3784.53    84.8
 3789.93   82.89 3797.15   81.41 3804.36   80.42 3815.48   81.78 3826.59   82.52
 3829.56   83.36 3847.59   87.34 3857.47   88.35 3871.57    91.1 3879.97   92.28
 3892.06   93.64 3901.94   95.32 3910.58   97.07 3921.97   97.67 3938.77   98.83
 3955.57   99.49 3972.37  100.65 3989.15 102.308 3997.58  102.64 4003.61   103.6
 4015.76   107.3 4023.85  112.41  4037.9  114.11 4052.18  118.19 4061.18  118.38
 4091.93  117.83 4098.67  117.85 4133.92  116.97 4209.51  116.89 4307.84  117.01
  4322.6  116.88 4425.84  116.96  4470.1  116.82  4504.5  116.89  4529.1  116.76
 4548.78  116.85  4627.5  116.73 4652.11  116.92 4716.08  116.76 4794.81  116.81
 4888.31  116.55 4952.27  116.57 5001.48  116.47 5119.57  116.37 5178.63   116.4
 5247.51  116.28 5314.28  116.28 5345.78   116.8 5357.78  119.05 5363.78  118.68
 5369.03  119.01 5373.53     118 5382.53  117.75 5498.47  118.25 5558.76  118.55
  5562.5  119.54    5567  119.29 5596.88  119.19 5655.93  119.19  5695.3  119.05
  5744.5  119.03 5808.47  118.87 5882.29  118.85 5936.41  118.77 6015.15  118.51
 6024.99  118.56 6059.44   118.2 6069.26  118.27 6143.08  118.03 6177.53  118.04
 6221.82   117.9 6251.33  117.96 6325.15  117.86 6394.04  118.03 6418.63  117.93
 6438.32  118.04 6472.77     118 6531.82   117.7 6571.17  117.59 6625.31  117.59
 6817.22  117.37 6866.43  117.25 6989.44  117.22 7033.73  117.15 7046.58  117.26
 7072.08  118.75 7088.58  118.38  7122.3  118.37  7146.9  118.03  7215.8  117.85
 7280.56  117.76 7301.55  118.02 7338.81  117.99 7392.94  117.78 7481.51  117.56
 7496.27   117.6 7540.56  117.41 7761.98  116.86 7870.25  116.65 8008.03  116.25
 8022.79  116.02 8062.16  116.06    8072  115.92 8096.61  116.07 8116.29  116.87
 8135.98  116.93 8160.58  116.59 8214.71  116.46 8278.69  116.42 8357.43  116.48
 8377.11  116.75 8386.95  116.41 8396.79  115.56 8411.56  115.25 8450.93  115.37
 8455.85  115.63 8475.54  117.77 8485.38  118.11 8529.68  117.67  8603.5  117.76
 8667.47  117.66 8711.76  117.77 8805.27  117.61 8849.56  117.68  8952.9  117.59
 8991.11  117.49 8999.36  119.18 9009.86  119.09 9253.09  119.26 9331.83  119.16
 9405.64  119.15 9440.09  119.24 9568.04  119.21 9602.49  119.29 9641.86  119.24
 9671.39  119.42 9686.15  119.24 9700.91  117.47 9710.76  117.37 9725.52   119.3
 9740.28  120.75 9755.04  121.77 9779.65  122.67 9794.41  122.19 9819.02  122.68
 9868.23  122.83    9883  123.13  9907.6  124.01 9956.81  124.77 9991.26  125.51
10025.71  126.0310055.23  126.2610065.08  126.4810071.64  126.2610129.04  126.48
10142.16  126.4610155.28  126.7110166.76  126.6210174.96  126.7910188.08  126.64
10194.64  126.84 10209.4  126.6210220.88  126.93 10225.8  126.4810232.36  127.02
10240.56  126.7410263.52  126.82   10275  126.5410288.12  126.5610301.24  126.25
10329.12  126.6310337.32  126.3510370.12  126.89 10389.8  126.5110407.84  126.71
 10422.6  126.36 10430.8  126.5910443.92  126.0510452.12   126.110460.32  126.52
10470.16   126.410486.56  126.5110506.24  126.3410539.04  126.3210560.36  126.49
10566.92  126.3510634.17  126.4910642.37  125.8210652.21  126.0610666.96  125.93
10734.21   126.210745.69  126.4510763.72  126.1710842.45  125.8410886.72  125.89
10898.21  125.8110927.72  125.8510990.04  125.8311017.92  125.7111026.12  125.76
11063.85  125.6711075.33  125.7611136.01  125.5511180.29  125.6211198.33  125.48
11222.93  125.5211226.21  125.4211249.17  125.4711321.33   125.511349.21  125.45

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  833.44    .066 3572.39     .07 3598.12    .025 3989.15     .07
 4052.18    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3572.39 4052.18              850    1950    1075             .1       .3
Left Levee      Station=  325.05      Elevation=  130.83
Right Levee     Station=10065.08      Elevation= 126.475

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 185

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.67    9.84  122.85   19.68   123.9   42.64  124.01    49.2  123.25
   55.76  123.66   75.44  123.38  108.23   123.4  150.87  123.05  177.11  123.09
  206.63  123.48  239.43  122.97  255.83   123.2  367.34  122.66   439.5  122.96
  488.69  122.91  531.33  123.13  564.13  123.05  580.53  123.23  603.49  124.12
```

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  613.32  126.81  629.72   132.7  639.56  135.55  646.12  136.72   649.4  135.53
  669.08   124.9  675.64  122.77  692.04  122.77  721.56  122.38   731.4  122.97
   764.2  121.34  770.75  121.35  787.15  119.75  796.99  119.64  819.95  118.04
  842.91  117.47  856.03  117.54  911.79  117.19   941.3  117.44  964.26  117.24
 1016.74  117.72 1062.66  117.96 1082.34   117.8 1141.37  118.27 1170.89  118.12
 1216.81  118.64 1223.37  118.88 1285.68  119.02 1295.52  118.74 1305.36  119.78
 1328.32  119.91  1331.6  119.17 1344.72   114.1 1351.28  112.23 1361.12  111.05
 1377.52   111.6 1390.64  112.57 1400.48   112.8 1410.32  111.59 1426.72   112.2
 1436.56  111.75 1462.79   112.3 1495.59  111.55 1511.99  111.53 1541.51   111.9
 1554.63     113 1567.75  111.48 1577.59  111.14 1584.15   111.6 1610.39  112.12
 1620.23  112.64 1662.86  113.52 1725.18  113.99  1738.3  113.72  1754.7  114.13
  1771.1  113.89 1784.22  114.23 1869.49   113.6 1885.89  113.35 1915.41  113.57
 1935.09  114.27 1961.33  114.45 1974.45  113.78 2026.92  114.09 2040.04  113.59
 2059.72  113.85 2072.84  113.04 2092.52  112.78  2128.6  112.95  2161.4   112.6
 2207.31  112.64 2217.15  112.46 2279.47  112.55 2305.71  112.77 2315.55   112.5
 2331.95  112.94 2377.87  113.22 2407.38  113.56 2423.78  113.42 2482.82  113.67
 2492.66  113.49 2532.02  113.65 2594.33  114.55 2614.01  115.46 2640.25   114.9
 2650.09  115.32 2686.17  115.88 2732.09  116.08 2751.76  115.03  2761.6  115.26
 2774.72   114.9 2797.68  115.04 2807.52  114.78 2830.48  115.03 2840.32  114.62
    2860  114.48 2886.24  114.67 2912.48  115.37 2938.71  114.59 3020.71  115.51
 3033.83  115.88 3046.95  115.74 3066.63  116.28 3086.31  115.95 3102.71  116.55
 3132.22  117.09 3142.06   116.8 3191.26  116.96 3214.22  117.23 3224.06  116.71
  3250.3     117 3289.65  116.37 3335.57  116.77 3348.69  116.06 3368.37  115.74
 3388.05  116.04 3411.01  116.85 3430.69  116.46 3450.37  117.66 3456.93  117.18
 3479.88  116.98 3486.44  117.29 3502.84  116.56 3532.36   116.4 3568.42  116.54
 3604.47  117.25 3617.58   117.2 3640.52  118.86 3670.02  119.53 3689.68  118.98
 3725.73  118.73 3735.56     119 3751.95  118.71 3787.99  119.29  3801.1  118.93
 3810.93  118.03  3830.6  117.42 3869.92  118.05 3879.75  117.99 3935.47  118.57
 3955.13  117.25 3964.96  116.06 3981.35  115.73 3997.73  116.38 4010.84  115.96
 4020.67  115.02  4030.5  115.59 4056.72  115.48 4066.55  116.13 4096.05  116.06
 4112.43  117.14 4118.99  117.02 4138.65  117.69 4155.03  117.26 4177.97  117.76
 4207.47  116.32  4217.3  116.65 4240.24  118.28 4256.62  117.47 4266.45  117.56
 4286.11  118.69 4328.72  118.69 4348.38  118.31 4358.21  118.56 4371.32  117.41
 4381.15  117.27 4390.98  115.71 4400.81  116.55 4417.19  115.95 4427.03  116.12
 4443.41   117.9 4456.52  118.15 4466.35  119.09 4476.18  120.72 4495.84  120.16
 4505.67   117.6 4528.61  118.44    4545  119.67 4561.38  119.56 4584.32  118.94
 4600.71  120.81 4613.81  120.02 4620.37  120.52  4630.2  119.88 4640.03  120.19
 4643.31  119.63 4653.14  115.11 4656.42  114.55 4676.08  115.59 4692.46  117.65
 4699.02  117.86 4728.51  117.59 4741.62  117.18 4761.28  117.87 4774.39  116.25
 4797.33  117.14 4803.88  117.96  4830.1  114.94 4846.48  116.38 4856.31  116.28
  4872.7  114.61 4885.81  114.73 4898.91  116.06 4921.85  115.67 4938.24  116.51
 4954.62  116.68 4974.28  118.06 4993.95  117.95 5003.78  119.11 5016.89  118.76
 5023.44  119.14 5033.27  117.75 5049.66  117.97 5069.32  115.94 5075.87  116.28
 5092.26  115.33 5111.92  115.42 5131.58  114.75 5147.97   115.2 5164.35  113.97
 5174.18  111.56 5184.01  110.39  5200.4  111.36 5210.23  110.84 5223.34  109.26
 5233.17  106.41 5239.72  105.82 5245.72     104 5245.72  103.92 5250.72     104
 5272.72   102.3 5292.72   101.4 5315.72    98.7 5325.72   95.18 5337.72    92.8
 5356.72    83.2 5365.72    79.5 5377.72   76.72 5389.72    74.9 5398.72    76.3
 5407.72      76 5424.72    83.6 5432.72    84.5 5450.72    90.9 5460.72    92.2
 5468.72      95 5475.72    98.5 5551.04  105.82 5560.87  109.95 5567.42  118.32
 5590.36  118.65 5695.22  118.55 5760.76  118.91  5770.6  118.68 5839.41  118.98
 5868.91  118.76 5891.84  118.94 5908.23  118.72 5921.35  118.93 5973.82  118.78
 5990.22   119.2 6032.86  118.97 6085.33  119.18 6147.65  118.79 6190.28  118.91
 6223.08  118.77 6301.79  118.73 6341.15  118.88 6387.06  118.72 6459.22  118.88
 6469.06  118.76 6554.33  118.78 6590.41  118.89 6619.92  118.71 6659.28  118.83
 6685.52  118.65 6718.31  118.71 6760.95  118.54 6810.15  118.67 6846.22  118.63
  6898.7  118.28 6905.26   118.4 6928.22  117.76 6934.77  117.93 6983.97  117.61
 7006.93  117.71 7036.45  117.53 7056.12   117.7 7105.32  117.68 7151.24  118.17
 7167.63  118.01 7180.75  118.28 7203.71  118.28 7243.07  117.82  7269.3  117.68
 7305.38  117.81 7433.29  117.78 7466.09  117.66 7548.08  117.88  7577.6  117.84
 7587.44  118.11 7636.63  117.93 7653.03   117.2 7698.95  116.69  7754.7   116.3
 7780.94  116.28 7817.02  115.93 7876.05   115.6 7885.89   115.7 7915.41  115.37
 8062.99  114.52 8135.15  114.24 8226.98  113.59 8236.82  113.15 8263.06  113.29
 8269.62  113.01 8286.02  113.34 8299.14  114.97 8312.26   115.1 8328.66  114.45
 8364.74  114.26 8407.38  114.25 8459.86  114.47 8472.98  115.03 8479.54  114.36
  8486.1  112.67 8495.94  112.08 8522.18  112.37 8525.46  112.89 8538.58  117.19
 8545.14  117.88 8574.67  117.06 8623.87  117.32 8666.51  117.19 8696.03  117.46
 8758.35  117.27 8787.87  117.45 8856.75   117.4 8886.27  117.21 9056.83   117.7
 9109.31  117.53 9158.51  117.56 9181.47  117.74 9266.75  117.76 9289.71  117.93
 9315.95  117.85 9335.63  118.22 9345.47  117.87 9355.31  114.34 9361.87  114.14
 9371.71  118.01 9381.55  120.91 9391.39  122.96 9407.79  124.77 9417.63  123.83
 9434.03  124.81 9447.15  124.86 9466.83  124.31 9476.67  124.55 9493.07   125.7
 9525.87  126.01 9548.83  126.66 9571.79  126.84 9591.47  126.57 9611.16  127.01
 9624.28  126.58 9643.96  126.75 9689.88  126.75 9739.08  127.02 9765.32  126.99
 9791.56  127.48 9814.52  127.31 9830.92  127.63 9857.16  127.33 9870.28  127.74
  9899.8   127.3 9922.76  127.91  9932.6  127.02 9945.72   128.1 9962.12  127.53
 9978.52   127.8 9994.92 127.4410008.04  127.71   10031 127.1310057.24  127.17
10083.48 126.5610139.24 127.3210155.64 126.7610221.24 127.8310240.92   127.3
 10260.6 127.0910296.68  127.48 10326.2  126.78 10342.6 127.2410349.16  126.62
10368.84 126.1610385.24 126.2510401.64  127.110421.32 126.8510454.12  127.09
10493.48 126.7410559.08 126.6910601.72 127.0310614.84 126.7510696.85  126.95
10713.25 126.7410726.37 127.0710749.33 127.0410765.73  125.710785.41  126.18
10814.93 125.9210949.41 126.4610972.37 126.9611008.45  126.411054.37  126.23
11074.05 126.3211087.17 126.0511119.97 126.0311165.89 125.7411201.97   125.7
11254.45 125.8311277.41 125.6711336.45 125.7611421.73 125.6811461.09  125.72
11516.85 125.4811533.25 125.5711608.69 125.3911631.65 125.5811753.02  125.16
11785.82 125.1211841.58 125.3111877.66 125.0211926.86  125.111933.42   124.9
11979.34    12512028.54 124.8512044.94    12512123.66 125.0612179.42  124.96

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  646.12    .066 5003.78     .07 5174.18    .025 5245.72     .07
 5250.72    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5003.78 5590.36              850    1950    1075             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5003.78  119.11       T
 5590.3612179.42  118.65       T
Left Levee      Station=  646.12      Elevation=  136.72
Right Levee     Station= 9611.16      Elevation=  127.01

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            134.40    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                0.066      0.059     0.066
  W.S. Elev (ft)            134.36    Reach Len. (ft)          850.00    1950.00    1075.00
  Crit W.S. (ft)            122.19    Flow Area (sq ft)      65636.21   18178.40   82194.24
  E.G. Slope (ft/ft)      0.000099    Area (sq ft)           79110.91   18178.40   87234.27
  Q Total (cfs)           235000.00     Flow (cfs)            89603.63   46522.88   98873.49
  Top Width (ft)          11527.85    Top Width (ft)          4352.21    586.58    6589.06
```

Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)	1.37	2.56	1.20
Max Chl Dpth (ft)	59.46	Hydr. Depth (ft)	15.08	30.99	12.47
Conv. Total (cfs)	23625290.0	Conv. (cfs)	9008136.0	4677093.0	9940064.0
Length Wtd. (ft)	1327.97	Wetted Per. (ft)	4360.98	602.28	6602.33
Min Ch El (ft)	74.90	Shear (lb/sq ft)	0.09	0.19	0.08
Alpha	1.31	Stream Power (lb/ft s)	0.13	0.48	0.09
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	330969.30	97323.28	345544.10
C & E Loss (ft)	0.04	Cum SA (acres)	31042.56	3668.44	33549.73

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 184.50*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	125.93	7.29	125.96	14.59	126.42	31.6	126.41	70.57	125.35
110.91	124.88	126.03	125.25	153.15	125.33	171.4	125.15	177.46	124.86
196.6	125.29	216.76	124.46	236.94	124.3	247.01	124.46	267.17	124.38
292.37	124.96	312.55	125.13	337.75	124.87	368.81	124.8348	393.2	125.11
403.28	125.1	423.44	125.74	438.58	127.13	447.3	128.29	454.58	130.18
466.74	133.95	474.03	135.86	478.9	136.64	480.68	136.05	491.42	130.74
495	129.68	520.05	129.51	525.42	129.81	543.31	129.01	555.83	128.22
561.2	128.17	573.73	127.38	623.83	126.3	639.93	126.1	652.46	125.74
675.38	125.47	706.14	125.39	716.87	125.23	749.08	125.21	765.18	125.01
793.81	124.97	827.81	124.19	833.17	123.92	838.54	124.3	851.07	124.05
863.59	119.99	868.96	119.31	890.44	119.95	895.8	119.29	904.75	119.51
910.12	119.24	924.43	119.37	942.32	118.83	967.37	118.76	974.53	119.24
981.69	118.41	1004.95	118.57	1010.32	118.8	1033.58	119.12	1083.68	119.15
1092.63	118.99	1146.3	119.12	1171.36	119.32	1182.09	119.72	1196.41	119.87
1203.56	119.57	1232.19	119.81	1239.35	119.53	1250.08	119.63	1257.24	119.21
1267.98	119.05	1287.66	119.07	1304.11	118.86	1335.97	119	1369.97	119.28
1398.6	119.68	1439.75	120.46	1448.7	120.49	1480.91	120.99	1486.27	120.97
1541.74	121.57	1552.48	122.01	1566.79	121.71	1591.84	122.21	1616.9	122.31
1627.63	121.79	1670.57	121.74	1686.68	121.3	1700.99	121.19	1715.31	121.33
1729.62	120.68	1788.67	120.18	1799.4	120.34	1810.14	120.18	1819.09	120.49
1854.22	120.97	1879.92	121.1	1885.29	120.83	1899.6	120.95	1921.07	120.54
1946.12	120.5	1953.28	120.08	1964.02	119.87	1987.28	120.31	1998.02	120.06
2008.75	120.61	2012.33	120.35	2028.43	120.3	2037.38	119.88	2073.15	119.64
2099.97	119.82	2112.49	120.6	2128.58	120.87	2139.31	120.55	2173.28	120.42
2192.94	120.71	2205.46	119.99	2216.19	119.61	2273.4	119.81	2284.12	119.14
2289.49	118.53	2298.43	118.36	2307.36	118.67	2319.88	117.97	2325.24	118.25
2339.55	118.18	2344.91	118.49	2361	118.44	2369.94	118.96	2384.24	119.22
2393.18	119.01	2405.69	119.26	2421.79	118.55	2439.67	119.54	2453.97	119.18
2464.69	119.75	2504.02	119.7	2516.54	119.06	2521.9	118.28	2527.26	118.71
2541.57	118.5	2550.51	119.39	2557.66	119.52	2568.38	120.79	2579.11	120.48
2584.47	119.18	2596.99	119.57	2605.93	120.16	2627.38	119.74	2636.32	120.65
2643.47	120.25	2647.05	120.5	2659.56	120.07	2666.71	117.53	2677.44	118.06
2689.95	119.21	2713.19	118.89	2723.92	119.19	2731.07	118.33	2743.59	118.68
2747.16	119.06	2761.46	117.44	2770.4	118.09	2775.76	117.99	2784.7	117.14
2791.86	117.2	2799	117.86	2811.52	117.66	2829.4	118.28	2840.12	119.07
2850.85	119.11	2856.21	119.74	2868.63	119.72	2875.21	19.0129	2885.18	119.09
2897.59	118.01	2901.73	118.11	2924.48	116.84	2936.9	115.67	2947.24	115.1
2957.58	113.64	2969.99	110.69	2980.34	109.88	2998.17	106.68	3003.7	100.98
3006.22	100.4952	3008.95	99.97	3027.74	99.06	3038.62	98.22	3053.14	96.34
3059.46	94.67	3067.03	93.59	3069.29	2.75314	3073.69	1.05616	3084.71	85.59
3092.28	82.94	3099.86	80.77	3112.09	81.89	3124.33	82.32	3131.5	83.5
3147.44	86.78	3158.31	87.63	3171.04	89.74	3186.86	92.12	3196.37	92.57
3202.68	93.38	3216.76	96.1	3226.41	97.06	3234.32	98.2	3250.14	99.91
3258.05	101.2	3273.86	102.78	3307.72	105.32	3311.85	106.0442	3319.15	108.37
3333.67	114.53	3341.41	118.88	3351.83	119.61	3372.59	120.15	3377.69	119.99
3385.33	117.52	3390.44	116.66	3400.63	115.63	3413.37	114.89	3433.76	114.8
3449.05	114.41	3466.89	114.34	3502.57	114.56	3553.53	114.68	3591.75	114.97
3611.71	115.21	3647.82	115.26	3680.95	115.55	3688.6	115.44	3726.82	116.03
3759.95	117.11	3772.7	117.86	3805.82	117.61	3854.24	117.78	3905.21	117.68
3933.7	117.99	3956.18	117.89	4012.24	117.86	4075.95	118.1	4129.47	118.05
4223.76	118.61	4239.05	118.56	4269.63	118.66	4295.12	118.61	4346.09	118.67
4381.77	118.6	4397.06	118.68	4499	118.6	4542.32	118.84	4567.81	118.78
4591.83	118.91	4611.13	118.84	4623.87	118.98	4639.16	118.92	4662.1	119.1
4669.74	119.02	4700.32	119.24	4738.56	119.27	4809.91	119.42	4817.33	119.31
4850.68	119.44	4886.36	119.47	4901.66	119.33	4919.49	119.42	4983.2	119.47
5034.17	119.26	5052.02	119.11	5164.14	118.68	5207.47	118.41	5217.74	118.48
5248.25	118.06	5259.15	118.17	5299.22	117.87	5304.31	117.92	5345.09	117.69
5360.41	117.72	5416.44	117.44	5434.28	117.47	5495.45	117.25	5562.91	117.39
5592.29	117.26	5604.32	117.39	5645.81	117.24	5676.39	116.99	5747.74	116.69
5760.48	116.75	5801.26	116.71	5816.55	116.62	5893	116.5	5921.04	116.38
5938.88	116.41	5997.49	116.22	6028.07	116.21	6051.01	116.3	6073.94	116.17
6094.33	116.28	6150.39	116.15	6196.26	116.26	6209.01	116.15	6244.03	116.12
6257.43	115.87	6295.65	115.64	6356.82	115.52	6379.75	115.31	6395.04	115.4
6420.53	115.27	6440.92	115.33	6456.2	115.2	6519.92	115.03	6540.31	115.08
6560.69	115.5	6565.78	115.94	6578.53	117.81	6621.85	117.39	6660.08	117.37
6680.47	117.22	6718.69	117.19	6784.95	116.97	6800.24	117.05	6846.11	116.93
6858.85	116.82	6932.76	116.75	6999.02	116.47	7042.34	116.38	7072.45	116.22
7086.25	116.05	7118.79	116.1	7132.28	115.88	7155.29	116.03	7173.71	116.85
7192.12	116.91	7218.18	116.54	7253.86	116.34	7271.7	116.39	7307.38	116.28
7322.67	116.34	7353.25	116.27	7399.24	116.32	7417.65	116.63	7426.85	116.29
7436.06	115.44	7449.87	115.13	7486.69	115.18	7491.29	115.51	7509.7	117.62
7518.91	117.98	7529.09	117.8	7574.96	117.52	7625.93	117.56	7643.77	117.64
7689.22	117.55	7717.67	117.63	7791.58	117.61	7801.77	117.52	7859.52	117.64
7873.13	117.55	7926.64	117.63	7985.26	117.52	7990.35	117.42	8026.03	117.53
8110.13	117.54	8143.26	117.65	8204.42	117.54	8250.29	117.39	8268.13	117.26
8288.52	117.38	8303.81	116.61	8314	116.41	8354.78	116.51	8375.17	116.38
8446.52	116.53	8502.58	116.39	8525.52	116.47	8599.42	116.41	8628.17	116.58
8641.97	116.41	8655.78	114.59	8664.99	114.46	8678.79	116.4	8692.6	117.84
8706.41	118.83	8729.42	119.74	8743.23	119.19	8766.25	119.68	8790.56	119.66
8812.27	119.42	8826.08	119.53	8849.09	120.05	8874.65	120.22	8887.39	120.01
8900.14	118.14	8915.42	118.12	8928.16	119.21	8930.71	119.1	8943.45	120.15
8948.55	121.75	8956.2	123.01	8961.29	125.06	8981.68	125.57	8999.52	125.82
9014.8	126.21	9021.63	126	9095.04	126.17	9108.69	126.4	9129.18	126.47
9142.83	126.31	9149.66	126.51	9165.02	126.29	9176.97	126.58	9182.09	126.14
9188.92	126.67	9197.46	126.38	9221.36	126.46	9233.31	126.17	9246.96	126.18
9260.62	125.87	9289.64	126.23	9298.17	125.95	9332.31	126.48	9352.8	126.11
9371.58	126.31	9386.94	125.96	9395.47	126.19	9398.89	125.88	9417.67	125.69
9426.2	126.12	9436.44	126	9453.51	126.12	9474	125.94	9508.14	125.92
9530.33	126.09	9537.16	125.95	9607.15	126.04	9615.69	125.36	9625.93	125.59

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 9641.29  125.44 9711.28  125.63 9723.23  125.87 9742.01  125.57 9823.95   125.2
 9870.04  125.21 9881.98  125.13 9977.58  125.14 10054.4  124.9710066.34  125.06
10129.51  124.85 10175.6  124.9310194.38   124.810322.41  124.8710351.42  124.83

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .112 1033.58    .066 3006.22    .015 3372.59    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2856.21 3372.59              850    1950    1075             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2856.21  119.74       T
 3372.5910351.42  120.15       T
Left Levee      Station=   478.8      Elevation=  136.64
Right Levee     Station=9014.805      Elevation= 126.215
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3385.3310351.42  117.52

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 184

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  129.19   13.12  128.84   19.68  128.85   29.53  128.39   45.93   127.3
   55.77  127.12   62.33  126.75   72.18  126.69   82.02  127.43  104.98  127.11
  111.55   127.2  114.83  126.72  127.95  127.42  141.07   125.9   154.2  125.71
  160.76   126.1  173.88  126.07  183.72  126.54  190.28  127.14  203.41  127.37
  219.81   126.8  242.78  126.68   255.9  127.09  262.46  127.11  275.58  128.36
  285.43   130.6  291.99  132.76  308.39  136.15  311.67  136.56  328.08  136.73
  334.64  135.72  344.48  133.31  360.88  131.77  364.16  131.09  374.01  128.14
  377.29  127.46  396.97  125.19  416.66  123.92   426.5  125.02  436.34  125.56
  449.47   125.1  465.87  126.47  482.27  128.78  492.12  128.52  508.52  128.56
   511.8  128.39  518.36  127.25  531.48  124.39  538.05  124.44  541.33  125.05
  551.17  124.85  557.73  124.11  567.57  123.54   580.7  122.52  590.54  122.04
   597.1   122.2  610.22  121.07  629.91  120.75  659.44  120.89  672.56  120.47
  685.68   120.6  695.52  119.68  702.09  119.65  708.65  120.37  725.05  120.15
  731.61  119.58  738.17  117.99  744.74   115.7  754.58  111.84  764.42   105.9
   767.7  105.64     770   95.94     780   95.94     790   93.94     800   94.64
     810   86.64     820   86.94     830   87.94     840   88.64     850   88.64
     860   89.64     870   89.94     880   90.64     890   90.94     900   91.64
     910   91.94     920   92.94     940   92.94     950   93.94     960   93.64
     970   94.94     980   96.64     990   97.64    1000   98.94    1010  100.94
    1030  102.98 1072.81  105.64 1076.09  105.94 1079.37  107.08 1089.22  111.89
 1095.78  114.28 1102.34  117.09 1105.62  118.02 1118.74  119.92 1128.58  120.79
 1138.43  121.27 1154.83  121.65 1161.39  121.33 1167.95  117.79 1171.23   116.4
  1177.8  114.69 1190.92  112.63 1207.32  111.16 1220.45  111.06 1227.01  110.76
 1233.57     111 1253.25  110.23 1276.22   110.1 1302.46  110.26 1322.15  110.55
 1338.55  110.49 1351.67  110.69 1387.76  110.68 1420.57  111.02 1436.97   111.1
 1463.22  111.51 1499.31  111.84 1509.15  111.78  1551.8  112.24 1561.64     112
 1584.61  112.62 1597.73  112.75 1610.85   113.1 1633.82   114.2  1653.5  115.44
 1669.91   116.9 1686.31  116.64 1692.87  116.69 1712.55  116.38  1722.4  116.63
 1765.05  116.55 1774.89  116.66 1827.38  116.69  1840.5  116.57 1860.19  116.79
 1883.15  116.79 1906.12  116.67 1942.21  116.77 1978.29   116.7 1984.86  116.61
 2017.66  116.89 2040.63  116.87 2060.31  117.06 2129.21  117.19 2142.33  117.52
  2165.3  117.58 2198.11  117.95 2204.67  117.93  2250.6  118.34 2270.28  118.28
 2309.65  118.55 2342.46  118.46 2408.08   118.6 2444.17  118.54 2454.01  118.44
  2473.7  118.56 2513.07  118.43 2529.47  118.54 2549.15  118.49 2572.12  118.52
 2591.81  118.72 2604.93  118.46 2621.33  118.74 2627.89  118.64  2660.7  118.87
 2677.11  118.87 2693.51  118.72 2700.07  118.85 2732.88  118.96 2749.28  118.92
 2765.69  119.19 2785.37  119.08  2814.9  119.44 2824.74  119.26 2844.43  119.41
 2864.11  119.71 2913.33  119.74 2955.98  119.87 2972.38  119.82 3005.19   120.1
 3011.75  119.91    3038  119.95 3057.68   120.1 3077.37  119.98 3103.61  120.18
  3123.3  119.98 3146.26  120.17 3169.23  120.12 3198.76  120.23 3215.16  120.17
 3228.28   120.3 3267.65   120.2  3293.9  119.94 3307.02  119.99 3316.87  119.61
 3366.08  119.25 3412.01     119  3431.7  118.95 3451.38  119.12 3461.22  118.87
 3497.31  118.75    3517  118.53 3543.24  118.58 3569.49  118.33 3579.33  118.43
 3599.02  118.36 3635.11  117.99 3641.67  118.11 3684.32  117.86 3694.16  117.72
 3723.69  117.73 3736.81  117.59  3756.5  117.59 3786.02  117.26 3808.99  117.24
  3858.2  117.05 3887.73  116.82 3900.85  116.92 3920.54  116.69  3943.5  116.78
 3953.35  116.61 4002.56  116.63  4012.4  116.42 4018.96  116.55 4051.77  116.35
  4081.3  116.28 4120.67  116.03 4156.76  115.99 4179.72  115.83 4186.28   115.9
 4212.53  115.66 4228.93  115.73 4258.46  115.55 4281.43  115.62 4301.11  115.43
 4373.29  115.29 4399.53   115.2 4412.66  115.05 4425.78  115.11 4435.62  114.97
 4458.59  115.03 4474.99  114.86 4488.11  114.92 4534.04  114.77 4543.89  114.86
 4566.85  114.83 4573.41  114.71 4602.94  114.85 4616.06  114.62 4632.47  114.55
 4658.71  114.73 4698.08  114.48 4711.21  114.62 4730.89  114.45 4737.45  114.54
 4760.42  114.31 4783.38  114.33 4789.94  114.47 4806.35  114.28 4862.12  114.32
 4868.68  114.24 4885.09  114.44 4901.49  114.46 4917.89  114.31  4950.7  114.47
 4983.51  114.32 4996.63  114.47 5006.47  114.27 5026.16  114.17 5045.84  114.43
 5058.97  114.43 5078.65  114.24  5104.9  114.38 5124.58  114.19 5157.39  114.32
 5163.95   114.2  5206.6  114.23 5232.85  114.41 5259.09  115.33 5265.65  116.23
  5275.5  118.76 5282.06  120.01 5301.74  119.57 5321.43  119.57 5337.83   119.3
 5370.64  119.43 5373.92  119.29 5387.04  119.48 5413.29  119.26 5426.41  119.33
 5449.38  119.27  5462.5  119.35  5478.9  119.18 5492.03  119.33 5521.55  119.21
 5528.12  119.33  5547.8  119.19 5567.48   119.4 5587.17  119.27 5597.01   119.4
 5626.54  119.36 5642.94  119.17 5669.19  119.26 5685.59  119.15    5702  119.28
 5721.68  119.09 5738.08  119.23 5777.45  119.16 5797.14  119.04 5813.54  119.14
 5823.38  118.97 5852.91  118.95 5879.16  119.02 5885.72  118.86 5895.56  118.98
 5925.09  118.81 5934.93  118.96 5967.74  118.76 5977.58  118.93  5990.7  118.75
 6016.95  118.77 6036.63  118.66 6043.19  118.76 6062.88  118.68 6092.41  118.81
 6105.53  118.64 6121.93  118.67 6128.49  118.41 6141.62  118.53 6151.46  118.37
 6174.43  118.52 6220.36   118.3 6240.04  118.43 6279.41  118.21 6325.34  118.31
  6331.9  118.14 6354.87  118.23 6407.36  118.18 6427.04  117.97 6440.17  118.07
 6450.01  117.96 6456.57  118.14 6466.41  118.03 6499.22  118.09 6505.78  117.92
 6525.47  118.08 6551.71  118.12 6564.84  117.93  6571.4  118.03 6594.36  117.86
 6610.77  117.86 6620.61  118.06 6630.45  117.82 6653.42  117.99 6666.54  117.94
 6732.15  117.91 6738.72  118.06 6748.56  117.89 6755.12  118.04  6774.8  117.73
 6814.17  117.84 6830.58  117.74  6843.7   117.9 6856.82  117.74 6873.23  117.85
 6889.63  117.78 6938.84  117.83 6948.69  117.66 6988.05  117.72 6991.33  117.83
 7017.58  117.84 7050.39  117.62 7053.67  117.75 7093.04  117.78  7099.6  117.59
 7125.85  117.77 7145.53  117.79 7175.06  117.67 7181.62  117.76 7230.83  117.67
 7247.23  117.85  7253.8  117.63  7270.2  117.76 7296.45  117.79 7319.41  117.53
 7332.53  117.64  7355.5  117.45 7375.18  117.44 7421.11  117.09 7434.24  117.12
  7457.2  116.89 7483.45  117.18 7493.29   116.7 7503.13  115.67 7516.26  115.29
 7549.06   115.3 7568.75  115.48    7595  115.21 7621.24  115.26 7631.08  115.13
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 7657.33  115.16 7686.86  115.31 7726.23  115.12 7736.07  115.23 7759.03  115.03
 7788.56  115.19 7808.24  115.14 7837.77  114.91 7850.89  115.04 7860.74  114.92
  7883.7  114.96 7890.26  115.09 7916.51  114.95 7949.32  114.95 7959.16  114.78
 7995.25  114.79 8041.18  114.64 8047.74  114.75 8073.99   114.5 8093.67  114.57
 8113.36  114.46 8129.76  114.57 8182.25  114.49 8192.09  114.36 8215.06  114.42
 8231.46  114.35 8238.02  114.56 8251.14  114.36 8254.42  114.07 8270.83  110.17
 8277.39  109.78 8290.51  109.83 8300.35  110.66 8306.91  111.75 8310.19  111.52
 8326.59  113.54 8333.16  116.73 8339.72  117.98    8343  119.19 8349.56  123.29
  8359.4  123.51  8375.8  124.51 8398.77  124.88 8418.45  125.42 8441.41  125.13
  8461.1  125.15 8474.22  124.77 8487.34  124.57 8507.02  124.53 8523.43  124.71

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .112  708.65    .066  725.05    .015 1102.34    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       708.65 1154.83          1037.5    1525    1100            .1       .3
Left Levee      Station=  328.08      Elevation=  136.73
Right Levee     Station= 8418.45      Elevation=  125.42
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1167.95 8523.43  117.64

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            134.15    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.44    Wt. n-Val.                0.112      0.015      0.066
  W.S. Elev (ft)            133.72    Reach Len. (ft)         1037.50    1525.00    1100.00
  Crit W.S. (ft)            123.67    Flow Area (sq ft)       3335.61   14280.47   113350.60
  E.G. Slope (ft/ft)      0.000062    Area (sq ft)            3335.61   14280.47   113350.60
  Q Total (cfs)           235000.00     Flow (cfs)             1511.45   109674.40   123814.20
  Top Width (ft)           8180.60    Top Width (ft)          365.83     446.18    7368.60
  Vel Total (ft/s)            1.79    Avg. Vel. (ft/s)          0.45       7.68       1.09
  Max Chl Dpth (ft)          47.08    Hydr. Depth (ft)          9.12      32.01      15.38
  Conv. Total (cfs)       29927320.0     Conv. (cfs)           192483.4   13967060.0   15767780.0
  Length Wtd. (ft)         1291.74    Wetted Per. (ft)        367.72     463.55    7380.42
  Min Ch El (ft)             86.64    Shear (lb/sq ft)          0.03       0.12       0.06
  Alpha                       8.75    Stream Power (lb/ft s)    0.02       0.91       0.06
  Frctn Loss (ft)             0.08    Cum Volume (acre-ft)    329563.70   95873.30   340598.30
  C & E Loss (ft)             0.01    Cum SA (acres)          30950.26    3622.21   33205.27


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 183.80*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  130.91   14.86  130.66   34.68  129.49   47.06  129.08    54.5  129.04
   61.92  129.59   79.26  129.35    86.7  129.06    96.6  129.58  106.51  128.45
  116.42   128.3  121.37   128.6  131.28  128.57  143.66  129.38  153.57  129.55
  165.96  129.12   183.3  129.03  198.16  129.35  208.06  130.29   215.5  131.97
  220.45  133.59  232.83  136.13  235.31  136.44   247.7  136.57   249.7  133.28
  273.65  131.72  282.63  130.52   293.6  129.82  305.57  129.34  315.55  129.93
  325.53  129.29  364.45  128.49   385.7  128.16   399.5  127.61  440.94   125.4
  454.74  124.92  471.22  124.52  492.18  124.17  514.13  123.61  530.09  123.32
  542.07  123.25  549.05  123.42  578.99  123.01  601.94  122.84  620.38  122.57
  635.87  122.98  643.85  123.43  649.84  121.82  679.78  122.17  703.17  122.24
   712.7  122.06  758.42  121.77  827.41   122.8  896.41  124.53  937.85  124.34
 1006.85  124.36 1020.65  124.24 1048.25  123.38 1079.92  122.15 1103.45  121.52
 1124.83  121.61 1131.09  121.49 1144.89  122.04 1170.73  121.79 1193.68  121.68
 1213.89  121.14 1249.56  120.86 1260.54  120.92 1264.53  120.67 1282.49  120.43
 1299.46  120.05 1345.36   119.6 1363.32  119.71 1378.29  120.17 1385.27  119.69
 1393.25  119.74 1399.24  119.49  1418.2  119.12 1437.16  118.92 1442.15  119.21
 1448.14  118.84  1468.1  118.76 1475.08  119.01 1482.07   118.8 1500.03  118.83
 1519.98  118.57 1533.95  119.16 1545.93  120.54  1556.9   119.4  1559.9   119.5
 1562.89  120.65 1572.87  120.23 1587.84  119.99 1629.74  120.19 1643.72  120.17
 1658.68  119.91 1666.66  120.16 1672.65  119.82 1683.63   119.6 1687.62  118.89
 1692.61  118.92  1695.6  119.54 1717.51  119.58 1755.32  119.88 1765.27  120.37
 1773.23  120.08  1778.2  119.07 1784.17  118.62 1797.11  118.51 1801.09   119.2
 1807.06  118.22 1817.01  118.56 1821.98  118.39 1836.91  119.22 1844.87  119.09
 1848.85   119.4 1857.62  118.97 1866.41   116.5 1872.74  115.88 1879.57  114.37
 1886.41  112.32 1896.65  108.86 1906.89  103.18 1910.31  102.65  1912.7   95.22
 1923.11   94.67 1933.52   92.93 1943.92   93.38 1954.33   87.31  1963.4   87.56
 1981.53   88.89  1990.6   88.92 1999.67   89.75 2008.74   90.07  2017.8   90.66
 2026.87   90.93 2035.94   91.48 2045.01   91.71 2054.07   92.45 2072.21   92.37
 2081.28   93.13 2090.34   92.95 2099.41   93.98 2108.48   95.39 2126.61   97.36
 2135.68   98.97 2153.82   100.7 2192.63  103.09 2198.58  104.24 2207.51  107.95
 2218.99  111.84 2224.33  115.11  2243.2  118.02 2252.13  118.88    2267  119.76
  2273.4  119.74 2282.98  116.14 2289.38   114.8 2302.16  112.99 2309.75  112.29
 2318.14  112.18 2330.93  112.29 2337.32  111.84 2359.62  111.77 2370.31  111.36
 2398.81  111.16 2409.49  110.62 2416.61  110.48    2430   110.9 2441.55  110.96
 2462.93  110.37 2493.91   110.4 2525.88  110.71 2541.85  110.78 2567.42  111.07
 2602.58  111.34 2612.54  111.33 2653.72  111.64  2663.3  111.45 2685.68  111.91
 2711.24   112.3 2733.66  113.11 2752.79  114.09 2768.77  115.18 2810.31  114.76
 2819.91  114.95 2922.17  114.99 2934.95  114.89 2954.13  115.07  2976.5   115.1
 3000.82  115.01 3034.03  115.12 3075.64  115.04 3107.53  115.27 3129.91  115.26
 3149.08   115.4  3216.2  115.47 3228.98  115.72 3251.36   115.8 3283.32  116.08
 3334.45  116.37 3353.63   116.3 3391.98  116.46 3423.94  116.37 3487.86  116.43
 3532.61   116.3 3551.79  116.37 3590.14  116.23 3606.12  116.38 3645.71  116.33
 3667.09  116.52 3679.63  116.32  3695.6  116.53 3701.99  116.46 3749.94  116.66
 3765.92  116.54 3772.31  116.64 3820.25  116.68 3836.23  116.88  3855.4  116.81
 3884.17  117.09 3893.76  116.95 3932.11  117.26 3952.15  117.32 3987.78  117.28
 4005.59  117.36 4016.29   117.2 4051.92  117.61 4069.73  118.87 4120.68  118.85
 4139.86  118.68 4165.42  118.77  4184.6  118.65 4206.97  118.79 4274.08  118.74
 4286.87  118.85 4325.22  118.77 4350.79   118.6 4363.57  118.66 4373.17   118.4
 4401.11  118.33 4426.06  118.15 4485.03  117.91  4504.2  118.01 4513.79  117.82
 4548.94  117.73 4568.12  117.58 4593.69  117.57 4619.26  117.39 4648.02   117.4
 4683.18   117.1 4689.57  117.19 4740.71  116.82 4769.47  116.82 4801.43   116.7
 4830.19  116.43 4852.57   116.4 4900.51  116.23 4929.27  116.06 4942.05  116.13
 4961.23  115.96  4983.6  116.03  4993.2   115.9 5041.13  115.86 5117.84  115.55
 5156.19  115.33 5220.11  115.21 5245.68     115 5281.21  114.94 5306.16  115.18
 5323.97  114.32 5334.66  114.83 5363.16  114.59 5427.84  114.51    5463   114.3
 5485.38  114.35 5558.88  114.14 5568.47  114.21 5597.23  114.09    5626  114.19
 5638.78  114.06 5680.33   114.2 5718.68  114.15 5731.47  114.23 5750.64  114.08
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 5757.03  114.16 5779.41  114.03 5808.16  114.12 5824.15  113.98 5878.48  114.05
 5900.86  114.16 5932.81  114.08  5954.6  114.18 5996.73  114.15 6009.51  114.29
 6038.28  114.07 6057.45  114.29 6089.41  114.18 6114.98  114.31 6134.16  114.22
 6166.12  114.34 6172.51  114.25 6214.06   114.3 6239.63  114.49 6265.19  115.18
 6271.58  115.87 6281.18  117.79 6287.57  118.73 6306.74  118.39 6325.92  118.39
 6341.89  118.21 6389.83   118.4  6415.4  118.26 6428.19  118.32 6463.34  118.31
 6479.32  118.18 6492.11  118.31 6520.87  118.25 6527.27  118.35 6546.44  118.27
 6565.61  118.41 6584.79  118.32 6594.38  118.42 6623.14  118.41 6639.12  118.26
 6664.69  118.31 6680.67  118.24 6696.65  118.36 6715.82  118.24  6731.8  118.36
 6770.15  118.32 6789.33  118.23 6805.31  118.35  6814.9  118.21 6843.66  118.16
 6869.23  118.25 6913.98   118.1 6923.56  118.21 6955.52   118.1 6965.11  118.25
 6977.89  118.13 7003.46  118.15 7022.63  118.07  7048.4   118.2 7051.96  118.13
 7069.78  116.17 7084.04  115.98 7091.15  116.57 7101.84  118.39 7119.66  120.45
 7126.79  120.68 7148.16  120.27 7156.87   120.3 7201.62  120.11 7220.79  120.22
 7259.14  120.07 7303.88  120.12 7310.27  119.99 7332.65  120.08 7369.06  120.02
 7390.43  120.36 7408.25  120.08 7418.94  120.21 7425.33  119.96 7441.31  119.76
 7473.27  119.82 7479.66  119.69 7498.84  119.82  7524.4  119.82 7565.95  119.61
 7581.94   119.6 7591.52  119.75 7601.11  119.58 7623.48  119.74  7643.4  119.66
 7689.72  119.63 7706.58  119.78 7722.55  119.78 7741.73  119.53 7780.08   119.6
 7796.06  119.52 7808.84  119.64 7821.63  119.52 7901.53  119.58 7911.12  119.45
 7949.46  119.49 7978.23  119.59 8010.19  119.39 8013.39  119.49 8051.74  119.51
 8058.13  119.36 8092.33  119.56 8131.64  119.41 8138.03  119.48 8185.97  119.38
 8201.95   119.5 8208.35  119.33 8224.32  119.42 8249.89  119.42 8272.26  119.22
 8285.04   119.3 8326.59  119.15 8371.33  118.89 8384.12  118.89 8406.49   118.7
 8432.06  118.92 8441.65  118.56 8451.23   117.8 8464.02  117.52 8495.97  117.53
 8515.16  117.65 8540.73  117.42 8575.88  117.39 8630.21  117.53 8668.57  117.37
 8678.15  117.47 8700.52  117.34 8729.29  117.43 8777.22  117.23    8790  117.34
  8799.6  117.25 8828.36  117.36 8851.22  117.25 8869.03  117.55 8885.89  117.66
 8904.66  117.51 8915.34  117.75 8975.38  117.58 8981.77  117.66 9007.34  117.48
 9018.67  117.55 9032.92  117.42 9061.67  117.52 9122.38  117.32 9160.74  117.45
 9167.13  117.62 9179.91  117.43  9183.1   117.2 9199.09  114.26 9205.48  113.99
 9218.26  114.06 9227.85  114.72 9234.24  115.55 9237.43  115.39 9253.41  116.91
 9259.81  119.43  9266.2   120.4 9269.39  121.31 9275.79   124.4 9285.37   124.6
 9301.35  125.42 9321.51  125.44  9342.9  126.21 9351.12  125.75 9359.34   124.5
 9373.04  124.18 9394.96  124.85 9419.62  124.54 9433.32  124.57 9455.24  124.94

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .112 1848.85    .066 1866.41    .015  2243.2    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1848.85    2267          1037.5    1525    1100             .1       .3
Left Levee      Station=   247.7      Elevation=136.5675
Right Levee     Station=9342.896      Elevation=  126.21
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 2282.98 9455.24  116.14

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 183.60*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  132.64   10.04  132.46   23.42  131.69   36.81  131.39   41.83  131.76
   58.56   131.4   65.25  131.75   71.95  130.99   88.68  131.07   97.04  131.61
  103.74  131.73   112.1  131.44  123.82  131.38  133.85   131.6  140.55  132.22
  148.91  134.42  158.95  136.32  167.32   136.4  170.84  129.91   172.6  129.38
  188.42  128.96  197.22  128.31  204.25  128.23  213.04  127.66  228.87  125.74
  248.22  124.98  269.31  124.71  279.86  125.53   286.9  126.49  292.17  125.97
  304.48  125.47  334.38   125.1  373.07  124.74  410.51  124.55  471.55  123.45
  507.87  122.67   554.2   122.2  561.23  122.03   584.1  121.88  598.16  121.91
  636.85  121.39  664.99  121.25  679.05  121.61  686.09  121.38   698.4  121.82
  721.26   121.8  728.29  121.54  735.33  121.67  751.16  121.47   791.6  121.49
  817.98  121.24  833.81  121.32   851.4  121.64  858.43  122.18  865.46  122.31
  868.98  121.86  876.02  118.94  883.05  119.02  904.15  118.85  909.43  119.05
  928.77  119.09  970.01  118.92   986.8  118.63 1067.36  118.44 1188.96  119.12
 1310.56  120.28 1383.59  120.15 1505.18  120.17  1529.5  120.08 1578.14  119.51
 1633.96  118.69 1665.61  118.85 1681.44  118.63 1697.27  118.74 1702.54  118.56
  1713.1  118.79 1724.13  118.55 1757.06  119.22 1762.33  118.99 1779.92  118.87
 1785.19  119.29 1793.99  118.66 1834.43   118.7 1837.95   118.5 1853.78  118.33
 1860.81  118.44 1870.05  118.17 1908.29  118.08 1924.12  118.24 1932.91  118.09
 1952.26  118.41 1959.29  117.98  1971.6   117.8 1990.95  117.81 2020.84  117.38
 2054.26  117.29 2101.74  117.08 2133.39  117.32 2159.77  118.15 2165.04  118.03
 2172.08  117.31 2186.15  117.57  2196.7  117.19 2203.73  117.31 2209.01  117.03
 2219.56  117.06 2230.11  116.82  2238.9  116.97 2251.21  116.73 2263.52  116.77
 2272.32  117.39 2282.87  116.66 2296.94  116.72 2318.04  116.58 2330.35   117.1
 2342.66   116.7 2356.73  116.65 2374.32  116.84 2381.35  116.59 2400.69  116.56
 2409.48  116.39 2420.03  116.68  2434.1  117.55 2444.65  119.17 2449.93  119.33
 2455.21   120.3 2465.76   119.4 2474.54  118.01 2479.82  118.21  2485.1   120.5
 2502.68  119.66 2518.51  119.49 2529.06  119.15  2578.3  119.29 2602.92  119.51
 2615.23  119.37 2627.54  119.47 2653.91  119.06 2667.98  119.62 2678.53  118.98
 2697.88  118.63 2704.91  117.24  2713.7  117.34 2718.97  118.59 2736.54  118.59
 2745.31  118.77 2757.58  118.64 2776.87  118.73 2803.17  119.03 2810.18  118.81
 2815.45  119.23 2824.21  119.23 2836.49  119.85 2841.75  120.43 2855.78  120.02
 2864.54  118.11 2875.06  117.34 2878.57  117.56 2890.85  117.25 2897.86  117.35
 2904.87  118.72 2915.39  116.78 2924.17  116.88 2932.93  117.47  2941.7  117.11
 2948.71   117.5 2955.72  117.52    2968  118.39 2975.01   118.4 2982.03  117.92
 2989.04  118.42 2995.12  118.38 2998.16  117.68 3004.25  114.04 3007.29  112.89
 3013.87  112.19 3020.97  110.74 3036.37  106.68 3041.02  104.86 3049.36  100.47
 3052.91   99.66  3055.4    94.5 3066.22    93.4 3077.03   91.92 3087.85   92.12
 3098.67   87.97  3106.8   88.18 3123.07   89.14  3131.2    89.2 3139.34   89.85
 3155.61   90.68 3171.88   91.32 3180.01   91.47 3188.15   91.96 3204.42    91.8
 3212.55   92.32 3220.69   92.25 3227.12   92.83 3236.96   94.14 3253.23   95.79
 3261.36   96.99 3277.63   98.43 3302.37   99.88 3315.13  100.76 3325.81  104.01
  3336.1  106.79 3340.89  111.89 3362.16  116.04 3379.18  117.88  3385.4  118.15
 3394.73  115.88  3413.4  113.36 3420.79  112.65  3431.2  113.44 3441.59  113.52
 3447.63  112.91 3453.85  112.79 3469.33  113.17 3479.74  112.53 3490.14  112.55
 3507.48  112.14 3517.88  110.99 3524.82   110.6 3535.23  111.17 3549.09  111.42
 3562.97  110.34 3569.91  110.04  3580.3  110.01 3614.98   110.3 3646.74  110.45
 3705.85  110.83 3755.63  111.04 3764.96  110.91 3811.63   111.5 3833.45  112.02
 3867.64  113.45 3908.07  113.13 3940.95  113.35 3967.19  113.28 4016.97  113.28
 4029.41  113.22 4048.08  113.35 4079.66  113.42 4093.53  113.35 4125.86  113.46
 4166.36  113.47 4197.41  113.64 4237.86  113.73 4303.19  113.75 4315.64  113.92
 4391.77  114.36 4418.31  114.41 4436.97  114.33 4474.31  114.36 4505.42  114.29
 4567.65  114.26  4611.2  114.16 4629.88  114.19 4667.21  114.03 4679.68   114.2
 4721.31  114.15 4741.88  114.32 4754.32  114.19 4822.77  114.44 4891.21  114.44
 4906.77  114.57 4925.44  114.54 4953.44  114.75 4962.77  114.64 5019.62  114.92
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  5054.3   114.8 5071.64  114.89 5082.05  114.55 5116.74  115.28 5123.68  116.07
 5134.08  117.65 5144.48  117.87 5183.67  117.61 5202.34  117.39  5245.9  117.31
 5267.67   117.4 5333.01  117.31 5356.08  117.42 5369.95  117.33 5429.46   117.2
 5456.67  117.25 5480.95  117.08 5505.23  117.06 5538.36  116.86 5557.02  116.91
 5566.35  116.76  5630.1  116.65 5669.02  116.46 5697.03  116.44 5731.25  116.21
 5744.57  116.23 5787.25  115.92 5846.37  115.81 5874.36   115.6 5942.81  115.41
 5970.82  115.29 5983.26  115.35 6001.93  115.23 6035.94  115.19  6129.6  114.97
 6191.71  114.63 6253.93  114.51 6299.54  114.22 6313.42  114.27  6337.7  114.75
 6344.63  114.22 6351.57  113.23 6355.04  113.14 6365.44  114.23 6393.19  113.81
 6438.29  113.74 6462.56  113.81 6490.38  113.64 6512.17  113.68 6559.67   113.5
 6593.06  113.55 6621.05  113.46  6661.5   113.5 6674.13  113.62 6701.94  113.66
 6726.16  113.82 6751.73  113.85 6841.95  113.68 6894.84  113.78 6932.17   113.9
 7009.95  113.98  7022.4  114.11  7050.4  113.96 7069.06  114.14 7100.18  114.12
 7125.07  114.24 7174.85  114.35 7222.13  114.38 7246.41  114.56 7271.29  115.02
 7277.51  115.51 7293.07  117.44 7311.73   117.2 7345.96  117.11 7392.62  117.31
 7464.18  117.27 7545.08  117.34 7563.74  117.43 7582.41  117.36 7619.75  117.47
  7635.3  117.35 7675.74  117.34  7691.3  117.44 7709.97  117.38 7745.85  117.51
 7781.53  117.41 7797.08  117.55 7839.49  117.37 7859.31  117.48 7902.86  117.39
 7943.31  117.45 7952.64  117.56 8008.64  117.48 8033.53  117.72 8037.19  117.55
  8047.6  115.32 8054.53  113.56    8058  113.27 8068.41  113.24 8075.34  114.49
 8085.75  118.12 8103.09  122.42 8110.03  122.86 8130.83  122.07 8182.87  121.92
 8201.53  122.01 8238.87  121.93 8310.43  121.93 8345.88  121.85 8356.28  122.01
 8366.68  122.61 8384.02  122.15 8394.43   122.4 8408.31  121.54 8472.21  121.56
 8497.09  121.52 8537.54  121.35 8585.19  121.49 8612.93  121.39 8658.03  121.34
 8689.99  121.52 8708.65  121.33 8773.99  121.38 8817.54  121.28 8864.21  121.34
 8873.55  121.25 8910.88  121.26 8938.88  121.34 8973.11  121.22 9010.44  121.24
 9016.66  121.13 9043.01  121.18 9049.95  121.34 9063.82  121.23 9162.89  121.03
 9203.34  121.05 9225.11  120.91 9254.58  120.93    9334  120.66 9355.78  120.52
 9380.67  120.65    9390  120.43 9399.33  119.93 9411.79  119.76 9461.56  119.82
 9486.46  119.63 9573.57  119.74 9604.88  119.61 9620.23   119.7 9670.01  119.66
 9716.68  119.55 9766.45  119.63 9788.71  119.54 9806.05  120.15 9830.33  120.39
 9840.74  120.24 9851.13  120.71 9930.91  120.46 9951.71  120.55 9965.59   120.3
    9976  120.49 9993.57  120.4810038.43  120.2810052.68  120.2810090.02  120.54
10096.24  120.6810111.79  120.3310127.35  118.3510146.01   118.310164.68  119.25
10180.23  120.2710186.46  122.1310195.79  123.4310202.01   125.510211.34   125.7
10225.72  126.3310246.53  126.0410253.46  126.1810267.34     127 10276.1  126.18
10284.86  123.78 10290.7   123.310299.46  123.2310314.06  123.8710322.82  124.73
10328.65  124.98 10349.1  124.51 10363.7   124.610369.53  124.8610387.05  125.18

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2989.04     .07 3049.36    .025  3336.1     .07 3379.18    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2989.04 3379.18          1037.5    1525    1100             .1       .3
Left Levee      Station=  167.32      Elevation= 136.405
Right Levee     Station=10267.34      Elevation=     127
Blocked Obstructions     num=      2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 3394.73    5500  114.36    900010743.06  121.18

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 183.40*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  134.36   19.13  133.73   21.73  133.92   37.38  133.54   50.42  133.85
   64.34  133.73   73.03  134.15   82.59   136.2   86.94  136.24   91.98  126.53
    94.5  125.76  117.17  125.29  129.77  124.42  139.85  124.36  152.44   123.6
  162.52  122.62  175.12  120.96  202.83  120.14  220.46  120.28  233.05  120.09
  238.09  120.84  248.17   121.5  253.21  122.76  258.24  123.04   265.8  122.33
  273.36  122.27  283.44  121.64  296.03  121.65  326.27  121.28  381.69  120.98
  432.08  120.96  477.42  120.58  522.76  120.37  552.99  120.04  641.17  119.74
  651.25  119.55   671.4  119.64     684   119.5  704.15  119.65  721.79  119.38
  729.35  119.46  759.58  119.16  769.65  119.29  799.88  119.18  820.03  119.82
  830.11   119.5  847.74  120.23   880.5  120.29  890.57  119.93  900.65  120.15
  923.32  119.93  951.04  120.08  958.59  119.97  981.27  120.13  993.86  119.94
 1014.02  120.06 1019.06  119.87 1041.73  119.95 1051.81  120.29 1066.92  120.29
    1077  121.05 1087.08  121.19 1092.12   120.5 1102.19  116.05 1104.71  115.54
 1112.27  116.13 1122.35  115.86 1129.91  116.03  1142.5  115.73 1150.06  116.02
 1177.77     116 1236.84   115.6  1260.9  115.21 1376.31  115.11  1550.5  115.45
  1724.7  116.03 1829.32  115.96 2003.52  115.97 2038.36  115.93 2108.03  115.65
 2187.99  115.24 2198.07  115.48 2233.34  115.93 2256.02  115.74 2278.69   115.9
 2286.25  115.64 2301.36  115.97 2308.92  115.54 2352.01  116.03 2364.34  116.31
  2371.9  115.97 2397.09  115.82 2404.65  116.46 2417.24  115.52 2427.32  115.68
 2434.88   115.4 2447.47  115.64 2475.19  115.73 2480.23  115.46  2502.9  115.31
 2512.98  115.54 2525.57  115.21 2540.69  115.14 2550.77  115.44 2558.32  115.22
    2581  115.21 2603.67  115.52 2616.27  115.33 2643.98  115.89 2654.06  115.28
 2671.69  115.07  2699.4   115.2 2706.96  114.93  2724.6  115.02 2742.23   114.7
 2752.31  114.86 2762.39  114.67  2790.1  114.73 2830.41  114.55 2858.12  114.56
 2903.46  114.92 2941.25  116.12 2948.81  115.96 2958.88  114.92 2966.44   114.9
 2979.04  115.39 2994.15  114.89 3004.23   115.1 3011.79  114.72  3026.9  114.82
 3042.02  114.53 3054.62  114.81 3072.25  114.51 3089.89  114.63 3102.48  115.56
  3117.6  114.49 3137.75  114.58 3155.39  114.36 3162.95  114.69 3167.99   114.4
 3185.62  115.19 3203.26  114.61 3223.41  114.55  3248.6  114.85 3258.68  114.49
 3276.31  114.34 3286.38  114.46 3298.98  114.21  3314.1  114.64 3334.25  115.95
 3339.29  116.53 3349.37  118.37 3356.92  118.61 3364.48  120.06 3372.04  119.03
  3379.6  118.71 3392.19  116.62 3399.75  116.91  3407.3  120.35  3432.5  119.08
 3455.17  118.83 3470.29  118.31 3510.59  118.38 3533.26  118.63 3540.82  118.51
 3576.09  118.82 3593.72  118.61 3611.36  118.76 3634.02  118.57 3649.14  118.21
 3669.29  119.07 3684.41  118.15 3694.49  118.15 3712.12  117.65  3722.2  115.58
 3734.79  115.76 3742.35  117.65 3767.51  117.64 3780.07   117.9 3797.66   117.7
 3825.29  117.82 3862.97  118.25 3873.01  117.92 3880.55  118.54 3893.11  118.58
 3910.69  119.59 3918.23  120.49 3938.33  119.97 3950.89  117.16 3958.42  116.37
 3965.96  116.07 3970.98  116.41 3988.57  116.03 3998.62  116.18 4006.15  118.11
 4008.66  118.25 4018.71  115.96 4023.73  115.34  4036.3  115.48 4048.86  116.38
 4061.41  115.83 4071.46  116.37 4081.51  116.34  4099.1  117.55 4109.14  117.52
 4119.19  116.74 4129.24  117.44 4135.55  117.42  4138.7   116.4 4145.02  110.96
 4148.18  109.28 4155.01  108.49 4178.35  103.68 4183.17  102.01 4191.84   97.75
 4195.52   96.67  4198.1   93.78 4205.37   92.46 4220.55   90.91 4231.77   90.86
    4243   88.64  4264.6    89.4 4271.81   89.48 4293.41   90.69 4322.22   91.47
 4336.63   91.23 4356.72   91.92 4387.04   95.02 4401.45   96.15 4434.64   98.16
 4453.22  101.73 4457.46  108.66 4461.22  109.18 4476.28  113.54 4491.35  115.99
 4497.41  116.55 4514.97  114.86 4531.83     113 4541.95  114.58 4552.07  114.75
 4562.19  113.54 4579.05  114.58 4589.18   113.7 4599.29  113.77 4616.16  113.12
 4626.27  111.36 4633.02  110.73 4643.15  111.51 4656.64  111.87 4670.13  110.19
 4676.88  109.72    4687  109.67 4720.73  110.03 4775.83   110.2 4798.32  110.19
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 4818.55  110.41 4866.62  110.36 4899.91  110.58 4933.25  110.93  4966.5  111.73
 5005.83  111.51 5037.82  111.73 5054.68  111.56 5123.86  111.54 5172.75  111.76
 5186.23  111.68 5287.28  112.02 5326.63  112.07 5390.19  112.03 5432.49  112.32
 5459.79  112.34 5476.35  112.49 5564.08  112.23 5604.57   112.2 5661.93  112.03
 5699.05  112.05 5722.67  111.88 5749.66  111.84 5756.41  112.05  5796.9  111.96
 5910.73  112.19 5962.18   112.2 6016.22   112.4 6073.59  112.35 6087.08  112.52
 6120.82  112.32 6137.69  112.43 6147.81   111.9 6164.69  112.55 6181.56  112.94
 6188.31  114.11 6198.42  116.42 6208.55  116.85 6235.54  116.55 6255.79  116.18
 6289.53  115.94 6328.38  116.02 6387.38  115.87 6414.37  115.99 6427.87  115.87
 6485.76  115.99 6512.22  116.18 6535.85  116.01 6559.46  116.05 6573.52  115.89
 6626.95  115.68 6680.93  115.69 6694.43  115.54 6727.87  115.54 6792.28  115.32
  6833.8  115.03 6900.26  114.89 6964.36  114.61 7042.62   114.5  7063.8  114.52
 7127.36  114.28 7166.82  114.29 7200.55  114.01 7305.14  113.76 7332.13  113.49
 7345.62   113.6 7359.12  114.17 7369.25  114.33 7375.99  113.53 7382.73  112.07
 7386.11  111.95 7396.23  113.64 7423.22  113.03 7467.09  112.97  7490.7  113.16
  7504.2  112.99 7538.96     113 7585.17  112.83 7617.64   112.9 7676.26  112.84
 7696.51  113.14 7723.49  113.12 7747.11  113.45 7763.98   113.5 7784.22  113.33
 7824.71   113.5 7859.75  113.38 7983.28   113.7 7996.78  113.63 8035.28  113.94
 8064.25  113.86 8080.67     114 8128.35  114.09 8151.97  114.27 8228.97  114.45
 8266.68  114.68 8283.44  115.14 8298.58  116.16 8316.73  116.02 8350.02  116.02
 8395.42  116.23 8431.73  116.29 8480.16  116.19 8546.71  116.44 8570.33   116.4
 8620.94  116.52  8651.3  116.39 8739.01  116.67 8772.75  116.59 8788.85  116.76
 8830.11  116.58 8849.38  116.71 8891.75  116.68 8940.17  116.88 9002.18  116.92
 9018.86  117.24 9022.41  116.98 9032.54   113.6 9039.29  110.95 9042.66  110.51
 9052.79  110.51 9059.52  112.42 9069.65  117.84 9086.52  124.38 9093.27  125.05
 9106.76  124.44 9113.51  123.88 9143.88  123.73 9182.28  123.79 9260.97  123.74
 9288.95  123.78 9322.69  123.67 9332.81  123.93 9342.92  124.86  9359.8  124.22
 9369.92  124.58 9383.42  123.25 9454.26   123.3  9481.9  123.14 9542.42  123.11
 9555.48  123.28 9582.47  123.12 9626.33  123.06 9657.42  123.26 9675.58  123.14
 9764.66  123.01 9815.27  123.11 9859.13  123.02 9916.48  123.07  9926.6  122.93
 9963.72  122.9810000.83  122.8810007.58  123.1310021.06  122.9610156.78  122.68
10177.96  122.5910206.62  122.6510240.37  122.5210263.98  122.5410305.07  122.33
10329.28  122.3910347.44  122.0510407.97  121.99 10442.8  121.7810473.16  121.95
10516.92  121.9610547.38  121.8410581.12  121.9910624.98  121.8310668.23  121.94
 10726.2  121.8310743.06  122.7510766.68  123.1910776.81  122.9610786.92  123.67
10864.53   123.410884.76  123.5610898.26  123.1910908.38   123.510969.12  123.18
11006.23  123.4311023.09  123.7411040.47  123.4611055.61  122.4511073.76  122.53
11088.89  123.1611107.05  123.6411113.11  124.8211122.19  125.5511128.24  126.61
 11151.3  127.2711171.54  126.6311178.29  126.7611191.79  127.7911201.09   126.6
11210.39  123.0511216.58  122.3711225.88  122.2711241.38  123.2411250.68   124.6
11256.87  125.0611278.57  124.4911294.08  124.6311300.27  125.0111318.87  125.41

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4129.24     .07 4191.84    .025 4461.22     .07 4491.35    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4129.24 4491.35          1037.5    1525    1100             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4129.24  117.44       T
 4491.3511318.87  115.99       T
Left Levee      Station=86.93999      Elevation=136.2425
Right Levee     Station=11191.79      Elevation=  127.79
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 3349.37  118.37 4514.97    6500  114.86 9383.4211107.05  123.25

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 183.2

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  136.08    6.56  136.08   13.12  123.16    16.4  122.14   45.92  121.62
   62.32  120.52   75.44  120.49   91.84  119.54  104.96   118.3  121.36  116.18
  127.92  115.86  157.44   115.3   180.4  115.62  196.79  115.47  203.35   116.5
  216.47  117.46  223.03  119.18  229.59   119.6  239.43  118.68  249.27  118.63
  262.39  117.82  278.79  117.87  318.15  117.46  390.31  117.23  455.91  117.35
  514.95  117.14  573.98  117.29  613.34  117.13  692.06  117.31  728.14  117.28
  741.26  117.06   767.5  117.26   783.9  117.11  810.14  117.39   833.1  117.09
  842.94  117.22   882.3  116.94  895.42  117.14  934.77  117.11  947.89  117.79
  961.01  118.03  974.13  117.63  997.09  118.63 1039.73  118.78 1052.85  118.32
 1065.97  118.64 1072.53  118.39 1085.65  118.63 1095.49  118.39 1131.57  118.65
 1141.41  118.51 1170.93  118.77 1187.33  118.55 1213.57  118.75 1220.13   118.5
 1249.65  118.58 1262.77  118.99 1272.61   118.7 1282.45  118.94 1295.57  119.92
 1308.69  120.07 1315.25  119.13 1328.37  113.17 1331.65  112.48 1341.49  113.24
 1354.61  112.84 1364.45  113.04 1380.85  112.62 1390.69  112.99 1426.77  112.92
  1518.6  112.15    1535  111.78 2742.03  111.78 2755.15  112.17 2801.07  113.02
 2830.59  112.86 2860.11  113.06 2869.95  112.71 2889.63  113.15 2899.47  112.57
  2958.5  113.04 2971.62  113.41 2981.46  112.96 3014.26  112.77  3024.1  113.63
  3040.5  112.39 3053.62  112.61 3063.46  112.24 3079.86  112.56  3089.7  112.31
 3096.26  112.64 3115.94  112.75  3122.5  112.41 3152.02   112.3 3165.14  112.63
 3181.54  112.24 3201.22  112.17 3214.34  112.59 3224.18  112.31  3253.7  112.34
 3283.22   112.8 3299.62  112.57  3335.7  113.37 3348.82  112.59 3371.78  112.35
 3407.86  112.59  3417.7  112.24 3440.66  112.41 3463.62  112.03 3476.74  112.26
 3489.86  112.04 3525.94  112.16 3578.42  111.99  3614.5  112.04 3637.46  112.34
 3673.53  112.53 3722.73   114.1 3732.57  113.89 3745.69  112.53 3755.53  112.52
 3771.93  113.22 3791.61  112.59 3804.73   112.9 3814.57  112.41 3834.25  112.58
 3853.93  112.24 3870.33  112.64 3893.29  112.29 3903.13  112.59 3916.25  112.48
 3932.65  113.73 3952.33  112.31 3978.57  112.45 4001.53  112.16 4011.37   112.6
 4017.93  112.22 4040.89  113.28 4063.85  112.52 4090.09  112.45 4122.89  112.86
 4136.01  112.38 4149.13  112.49 4158.96   112.2 4172.08  112.36 4188.48  112.03
 4208.16   112.6  4234.4  114.34 4240.96  115.11 4254.08  117.57 4263.92  117.89
 4273.76  119.82  4283.6  118.44 4293.44  118.02    4300   116.6 4309.83  115.23
 4319.67  115.62 4329.51   120.2 4332.79  120.81 4336.07  119.91 4362.31   118.5
 4391.83  118.16 4411.51  117.47 4463.98  117.56  4493.5  117.89 4503.34  117.72
 4549.26  118.14 4572.22  117.85 4595.18  118.06 4624.69  117.83 4644.37  117.36
 4670.61  118.53 4690.29  117.31 4703.41  117.33 4726.37  116.68 4739.49  113.93
 4755.88  114.18 4762.44  116.41 4765.72   116.7 4798.48  116.69 4814.84  117.03
 4837.73  116.76 4873.71  116.91 4922.76  117.48 4935.84  117.03 4945.66  117.86
 4962.01  117.93  4984.9  119.33 4994.71  120.55 5007.79  120.04 5020.88  119.91
 5027.42  118.79 5037.23   116.2 5047.04  115.17 5056.85   114.8 5063.39  115.27
 5086.29  114.81 5099.37  115.02 5109.18  117.59 5112.45  117.77 5125.53  114.72
 5132.07   113.9 5148.43  114.09 5164.78  115.29 5181.13  114.55 5194.21  115.23
 5207.29  115.16 5230.19  116.72 5243.27  116.64 5256.35  115.57 5269.43  116.47
 5275.97  116.46 5279.24  115.11 5285.79  107.89 5289.06  105.67 5292.33  105.44
 5320.33  100.67 5325.33   99.16 5336.33    94.1 5348.33    91.3 5360.33      90
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 5387.33    89.3 5414.33    89.8 5427.33    90.6 5441.33      91 5455.33      91
 5471.33    90.6 5486.33      91 5503.33   92.43 5527.33   94.01 5544.33    94.9
 5570.33   96.68 5574.02  105.44  5577.3  105.88 5590.41  111.04 5603.53   114.1
 5613.36  115.54 5626.48  115.06 5642.87  113.36 5652.71  115.73 5662.54  115.98
 5672.38  114.41 5688.77  115.98 5698.61  114.87 5708.44  114.98 5724.84   114.1
 5734.67  111.73 5741.23  110.86 5751.07  111.84 5764.18  112.33  5777.3  110.04
 5783.86   109.4 5793.69  109.33 5826.48  109.76 5862.54  109.82 5901.89  109.68
 5921.56  109.95 5983.86  109.77 6016.64  109.93 6033.04  109.84 6052.71  110.05
 6108.45  109.87 6134.68  110.11 6151.07   109.9 6226.48  109.86 6265.83   110.1
 6278.94  110.02  6347.8  110.32 6396.98  110.45 6462.55   110.3 6492.06  110.32
  6518.3  110.53 6544.53  110.47 6560.93  110.62  6646.2  110.13 6685.56   110.1
 6741.31  109.85 6777.39   109.9 6800.35  109.67 6826.58  109.63 6833.14  109.89
  6872.5  109.78 6892.18  109.92 6957.77  109.89 6967.61  110.02 7052.88  109.95
 7085.67  110.08 7141.43  109.89 7154.55  110.12 7187.34  109.84 7203.74  109.97
 7213.58  109.25 7229.98  110.12 7246.38  110.61 7252.94  112.14 7262.77   115.2
 7272.61  115.83 7298.85   115.4 7318.53  114.89 7351.32  114.53    7371  114.66
 7410.36  114.61 7446.43  114.43 7472.67  114.56 7485.79  114.42 7528.42  114.62
 7567.78   115.1 7590.74  114.94 7613.69  115.04 7626.81  114.86 7679.29  114.62
 7731.76  114.74 7744.88  114.53 7771.12  114.59 7839.99   114.4 7872.79  114.14
 7944.94  114.02 8007.25  113.77 8115.48  113.77 8154.83  113.55 8204.03   113.6
 8236.82  113.28 8338.48   113.1 8364.71  112.75 8377.83  112.93 8390.95  113.71
 8400.79  113.91 8407.34  112.83  8413.9  110.91 8417.18  110.77 8427.02  113.04
 8453.25  112.25 8495.89  112.21 8518.84   112.5 8531.96  112.29 8574.59  112.33
 8610.66  112.15  8636.9  112.25  8699.2  112.19 8718.88  112.67 8745.11  112.59
 8768.07  113.08 8784.46  113.16 8804.14  112.94 8843.49  113.23 8866.45  113.04
 8997.62  113.46 9010.74  113.36 9050.09  113.78 9076.32  113.75 9115.67     114
 9138.63  114.01 9161.58  114.29 9237.01  114.53 9256.68  114.74 9273.08   114.6
 9299.31  114.89 9332.11  114.81 9427.21  115.29 9473.12  115.16 9545.26  115.51
 9568.22  115.42 9617.41  115.59 9646.92  115.44 9732.18  115.83 9764.97  115.77
 9781.37  115.97 9820.72  115.78 9843.68  115.98 9892.87  115.97 9938.78  116.26
 9987.97  116.3110004.36  116.7610007.64  116.4110017.48  111.8910024.04  108.34
10027.32  107.7510037.16  107.7710043.71  110.3410053.55  117.5710069.95  126.35
10076.51  127.2310089.62  126.4510096.18  125.68 10125.7   125.510194.56  125.65
10250.31  125.5210266.71  125.63 10299.5   125.510309.34  125.8410319.17  127.11
10335.57  126.2910345.41  126.7610358.53  124.9610427.39  125.0410447.07  124.88
10509.37  124.8210525.77  125.06   10552  124.8510594.64  124.7710617.59  125.02
10666.78  124.8610719.25  124.8610729.09  124.7310778.28  124.8710820.91  124.79
10876.66  124.8610886.49  124.6910922.57  124.7110958.64  124.58 10965.2  124.91
10978.31  124.6911053.74  124.5111102.93  124.3211145.56  124.2611158.67  124.37
11191.47  124.2511214.42  124.3311237.38  124.1711276.73  124.1211319.36  124.26
11368.55  124.1211388.23  123.9611417.74  124.2211440.69  124.2411489.88  124.07
11522.68   124.311565.31  124.0611611.22  124.2611663.69  124.1211680.08  125.35
11703.04  125.9811712.88  125.6911722.71  126.6311798.14  126.3311817.81  126.56
11830.93  126.0711840.77  126.51 11899.8  126.0711935.87  126.4311952.26  126.82
 11978.5  126.4712017.85  126.9812034.25  127.0112040.81  127.62 12057.2  127.73
12076.88  128.2212096.55  127.2312103.11  127.3412116.23  128.5812126.07  127.03
12135.91  122.3312142.46  121.44 12152.3  121.32 12168.7   122.612178.54  124.48
12185.09  125.1412208.05  124.4612224.45  124.66   12231  125.1712250.68  125.64

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5269.43     .07 5320.33    .025 5574.02     .07 5603.53    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5269.43 5603.53          1037.5    1525    1100             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5269.43  116.47       T
 5688.7712250.68  115.98       T
Left Levee      Station=    6.56      Elevation=  136.08
Right Levee     Station=12116.23      Elevation=  128.58
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1308.69 4329.51  119.64 5688.77 7272.61  115.4110358.53   12000  124.96

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            133.72    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.066      0.039      0.066
  W.S. Elev (ft)            133.67    Reach Len. (ft)          1037.50    1525.00    1100.00
  Crit W.S. (ft)            121.45    Flow Area (sq ft)       78088.28   12563.84   97058.32
  E.G. Slope (ft/ft)      0.000066    Area (sq ft)            78501.30   12563.84  103051.80
  Q Total (cfs)           235000.00    Flow (cfs)              86146.61   42994.74   105858.70
  Top Width (ft)          12242.90    Top Width (ft)           5261.65     334.10    6647.15
  Vel Total (ft/s)            1.25    Avg. Vel. (ft/s)            1.10       3.42       1.09
  Max Chl Dpth (ft)          44.37    Hydr. Depth (ft)           14.84      37.61      14.60
  Conv. Total (cfs)       28925390.0    Conv. (cfs)             10603510.0   5292083.0   13029800.0
  Length Wtd. (ft)          1168.03    Wetted Per. (ft)         5271.91     347.81    6665.81
  Min Ch El (ft)              89.30    Shear (lb/sq ft)            0.06       0.15       0.06
  Alpha                       1.99    Stream Power (lb/ft s)      0.07       0.51       0.07
  Frctn Loss (ft)             0.06    Cum Volume (acre-ft)     325785.60   93979.02   329287.50
  C & E Loss (ft)             0.00    Cum SA (acres)           30681.73    3567.58   32497.41


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 183.00*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  135.95    4.92  135.95   12.39  126.25   16.94  125.46   21.75  122.36
   24.16  122.12   49.71  121.69   91.48  119.26  101.97  118.88  135.57  117.08
  151.59  117.43  176.63  117.03  202.76  117.39  221.41  117.31  228.88  118.08
  243.81  118.81  251.28  120.12  258.74  120.45  269.94  119.75  281.14   119.7
  296.07  119.08  314.73  119.14  359.53  118.85  432.91  118.68  519.47  118.82
  579.59  118.33  650.68  118.44  695.47  118.32  733.47  118.44  798.39  118.52
  841.05  118.32  870.92  118.49  889.58  118.41  919.44  118.59  945.57  118.41
  961.89  118.69  985.94  118.27  1016.5  118.35 1061.28   118.3 1076.21  118.82
 1091.14  119.01 1106.08  118.72 1132.21  119.45 1180.73  119.57 1195.66  119.21
  1210.6  119.48 1244.19  119.26 1285.25  119.46 1296.45  119.35 1330.05  119.51
 1378.57   119.1 1394.69   118.8 1406.71  119.04 1421.14  117.96 1434.57  118.08
 1456.96  117.88 1486.83  118.71 1494.29  118.27 1505.29  114.46 1512.96  113.14
 1524.15  113.71 1539.09  113.42 1568.95  113.18 1599.07  113.59 1608.69  113.21
 1639.95  113.45 1656.78  113.13 1692.84  112.88 1714.49  113.24 1721.69  112.76
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 1767.38  113.01  1832.3  113.12 1865.97  113.06 1962.14  113.17 2027.07  113.13
 2106.41   113.2 2178.55  113.21  2209.8  113.05 2238.66  112.46  2265.1  112.09
    2318  111.95 2565.67  112.01 2628.18  112.28 2669.06  112.57  2695.5   112.9
 2813.32  113.01 2928.74  112.51 3034.54  112.58 3118.06  112.55 3135.52  112.91
 3185.25   113.5 3218.84  113.34 3252.44  113.52 3263.64  113.26 3286.04  113.58
 3297.23  113.14 3364.41  113.52 3379.35  113.81 3390.54  113.48 3427.87  113.32
 3439.07  113.97 3457.73  113.06 3472.67  113.23 3483.86  112.96 3502.53  113.18
 3513.73  112.98 3521.19  113.25 3543.59  113.33 3551.06  113.07 3584.65  113.02
 3599.58  113.26 3618.25  112.96 3640.64  112.92 3655.58  113.25 3666.77  113.03
 3700.57  113.04 3733.97  113.42 3752.63  113.24 3793.69  113.84 3808.62  113.28
 3834.75  113.15 3875.81  113.33 3887.01  113.06 3921.77  113.16 3939.27  112.97
  3954.2  113.11 3969.13  112.93  4010.2  113.07 4069.92  112.93 4110.98  112.98
 4186.26  113.55 4234.16  114.55 4245.35  114.43 4260.29  113.38 4271.48  113.33
 4290.15  113.91 4312.55  113.29 4327.48  113.31 4338.68  112.82 4361.07  112.87
 4383.47  112.57 4402.13  112.85 4428.26   112.6 4439.46  112.83 4454.39  112.73
 4473.06  113.64 4495.45  112.61 4525.32  112.67 4551.45  112.49 4562.65  112.81
 4570.11  112.52 4596.24   113.3 4622.37  112.71 4652.23  112.68 4689.56  112.93
 4704.49  112.59 4719.43  112.69 4745.54  112.57 4764.21  112.29 4786.61  112.72
 4816.47  114.04 4823.93  114.62 4838.87  116.45 4850.06  116.69 4861.26  118.15
 4872.46  117.12 4883.66   116.8 4891.12  115.72 4902.31  114.68 4913.51  115.01
 4924.71  118.42 4948.47  117.66 4995.63  117.21 5018.03  116.67 5077.74  116.76
 5111.34     117 5122.54  116.89  5174.8  117.24 5200.93     117 5227.06  117.18
 5260.64  116.99 5283.04  116.65  5312.9  117.54  5335.3  116.63 5350.23  116.66
 5376.36  116.17 5391.29  114.11 5409.95   114.3 5417.41  115.95 5421.14  116.17
 5458.43  116.19 5477.04  116.44 5513.51  116.28 5551.98  116.46 5578.43  116.73
 5597.67   117.2 5614.75  116.36 5625.93  116.93 5644.53  116.99 5670.58  118.02
 5681.75  118.96 5696.63  118.52 5711.53  118.43 5718.97   117.6 5730.14  115.67
  5741.3   114.9 5752.47  114.62 5759.91  114.98 5785.97  114.61 5800.86  114.78
 5812.02  116.73 5821.28  116.36 5830.63  114.74 5838.07  114.45 5845.32  115.07
 5856.69     115 5869.37  115.33  5875.3  116.12  5883.8  116.15 5893.91  114.83
 5907.84  114.04 5923.68  114.38 5929.48  114.87 5946.31  115.43 5963.14  116.58
 5979.51   116.2  5994.4  116.89 6002.11  114.52 6005.97  112.73  6013.7  106.71
 6017.56  104.56 6037.41  100.89 6054.45    98.7 6060.35   97.45 6073.32   93.62
 6092.32   91.01 6101.64   89.44  6112.9   88.43 6133.49   87.34 6158.18   89.46
 6195.22   94.49 6212.49   94.43  6226.6   94.71 6242.59   95.75 6296.32   98.35
  6305.6   99.07 6309.07  105.96 6312.51  106.71 6324.48  112.56 6328.72  114.27
 6336.82  116.19 6346.72  116.84 6359.93  116.26 6376.43  114.97 6386.34  116.75
 6396.24  116.93 6406.14  115.74 6422.65  116.92 6432.56   116.1 6442.45  116.18
 6458.97  115.49 6468.86  113.72 6475.47  113.08 6485.38  113.83 6498.58   114.2
 6511.79  112.46 6518.39  111.97 6528.29  111.91 6561.31  112.23 6597.62  112.29
 6637.24   112.2 6657.04  112.41 6719.77  112.26  6789.1  112.49 6845.22  112.34
 6871.63  112.52 6888.14  112.36 6964.07  112.34 7003.69  112.54 7016.89  112.47
 7135.74   112.8 7201.76  112.68 7231.48   112.7  7257.9   112.9 7284.31  112.67
 7300.82  112.77 7386.68   112.3 7426.31  112.19 7482.45  111.88 7518.78  111.83
  7568.3  111.44 7574.91   111.6 7622.63  111.33 7634.36  111.46  7700.4  111.27
 7767.29   111.3 7786.57   111.2 7829.18  111.31  7857.3  111.17 7898.54  111.47
 7931.55  111.15 7948.07  111.16 7957.97  110.56 7974.49  111.24    7991  111.58
  8007.5  115.11 8017.41  115.64  8079.1  114.94 8096.66  114.66 8133.75   114.6
 8178.74  114.39 8218.85   114.5 8232.06  114.38 8268.75  114.55 8304.12  115.11
 8333.04  115.15 8339.47  115.41 8384.47  114.86  8410.2  115.09 8464.84  115.29
 8479.73  115.46 8583.78  115.32 8621.73  115.11 8694.38  115.02 8757.12  114.81
 8866.09  114.89 8905.71  114.69 8955.25  114.76 8988.27  114.52 9090.63   114.4
 9117.04  114.14 9130.25  114.27 9153.37  115.05 9169.87  112.69 9179.78  114.38
 9206.19  113.76 9249.13  113.77 9272.24  113.99 9285.45  113.83 9328.37   113.9
 9374.54  113.52 9380.97  113.95  9409.9  114.03 9453.84  113.99 9473.66  114.36
 9500.07  114.31 9523.18   114.7 9539.69  114.78  9559.5  114.61 9599.12  114.85
 9622.24  114.71 9663.85  114.77 9754.32  115.07 9767.53     115 9807.15  115.32
 9833.56  115.32  9896.3  115.52 9919.41  115.75 9995.36  115.9710015.16  116.14
10031.68 116.0410058.09  116.2710091.11   116.210186.87   116.6 10233.1  116.51
10305.73   116.810328.85  116.7510378.38  116.88 10408.1  116.7610493.94  117.06
10526.96  117.0310543.47  117.1810583.09  117.0610606.21  117.2310655.74  117.24
10724.62  117.68 10751.5   117.6   10768  117.81 10771.3  117.5410787.82  111.48
10791.12  111.0410801.03  111.0510807.62  112.9810817.53   118.410834.04  124.99
10840.65  125.6510860.45  124.4810890.18  124.3110956.08  124.3911015.65  124.32
11032.16  124.3911065.18  124.2711075.08  124.5211084.98  125.47 11101.5  124.85
 11111.4  125.2111124.61  123.8811193.95  123.9311213.76  123.8111276.49  123.75
11293.01  123.9311319.42  123.7811362.35  123.7211385.46   123.911415.75   123.8
11487.82  123.7811497.73  123.6811547.26  123.7811590.18   123.711646.32  123.75
11656.21  123.6211692.54  123.6411728.86  123.5411735.47  123.7811795.06  123.35
11874.15  123.0411917.07  122.9911930.27  123.0812009.52  122.8912092.07  122.97
12161.41  122.7612191.13  122.9512263.77  122.8512296.53  123.0412328.68  122.89
12385.94  123.0112438.77  122.9512455.28   123.9 12478.4  124.37 12488.3  124.15
 12498.2  124.8512574.15   124.712593.96  124.8812607.17  124.5212617.07  124.85
12676.51   124.512712.83   124.812729.33  125.0912755.75   124.912791.57  125.38
12801.21  124.1812811.89  124.0512818.49  124.5112833.36  124.8512846.22  126.75
12855.86  127.4712874.62  126.9312884.79  126.1812894.44  128.0112905.54  126.92
12917.84  121.8812925.63  120.9112937.33  120.8612956.83  122.0212976.32  124.11
12989.93  124.4112998.81  123.7213021.01  123.7913030.92     12513054.32   125.3

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082  5883.8    .066 5979.51    .015 6309.07    .066 6336.82    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        5994.4 6336.82           1037.5    1525    1100             .1       .3
Left Levee      Station=    4.92      Elevation=135.9525
Right Levee     Station=12894.44      Elevation= 128.015
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    1505 3185.25   113.5 6458.97 8011.99  115.4911124.61   14000  123.88

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 182.80*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  135.83    3.28  135.83   11.65  129.33   16.76   128.8   22.16  122.68
   24.85  122.23   49.11   121.9   73.38  120.91  100.34  118.44   132.7  117.85
  154.26  118.03  167.74  119.15  178.53  119.19  197.41  118.76  225.12  119.16
  246.04  119.14  271.15  120.17  279.52  121.05  287.89  121.29  300.45  120.83
  313.01  120.78  329.75  120.34  350.68  120.41  400.91  120.24   483.2  120.11
   553.3  120.18  580.26  120.31  601.83  120.19  647.66   119.5   690.8  119.62
  768.99  119.51  820.21  119.67  841.79  119.59  893.01  119.74  955.02  119.56
 1043.99  119.85 1065.56  119.74 1076.34  120.18 1103.31   119.5 1137.58  119.56
 1187.79  119.48 1221.28  119.98 1238.02   119.8 1267.32  120.27 1321.73  120.36
 1338.48   120.1 1355.22  120.31 1392.89  120.12 1438.93  120.27 1489.16  120.24
 1513.12  120.05 1561.65  119.08 1575.13  119.53 1591.31  117.29 1631.48  116.82
```

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 1661.41  117.04 1672.19  117.52 1685.67  114.18 1699.15  113.78 1715.33  114.25
 1744.98  113.61 1753.07  113.87 1774.65  113.69 1790.82  114.22 1801.61  113.47
 1825.87  113.73 1836.66  114.13 1855.53   113.6 1895.97  113.37 1912.15  113.58
 1920.24  114.25 1928.32  113.34 1936.41  113.78 1979.56  114.24 2052.35  114.46
 2065.83  114.34 2138.63  114.49 2184.46   114.4 2197.94  114.55 2270.74  114.49
 2359.71  114.61 2381.28  114.56  2440.6  114.65 2475.64  114.32    2508  113.14
 2537.66   112.4 2591.59  112.25 2596.97  112.12  2715.6  112.15 2745.26  112.33
 2756.05   112.2 2820.76  112.18 2874.68  112.25 2890.86  112.46 2944.78  112.78
 2990.62  113.36 3020.27  114.02  3071.5  114.18 3098.46  114.08 3152.38  114.24
 3195.53  114.02 3203.61  113.77 3252.15  113.35  3281.8  113.24  3351.9  113.26
 3400.43  113.38 3457.05  113.31 3502.88  113.39 3513.67  113.62 3569.43  113.98
  3607.1  113.82 3644.77  113.97 3657.33   113.8 3682.44  114.01    3695  113.71
 3770.33     114 3787.07   114.2 3812.94   113.9 3841.48  113.87 3854.04  114.32
 3874.97  113.72 3904.27  113.68 3971.24  113.91 3979.61  113.73 4017.28  113.73
 4034.03  113.89 4054.95  113.68 4080.07  113.68 4096.81   113.9 4109.37  113.75
 4147.26  113.74 4184.71  114.05 4205.64  113.92 4251.68  114.31 4268.42  113.97
 4297.72  113.94 4343.77  114.07 4356.32  113.88  4395.3  114.04 4448.41  113.82
 4494.45  113.98 4561.42  113.87 4627.17  113.97  4682.8  114.37 4691.88  114.33
 4729.62  114.86 4758.14  114.97 4774.88  114.23 4787.44  114.14 4808.37   114.6
 4842.86  113.93 4862.78  113.22 4887.89  113.15 4913.01   112.9 4933.94  113.07
 4963.24  112.91 4992.54  112.98 5013.46  113.56 5038.58   112.9 5122.29  112.83
 5151.59  113.32 5180.89  112.91 5255.37  112.99 5272.98   112.8 5289.72  112.89
 5339.94  112.55 5365.05  112.85 5398.54  113.75 5423.65  115.33 5436.21   115.5
 5448.76  116.47 5461.32   115.8 5473.88  115.58 5494.79  114.12 5507.35  114.41
 5524.09   117.1 5535.77   116.9 5546.55  116.18 5551.94  116.71 5570.82  116.26
 5599.44  116.25 5624.55  115.86 5741.74  116.05 5800.34  116.34 5829.64  116.15
 5858.94   116.3 5921.71  115.94 5955.19  116.55 5980.31  115.96 5997.05  115.98
 6026.35  115.65 6043.09   114.3 6064.01  114.41 6076.57  115.63 6104.65  115.64
 6128.92  115.83 6180.14  115.76 6223.28  115.94 6252.94  116.19  6274.5  116.95
 6282.59   116.1 6293.66  115.68 6306.19     116 6327.06  116.04 6356.27   116.7
 6368.79  117.36 6385.48  116.99 6402.18  116.94 6423.05  115.13 6448.09  114.45
 6456.43  114.68 6485.66  114.41 6502.35  114.53 6514.87  115.86 6525.25  116.09
 6536.03  114.73 6541.42  114.76 6552.21  116.17  6557.6  116.38 6573.78  115.56
 6579.17  115.76 6587.26  117.13 6598.04   117.1 6614.22  113.67 6622.31  112.89
 6635.79  113.31 6646.58  114.24 6665.44  114.34 6684.32  116.52 6702.67  116.83
 6708.59  117.38 6719.37  117.32 6727.15  113.01  6737.3  108.28 6746.05  103.44
 6768.94   98.65 6788.57   96.74 6810.32   93.14  6824.3   92.09  6832.2   91.16
 6840.11   89.35 6855.93   87.11 6879.66   85.39 6902.78   89.13 6925.91   94.46
 6937.47   97.99  6942.1   98.46 6966.87   98.41 6981.84   99.08 7032.17  100.69
 7040.86  101.47 7044.11  106.48 7047.34   107.4 7054.94   111.6 7062.52  116.45
 7070.11  118.28 7076.58  118.41 7083.05  117.66 7093.38  117.46 7109.99  116.59
 7119.97  117.76 7129.93  117.87 7139.91  117.08 7156.53  117.86  7166.5  117.32
 7176.47  117.38 7193.09  116.87 7209.71   115.3 7219.69  115.83 7232.98  116.06
 7246.28  114.88 7262.89  114.49 7296.14   114.7 7372.59  114.72 7392.53  114.86
 7455.69  114.76 7525.49  114.92 7581.99   114.8 7608.59  114.92  7625.2  114.82
 7701.65  114.83 7741.55  114.97  7795.1  114.97  7874.5  115.14 7966.63  115.07
 7995.77  115.26 8015.18  115.16 8021.65  114.88 8040.72  114.92 8099.34  114.57
 8167.06  114.28 8223.58  113.91 8260.16  113.76 8310.03  113.26 8348.55  113.14
 8364.73  112.82  8371.2     113 8403.57   112.9 8416.51  112.71    8478  112.56
 8510.37  112.63 8529.79  112.44 8568.63  112.56    8601  112.36 8626.89  112.78
 8642.52  112.83 8692.39  112.34 8702.37  111.87 8723.99  112.49 8735.62  112.55
 8752.24  115.03 8766.07  115.51 8772.54  115.29 8801.66  115.28 8814.61  115.01
 8824.32  115.16 8869.64  114.44 8879.34  114.55 8924.65  114.28 8947.31  114.45
 8978.33  114.33 9015.28   114.5 9050.88  115.24    9080  115.33 9086.48  115.87
  9105.9   115.3 9131.79  114.92 9157.69  115.48 9212.71  115.88    9241  116.27
 9293.62  116.19 9332.46  116.23 9351.88  116.09 9400.42     116 9432.79  116.04
 9497.51  115.86 9562.25  115.89 9616.71  116.01 9652.87  115.84 9706.48  115.93
 9739.72  115.76 9842.78  115.71 9882.66  115.61 9905.95  116.18 9922.57  114.61
 9932.54  115.72 9959.14  115.2810002.41  115.3410025.63  115.4810057.44  115.37
10096.27  115.4910118.93  115.2310128.64  114.8510135.11  115.6910164.24  115.82
10208.48  115.7810228.43  116.0410255.02  116.0310294.91  116.41   10339  116.27
10354.76  116.4710419.92  116.3710432.87  116.5210465.23  116.51 10497.6  116.67
10524.32  116.6310564.21  116.8510653.97  117.0410677.24  117.2110790.27  117.48
10816.87  117.6410860.09   117.610946.53  117.9110993.07  117.8611066.21  118.09
11139.35  118.1611169.27  118.0911305.58  118.3911345.47  118.3511368.74  118.47
11418.61  118.5111468.55  118.7711487.96  119.0911534.97  118.6811551.59  114.62
11564.89  114.3311571.53  115.6211581.51  119.2411598.14  123.6211604.79  124.07
11624.73  123.2911653.03  123.1211753.36  123.1811830.85  123.0511840.83   123.2
11850.79  123.8311867.42   123.411877.39  123.67 11890.7  122.8111960.51  122.83
11980.46  122.7312043.62  122.6812060.24  122.8112130.06  122.6712153.33  122.79
12183.83  122.6912256.39  122.7112415.97  122.6312499.08  122.4912505.73  122.65
12536.61  122.37 12552.8  122.4312565.74  122.1212601.34   121.912672.55  121.71
12701.87  121.7812781.67  121.6112834.38  121.69 12934.6  121.5612964.52  121.69
13037.65  121.6213070.64  121.7913103.01  121.6713213.86  121.7913230.47  122.44
13253.75  122.7613263.73  122.6113273.69  123.0713350.16  123.08 13370.1  123.21
 13383.4  122.9713393.38  123.1913453.22  122.9313506.41  123.3713523.76  123.24
13549.65  123.7313556.13  123.4913569.07  123.8313578.78  121.3713589.53   121.1
13607.91   121.613611.15  121.9813624.09  125.49 13633.8  126.7713653.22  126.65
13662.93  124.6913672.64  127.4513685.51  126.7213695.81  122.3913708.79  120.38
13722.36   120.413744.96  121.4413758.53  122.4913783.33  124.0313793.62  122.87
13811.63   122.613819.35  122.94 13824.5  124.59 13834.8   124.913857.96  124.96

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082  6557.6    .066 6635.79    .015  6942.1    .066 7040.86    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6719.37 7070.11          1037.5    1525    1100             .1       .3
Left Levee      Station=    3.28      Elevation= 135.825
Right Levee     Station=13672.64      Elevation=  127.45
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
    1600 5423.65  115.33

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 182.60*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   135.7    1.64   135.7   10.92  132.42   16.58  132.13   19.57  128.43
   22.56  122.99   25.55  122.34   52.43     122   79.33  121.08   97.26  118.66
   109.2  117.63  130.12  117.49  145.06  117.81  157.01  118.78  168.96  119.04
   183.9  120.86  195.85  121.01  201.83  120.58  216.77  120.48  255.61  121.01
  270.66  120.98  298.49  121.52  317.05  122.14  363.43  121.59  402.01  121.71
  533.48  121.54   575.3  121.67  611.16  121.62  641.04  121.79  664.94  121.64
  715.74  120.68  763.54  120.82  817.32  120.69  841.22  120.85  850.19  120.68
  906.96   120.9  930.86  120.76  987.63  120.95 1002.57   120.8 1050.38  120.87
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 1056.35  120.77  1092.2  121.03 1142.99  120.98 1154.95  121.16 1178.85  121.02
  1190.8  121.68 1199.76  121.57 1220.68  120.73 1258.66  120.76  1314.3  120.67
 1351.41  120.96 1369.97  120.89 1402.44  121.09 1447.75  121.19 1481.29  120.99
 1499.85  121.15 1555.32  120.96 1585.19  121.08 1648.28  120.98 1674.83  120.79
 1707.69  119.82 1728.61  119.36 1743.54  120.02  1755.5  117.36 1761.47  116.63
 1785.38  116.01 1797.33     116 1827.21  115.31 1839.16  115.54 1851.11  116.66
 1857.09   115.9 1866.04  113.91 1875.01   114.5 1880.99  114.28 1898.91  114.86
 1931.78  113.99 1940.74  114.46 1964.65  114.05 1970.62  114.66 1982.58  114.85
 1994.53  113.74 2006.47  114.18 2021.42  114.17 2033.37   114.8  2051.3  114.51
 2054.29  114.07 2069.22  114.12  2099.1  113.85 2117.03  114.22    2126  115.25
 2134.95  113.92 2143.92  114.62 2191.73  115.47 2272.39  115.79 2314.23  115.63
 2335.14  115.82 2368.01  115.84  2418.8   115.7 2433.74  115.93 2514.42  115.84
 2613.01  116.03 2636.92  115.94 2702.65  116.08 2741.49  115.59 2771.37  114.28
 2777.35  113.82 2810.21  112.72 2869.97  112.49 2875.94   112.3 2929.73  112.36
 2962.59  112.27 3007.41  112.33 3040.28  112.61 3052.23  112.41 3085.09  112.49
 3123.94  112.37  3183.7  112.49 3201.62   112.8 3261.38  113.28 3312.17  114.15
 3345.03  115.15 3401.81  115.38 3431.69  115.23 3491.44  115.46 3539.25  115.14
 3548.21  114.77    3602  114.14 3634.86  113.98 3712.55     114 3766.33  114.18
 3829.07  114.07 3879.86  114.09 3891.81  114.32 3963.52  114.46 3978.46  114.29
  4037.1  114.43 4078.85  114.44 4092.76  114.28 4176.24  114.47 4194.79   114.6
 4223.47   114.4  4255.1  114.42 4269.01  114.66  4292.2  114.39 4310.76  114.48
 4361.78  114.33 4375.84  114.52 4408.17  114.39 4468.47  114.52 4491.66   114.4
 4538.05  114.56 4593.96  114.44 4632.79  114.67 4658.65  114.59 4709.67  114.78
 4728.23  114.66 4811.72  114.81 4853.89  114.66 4868.83  114.91 4927.68  114.71
 4978.71  114.89 5066.03  114.81 5083.96  114.93 5125.79  114.84 5187.43  115.28
 5197.49  115.12 5239.32  115.44 5270.92   115.5 5305.05  114.96    5320  115.31
 5340.91  115.07 5364.81  114.52 5386.89  113.63 5442.55  113.23 5530.68  113.23
 5553.87  113.47  5581.7   113.2  5612.8   113.1  5665.2  113.24 5674.47  113.13
 5706.94  113.34 5739.41   113.1 5768.17  113.19 5841.46     113 5860.02  113.09
 5915.67  112.81  5943.5  112.97  5980.6  113.45 6008.44   114.2 6022.35   114.3
 6036.27   114.8  6064.1  114.36 6087.28  113.57 6101.19   113.8 6119.75  115.24
 6132.68  115.56 6144.63  114.69 6150.61   115.6 6171.52  115.19 6183.48  115.38
 6231.07  115.06 6270.12  115.07 6279.08  115.23 6326.89  115.14  6422.5  115.43
 6458.35   115.3 6490.82  115.42 6560.38  115.23 6597.49  115.56 6625.32  115.28
 6676.34  115.14  6694.9  114.48 6718.08  114.53 6731.99   115.1 6763.11  115.12
    6790  115.32 6831.83  115.35 6846.77  115.24 6879.63  115.48 6894.57  115.41
 6927.44  115.66 6951.34  116.69 6960.31  115.49 6972.26  115.01 7029.03  115.13
 7055.83  115.77 7076.83  115.44 7092.84  115.46 7115.96   114.6  7143.7  114.27
 7152.95  114.39 7185.34  114.21 7203.84  114.29 7229.21  115.81 7241.17  114.75
 7247.13  115.05 7259.09  117.27 7265.06  117.55 7282.99  116.04 7288.97  116.18
 7297.93  118.07 7309.88  118.23 7327.81  113.07 7336.77  111.74 7351.71  112.38
 7363.67   113.6 7384.58  113.25 7405.49  116.45 7414.46  116.63 7432.39  118.12
 7444.33  117.74 7453.14  111.28 7459.02  108.02 7464.64  106.72 7474.55  102.33
 7500.46   96.41 7522.68   94.77 7536.28   93.33 7547.31   92.66 7563.14   92.28
 7572.09   91.32 7581.05   88.91 7598.96   85.79 7625.82   83.43 7647.38    88.8
 7668.94   96.22 7679.73  101.48 7684.04  102.23 7707.13  102.12 7768.03  103.04
 7776.13  103.86 7779.16  106.99 7782.17  108.08 7789.25  112.69 7796.33  118.63
  7803.4  120.37 7809.92  120.09 7816.43  118.78 7843.55   118.2  7853.6  118.78
 7873.67  118.41  7890.4  118.81 7927.22  118.26 7943.95  117.52 7967.37  117.93
 7987.46  117.12 8107.93  117.24 8161.84  117.23 8261.87  117.36 8318.77  117.27
 8412.75  117.27 8468.15  117.41 8533.32  117.35  8621.3   117.5 8706.02  117.45
 8735.35  117.64  8754.9   117.5 8761.42  117.08 8820.07  116.94 8865.69  116.66
 9001.55   115.7 9051.75  115.07 9090.53  114.81 9106.82  114.31 9113.34  114.55
 9145.93   114.4 9158.96  114.12 9220.87  113.85 9253.46  113.96 9273.01  113.68
 9282.78   113.9 9299.08  113.61 9312.12   113.8 9344.71  113.54 9370.77  114.23
 9406.62  114.02 9452.24  113.17 9468.53   113.6 9480.24  113.52 9496.97  114.94
 9510.89  115.38 9517.41   115.1 9546.73  115.39 9559.76   115.1 9569.55  115.37
 9615.17  114.34 9624.94  114.51 9670.55  114.18 9693.37  114.44  9724.6  114.29
  9761.8  114.46 9797.65  115.38 9804.16  115.23 9826.97   115.5 9833.48  116.34
 9853.04  115.43  9879.1  114.97 9905.18  115.87 9960.58  116.47 9986.64  117.16
10042.03 117.0210081.14 117.1310100.69 116.9910149.57 116.9610182.15 117.05
10247.32 116.88 10312.5 116.96 10335.3 117.1210384.18 117.1210403.73 116.97
 10429.8  117.110527.55 116.9710540.59 117.05 10635.1 116.9610658.53 117.32
10675.26 116.5310685.31 117.0610712.08 116.7910779.03 116.9610811.05  116.9
10850.14  117.110872.75 116.7710882.73 116.1810889.25 117.4310918.58 117.62
10957.68 117.5711009.98 117.7511061.95 118.0411094.53 117.8511107.58 118.08
   11176 117.9611189.03 118.1711221.61 118.11 11254.2 118.2911312.86 118.34
11368.25 118.5511397.58 118.5211449.71 118.7211575.64 119.0211619.16 118.98
11681.07 119.1711753.05 119.2111826.68 119.3811930.45 119.4212067.68 119.61
 12150.3 119.6812231.76 120.0312251.31 120.4912274.12 120.3112298.63 119.81
12315.37 117.7612328.76 117.6212335.45 118.2612345.49 120.0712362.23 122.26
12368.92 122.48   12389 122.0912417.49 121.9312485.93 121.8912518.51 121.97
12596.53 121.82 12616.6 122.1912643.39 122.1212656.78 121.7312727.06 121.72
 12779.2 121.6212827.48 121.68 12951.9 121.5712984.48 121.6613195.66 121.48
13294.05 121.4413323.38 121.3313336.42 120.8813372.25  120.613443.95 120.43
13486.31  120.513553.81 120.3313606.88 120.4513662.27 120.31 13737.9 120.42
13779.58 120.3513844.75 120.5313877.34 120.4413896.89 120.5513945.77  120.5
13988.94 120.6214005.67 120.99 14053.3 121.2814146.25 121.5314229.94 121.37
14283.48 121.6414300.95 121.5714327.02 122.2514333.54 121.8614346.57 122.28
14356.34 118.5614367.17 118.1414385.68 118.5614388.93 119.1214401.96 124.23
14411.74  126.08 14431.3 126.3514441.07 123.1914450.84 126.8914465.48 126.53
 14477.2 121.7314491.83 119.8514509.39 119.9914515.24 120.47 14533.1 120.87
 14553.3 121.6214565.01  122.414570.86 123.4914576.72 123.6414588.43 122.01
14608.92 121.61 14617.7  122.114623.55 124.4714635.27 124.7414661.61 124.63

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082 7444.33    .066 7536.28    .015 7843.55    .066 7927.22    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7444.33  7803.4          1037.5    1525    1100             .1       .3
Left Levee      Station=    1.64       Elevation=135.6975
Right Levee     Station=14450.84       Elevation= 126.885
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0  157.01  118.78    1850 7229.21  115.81

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 182.4

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  135.57    16.4  135.47   19.68  130.55   22.96   123.3   26.24  122.45
   55.75  122.11   75.43  121.27   85.27  121.25  104.95  118.05  118.06  116.81
  141.02  116.98  157.42  117.78  170.54  119.43  183.65  120.05  200.05  122.58
  213.17  122.83  219.73  122.28  236.13   122.2  278.76  122.82  314.84  122.81
  350.91  123.01   400.1  122.84  439.46  123.03  583.76  122.97  629.67  123.13
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  669.03  123.05  701.82  123.27  728.06   123.1  783.81  121.85  790.37  122.02
  826.44  121.85  836.28  122.02  895.31  121.83  921.55  122.07  931.39  121.86
   993.7  122.13 1019.94  121.93 1082.25  122.17 1098.65  121.97 1151.12  122.12
 1157.68  121.98 1197.03  122.32 1252.78  122.19  1265.9  122.47 1292.14  122.31
 1305.25  123.18 1315.09  123.05 1338.05  121.96 1374.12  121.99  1426.6  121.83
 1515.14     122 1551.22  121.86 1587.29     122 1623.37  121.88 1652.88  122.02
 1705.36  121.79 1738.15   121.9  1793.9   121.8 1836.54  121.53 1872.61  120.18
 1895.57  119.64 1911.96  120.51 1925.08  116.96 1931.64  115.96 1957.88  115.07
    1971  115.07 2003.79  113.76 2016.91  114.04 2030.03  115.79 2036.59  115.33
 2046.42  113.63 2056.26  115.15 2062.82  114.78  2082.5  115.47 2118.57  114.36
 2128.41  115.05 2141.53  114.49 2154.65   114.4 2161.21  115.22 2174.33  115.48
 2187.45     114 2200.56   114.6 2216.96  114.61 2230.08  115.47 2249.76  115.12
 2253.04  114.54 2269.43  114.64 2302.23  114.34 2321.91  114.87 2331.75  116.26
 2341.58   114.5 2351.42  115.47  2403.9   116.7 2492.44  117.13 2508.84   116.9
 2538.36  116.91 2561.31  117.16 2597.39  117.19 2653.14  117.01 2669.54  117.32
 2695.78  117.13  2708.9  117.32 2758.09  117.19 2866.31  117.45 2892.55  117.33
  2964.7  117.52 2987.66     117 3007.33  116.86 3040.13  115.11 3046.69   114.5
 3082.76  113.03 3148.36  112.72 3154.91  112.47 3213.95  112.55 3250.02  112.43
 3299.21  112.52 3335.29  112.89 3348.41  112.62 3384.48  112.72 3427.12  112.57
 3492.71  112.72 3512.39  113.14 3577.98  113.78 3633.73  114.94 3656.69  115.96
  3669.8  116.27 3732.12  116.58 3764.91  116.38 3791.15  116.61 3823.94  116.52
  3830.5  116.69 3882.98  116.26 3892.81  115.77 3922.33   115.3 3932.17  115.41
 3951.85  114.93 3987.92  114.71 4073.19  114.74 4132.22  114.98 4201.09  114.84
 4237.17  114.95 4256.84  114.79 4269.96  115.02 4309.32  114.88 4348.67  114.95
 4365.07  114.74 4437.22   114.9 4522.48  114.83 4624.15  115.04 4633.99   114.9
 4745.49  115.13 4784.84     115 4801.24  115.14 4834.04  115.04 4883.23  115.17
 4942.26   115.1  4968.5  115.23 5040.65  115.14 5083.28   115.3 5158.71   115.2
 5221.02  115.53 5286.61  115.55 5325.96  115.42 5342.36  115.79 5375.16   115.8
 5394.83  115.55 5450.59   115.8 5558.81  115.75 5578.49   115.9  5624.4   115.7
 5693.27  116.21 5703.11  115.91 5749.02  116.02 5765.42  115.86 5788.38  116.09
 5821.17  115.75 5837.57  116.07 5860.53  115.79 5886.76   115.1 5903.16  114.11
 5949.07  113.65 5988.43  113.49 6054.02  113.56 6090.09  113.37 6122.89   113.5
 6158.96  113.32 6198.32  113.49 6306.54  113.28  6329.5  113.43 6388.53  113.13
    6441  113.33 6493.47  113.06 6575.46  113.17  6585.3  113.07 6650.89  113.17
 6677.12  112.98  6696.8  113.22 6709.92  113.06  6729.6  114.21 6736.16  113.18
 6742.71  113.21 6749.27   114.5 6772.23  114.11 6785.35   114.4  6841.1  114.25
 6880.45  114.26 6890.29  114.46 6942.76  114.27 7014.91  114.49 7024.75   114.3
 7047.71  114.54 7087.06  114.45 7093.62   114.6 7162.49  114.47 7293.67  114.64
 7339.59  114.62 7359.26  114.75 7382.22  114.56 7421.57  114.59 7451.09   114.8
 7460.93  114.66    7497  114.87  7513.4  114.72 7549.47  115.01 7565.87  114.88
 7601.95  115.12 7628.18  116.44 7638.02  114.88 7651.14  114.34  7674.1  114.06
 7693.77  114.16 7713.45  113.91 7739.69  114.21 7765.92  113.91 7815.12  114.09
 7861.03   114.1 7893.82  113.97 7923.34  114.15 7933.18  115.54  7946.3  114.77
 7952.85  115.35 7965.97  118.37 7972.53  118.73 7992.21  116.52 7998.77  116.61
 8008.61  119.02 8018.45  119.75 8021.72  119.35  8041.4  112.48 8051.24  110.59
 8067.64  111.45 8080.76  112.97 8093.87  112.24 8103.71  112.16 8126.67  116.39
 8136.51  116.76 8156.19  118.87 8166.02  118.88  8169.3  118.16 8179.14  109.55
  8185.7  105.62 8191.98  105.17 8201.98  101.47 8231.98   94.17 8271.98   91.97
 8301.98   92.47 8311.98   91.47 8321.98   88.47 8341.98   84.47 8371.98   81.47
 8391.98   88.47 8411.98   97.97 8421.98  104.97 8425.98     106 8503.88  105.38
 8510.44  105.83    8517  108.76 8523.57  113.78 8530.13  120.81 8536.69  122.46
 8543.25  121.78 8549.81  119.89 8615.42  119.72 8641.67   119.8 8664.63  119.62
 8690.88  119.84 8743.37   119.6 8858.19  119.79 8897.55  119.69 8979.57  119.85
 9015.65  119.74 9150.16  119.73 9205.93  119.87 9271.54  119.74 9360.12  119.85
 9445.41  119.83 9474.94  120.01 9494.62  119.83 9501.18  119.28 9560.23  119.12
 9579.92  118.85 9606.16  118.83  9734.1  117.72 9776.75  117.28 9799.71  116.74
 9832.52  116.48 9848.92   115.8 9855.48  116.11 9888.29   115.9 9901.41  115.52
  9953.9  115.29 9963.74  115.13 9996.55  115.2910016.23  114.9210026.07  115.22
10042.48  114.81 10055.6  115.0510088.41  114.7310114.65  115.6710150.74  115.37
10196.67  114.3810213.07  114.7110226.19  114.4710232.75  115.0410245.88  114.77
10255.72  115.2510262.28  114.9110281.96  115.08 10291.8  115.4910304.92  115.19
10314.77  115.59 10360.7  114.2310370.54  114.4710416.46  114.0710439.43  114.43
10468.95  114.2410508.32  114.4110544.41  115.5110550.97  115.2910573.93  115.68
10580.49   116.810600.18  115.5610626.42  115.0210652.67  116.2610708.44  117.06
10734.68  118.0210790.45  117.8610829.82  118.04 10849.5  117.8910875.74  118.05
10898.71  117.9110931.51  118.0510997.12  117.9111062.74  118.02 11085.7  118.24
11134.91  118.2711154.59   118.111180.84  118.2711279.25  118.2211292.37  118.33
11387.51   118.311417.03  118.4911462.96   118.311508.89  118.4711564.66  118.43
11604.02  118.7111626.99   118.311636.83  117.5111643.39  119.1711672.92  119.41
11712.28  119.3611764.77  119.4711817.26  119.7111850.06  119.4311863.19   119.7
11899.27  119.7411932.08  119.56 11945.2  119.82   11978  119.7112010.81  119.92
12069.86  119.8912125.63  120.1112155.15  120.0212207.64  120.1812325.74   120.4
12378.23  120.3512440.56   120.512565.22  120.6112614.43  120.7412742.37  120.74
 12821.1   120.812896.55  120.9712912.96  120.9112994.97  121.2813014.65  121.89
13037.62  121.6513054.02  121.0213067.14   120.913152.44   120.913181.96  120.74
13250.86  120.6413283.66  120.7713398.48  120.5113431.29   120.713546.11  120.54
13680.61  120.5813719.98  120.4513752.78  120.5913946.34   120.414015.23  120.44
14064.44  120.3614077.56   120.114093.97  120.2414107.09  119.6514143.17  119.31
14215.35  119.14   14258  119.2214313.76  119.0214379.38  119.2114435.15  119.02
14490.92  119.1914553.25  119.0814618.86  119.2814651.67  119.2114671.35  119.37
14720.56  119.2514786.17  119.5614828.82   119.514904.27  119.8314946.92  119.88
14986.29  119.74 15051.9  119.9315078.14  119.8915104.39  120.7715110.95  120.22
15124.07  120.7315133.91  115.7515147.04  115.0715163.44  115.5115166.72  116.25
15179.84  122.9715189.68  125.3815209.37  126.0615219.21   121.715229.05  126.32
15245.45  126.3415258.58  121.0715274.98  119.3215294.66  119.5115301.22  120.05
15343.87  120.5615356.99  121.5315363.55  123.0215370.12  123.2515383.24  121.16
 15406.2  120.6315416.04  121.25 15422.6  124.3615435.73  124.5715465.25  124.29

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082 8018.45    .066 8179.14    .015 8523.57    .066 8536.69    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8169.3 8536.69          1987.52 1916.67 1916.38            .1       .3
Left Levee      Station=       0      Elevation=  135.57
Right Levee     Station=15229.05      Elevation=  126.32
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   72.11  171.27  119.54 1938.03 7959.44  116.59

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            133.49    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                 0.082      0.021     0.061
  W.S. Elev (ft)            133.40    Reach Len. (ft)          1987.52    1916.67   1916.38
  Crit W.S. (ft)            122.57    Flow Area (sq ft)       126420.90   13097.87   98563.11
  E.G. Slope (ft/ft)      0.000038    Area (sq ft)            126420.90   13097.87   98563.11
  Q Total (cfs)           235000.00     Flow (cfs)             88068.27   60429.54   86502.20
  Top Width (ft)          15447.47    Top Width (ft)           8151.52     367.39    6928.56
  Vel Total (ft/s)            0.99    Avg. Vel. (ft/s)            0.70       4.61      0.88
  Max Chl Dpth (ft)          51.93    Hydr. Depth (ft)           15.51      35.65     14.23
  Conv. Total (cfs)       38229600.0    Conv. (cfs)             14326870.0   9830627.0   14072100.0
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Length Wtd. (ft)	1944.26	Wetted Per. (ft)	8162.61	385.64	6946.18	
Min Ch El (ft)	81.47	Shear (lb/sq ft)	0.04	0.08	0.03	
Alpha	6.10	Stream Power (lb/ft s)	0.03	0.37	0.03	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	315102.70	92200.04	318914.10	
C & E Loss (ft)	0.02	Cum SA (acres)	30042.37	3518.46	31811.77	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 182.05*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	129.06	4.37	128.7	10.93	129.54	29.51	135.05	37.16	135.47
47.78	134.88	50.93	133.29	56.44	122.41	59.19	120.85	83.96	120.43
108.75	119.55	125.27	117.16	136.27	116.37	169.32	116.66	180.33	117.65
191.34	117.97	205.11	119.54	216.12	119.62	221.63	119.2	249.49	118.94
276.04	119.38	318.5	119.16	373.05	119.07	414.05	119.17	527.24	119.18
573.29	119.24	610.45	119.46	668.85	119.07	695.18	118.36	730.97	118.37
739.23	118.51	788.79	118.4	859.95	118.6	893.42	118.46	945.73	118.65
959.5	118.51	1003.55	118.58	1009.05	118.48	1042.09	118.75	1088.89	118.67
1099.91	118.86	1121.93	118.76	1132.94	119.34	1160.48	118.53	1234.82	118.48
1309.15	118.69	1369.72	118.62	1385.46	118.5	1424.78	118.67	1468.84	118.48
1496.37	118.59	1543.17	118.55	1578.97	118.34	1609.25	117.41	1628.52	117.08
1642.28	117.66	1653.3	115.28	1658.81	114.6	1680.84	113.99	1691.85	113.99
1719.38	113.14	1730.39	113.33	1741.41	114.5	1755.17	113.07	1763.43	114.09
1768.93	113.85	1785.46	114.32	1815.74	113.58	1824	114.03	1846.03	113.59
1851.53	114.13	1862.55	114.3	1873.56	113.31	1884.57	113.73	1898.34	113.76
1909.35	114.34	1925.87	114.07	1928.63	113.67	1969.92	113.57	1986.44	113.95
1994.71	114.89	2002.96	113.71	2011.22	114.33	2055.28	115.12	2129.61	115.44
2143.38	115.29	2187.43	115.44	2202.94	115.33	2240.1	115.68	2298.48	116.69
2335.65	117	2351.56	117.44	2378.11	117.55	2404.65	117.03	2465.51	117.01
2494.89	117.2	2505.51	116.74	2526.08	116.91	2542.66	116.71	2561.87	116.12
2594.91	114.59	2616.97	113.97	2625.19	113.48	2659.44	112.53	2675.37	112.67
2685.76	112.47	2765.61	112.51	2806.91	112.43	2837.2	112.66	2848.21	112.49
2903.63	112.51	2969.35	112.62	2985.87	112.92	3040.94	113.35	3087.74	114.13
3118.02	115.03	3170.34	115.29	3197.87	115.19	3252.93	115.36	3296.99	115.1
3305.24	114.77	3354.81	114.25	3407.92	114.08	3456.68	114.12	3506.23	114.3
3564.05	114.19	3621.87	114.36	3654.91	114.23	3687.95	114.31	3701.71	114.18
3762.29	114.3	3811.33	114.28	3919.22	114.48	3933.43	114.38	4013.05	114.58
4054.12	114.47	4067.89	114.58	4186.28	114.62	4208.3	114.73	4268.88	114.74
4294.4	115.05	4331.55	115.11	4347.46	114.97	4405.86	115.09	4448.33	115.33
4508.4	115.18	4522.17	115.46	4549.7	115.43	4566.22	115.23	4623.5	115.49
4703.88	115.39	4720.4	115.5	4750.89	115.41	4803.98	115.65	4816.76	115.86
4851.75	115.57	4877.33	115.55	4896.61	115.76	4924.14	115.53	4937.9	115.74
4979.2	115.06	4992.97	114.39	5048.17	114.02	5106.55	114.11	5149.9	114.05
5177.44	114.14	5207.72	114.02	5240.76	114.15	5297.65	114.18	5331.61	114.07
5382.58	114.12	5403.82	114.02	5435.67	114.37	5467.51	114.15	5515.29	114.27
5547.13	114.06	5620.7	114.09	5670.26	113.91	5686.78	114.61	5697.79	113.94
5703.29	114.8	5722.57	114.54	5733.58	114.73	5775.39	114.64	5813.42	114.68
5821.68	114.81	5865.73	114.67	5953.84	114.89	5992.38	114.9	6050.2	114.79
6131.04	114.96	6200.06	114.87	6215.39	115.06	6300.74	115.07	6331.03	115.23
6388.84	115.2	6419.13	115.35	6441.15	116.26	6449.41	115.26	6460.43	114.95
6496.22	114.84	6512.74	114.64	6534.77	114.81	6556.79	114.61	6636.64	114.8
6664.16	114.71	6688.95	114.85	6697.21	115.8	6708.22	115.32	6713.72	115.67
6724.73	117.62	6730.24	117.87	6746.76	116.41	6752.27	116.47	6760.53	118.09
6771.54	118.32	6788.06	113.76	6796.32	112.5	6810.09	113.08	6821.1	114.08
6840.37	113.52	6859.64	116.41	6867.91	116.68	6884.43	118.14	6895.43	117.71
6904.78	111.15	6911.02	107.78	6916.98	106.75	6928.41	102.71	6954.99	97.87
6961.75	97.6	6984.09	95.9	6992.99	94.98	7007.56	94.2	7021.5	93.85
7031	92.9	7040.5	90.71	7059.5	87.86	7088	85.59	7108.7	90.31
7129.39	97.2	7139.74	102.2	7143.88	103.02	7224.48	105.17	7231.27	105.72
7233.84	106.74	7244.86	113.38	7251.65	118.14	7258.43	119.32	7271.47	117.08
7298.29	116.82	7385.58	116.47	7411.66	116.63	7464.39	116.42	7583.98	116.5
7607.23	116.39	7698.56	116.46	7746.75	116.3	7819.84	116.31	7868.09	116.23
7923.51	116.27	8005.86	116.12	8022.46	116.37	8039.07	118.43	8085.58	118.47
8112.16	118.36	8132.09	118.53	8145.37	119.98	8152.02	119.77	8161.98	118.68
8210.4	117.88	8216.92	117.51	8321.25	117.03	8394.51	116.48	8448.39	116.16
8490.78	115.76	8513.59	115.36	8546.2	115.14	8562.5	114.64	8569.02	114.84
8601.62	114.66	8614.66	114.38	8676.6	114.02	8709.21	114.07	8728.77	113.79
8738.54	113.98	8754.85	113.73	8767.89	113.85	8800.5	113.61	8826.57	114.17
8862.44	113.91	8908.08	113.22	8924.38	113.4	8937.42	113.21	8943.94	113.57
8956.99	113.35	8989.13	113.44	9002.42	115.29	9025.45	115.56	9071.09	114.57
9080.87	114.72	9126.5	114.47	9149.33	114.71	9178.67	114.56	9217.79	114.65
9253.66	115.39	9260.18	115.24	9282.99	115.47	9289.51	116.23	9309.08	115.44
9335.16	115.07	9361.24	115.88	9416.67	116.37	9442.74	116.96	9498.17	116.84
9556.85	116.81	9582.93	116.95	9605.75	116.8	9638.35	116.9	9700.01	116.77
9791.58	116.94	9849.5	116.84	9866.11	117.03	9879.39	115.74	9925.9	115.15
9945.83	115.29	9983.92	115.1110015.59		115.2510038.84		115.1310072.07		115.42
10078.71	115.1510120.85		115.2510168.39		115.1210212.13		115.2810268.05		115.21
10294.62	115.8410306.67		115.6310339.28		114.67 10351.1		118.1210357.74		118.62
10427.5	118.3110466.42		118.3110518.59		118.4510551.18		118.2410564.23		118.4
10600.08	118.3810632.69		118.2210645.73		118.3810678.33		118.2710710.93		118.38
10769.61	118.2610825.04		118.3710854.37		118.2510899.21		118.33 11023.9		118.36
11076.07	118.3111181.57		118.34 11248		118.2911287.86		118.33 11384.2		118.31
11437.94	118.211607.47		118.1711630.02		118.2711688.97		118.3211708.52		118.71
11731.35	118.5611749.61		118.0611874.79		117.811943.26		117.7411975.86		117.82
12005.39	117.7212089.97		117.6312122.57		117.7412204.71		117.6312236.68		117.53
12390.74	117.5112463.81		117.8312483.74		117.7212497.03		117.2512520.29		118.19
12533.58	119.2512553.51		117.9412573.44		117.7112633.24		117.6712659.81		117.37
12696.35	117.512751.78		117.2712781.13		117.1712794.17		116.6712830.02		116.34
12879.05	116.1312942.16		116.1412999.55		116.0313064.76		116.1513120.18		116.02
13154.77	116.0813237.55		116.0913302.75		116.4213330.82		116.4813350.75		117.66
13367.37	116.913374.01		116.2413390.62		116.2713397.26		117.1513413.87		117.8
13427.16	117.9713443.77		117.0713450.41		117.7413473.66		117.8513480.31		117.51
13490.28	118.113510.21		118.5713543.43		120.0113550.07		119.99 13570		118.99
13616.51	119.17 13629.8		119.37 13676.3		119.6413712.84		119.7413732.78		119.94
13759.17	119.9713785.26		120.6713791.78		120.3213804.82		120.6813814.59		117.45
13827.64	117.0113843.94		117.2313860.24		121.2513870.02		122.513889.58		124.01
13899.36	121.6513909.14		125.4813925.44		125.8713934.42		122.9313941.59		123.29
13954.15	120.5113973.87		119.3813982.83		119.9713998.97		119.8114009.72		120.19
14016.9	120.9814022.27		120.5314036.62		120.31 14067.1		120.4514101.16		120.79
14113.72	121.4614125.82		123.1314136.97		123.314145.98		122.5514156.75		122.19
14160.33	120.6414165.71		122.0414171.09		122.2814178.26		120.33 14192.6		119.46

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14206.95  121.0214214.89  121.0314226.02  123.0214248.18  123.1614298.38  122.88

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082 6895.43    .066 6961.75    .015  7059.5    .066 7258.43    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6895.43 7258.43          1987.52 1916.67 1916.38             .1       .3
Left Levee      Station=   37.16      Elevation=135.4667
Right Levee     Station=13914.51      Elevation=125.8533
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    1600 6713.72  115.67 7271.47   10633  117.08

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 181.70*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.54    8.75  121.84    15.3  122.18   21.86   123.5   39.35  128.84
   59.02  134.53   65.57  135.32   74.32  135.36   82.91  134.26   85.46   131.1
   89.91  121.52   92.14  119.26  112.18  118.75  132.22  117.86  147.31  116.12
  164.49  116.18  181.21  115.53  199.02   115.9  210.16  116.51  246.06  115.43
  267.53  115.93   284.7   115.8  301.88  115.39     346  115.31  470.71   115.4
  507.97  115.37  538.02  115.77  563.78  115.33  585.25  115.58  598.14  115.03
   619.6  114.82  642.18  114.99  682.27  114.98  739.82  115.12   766.9  114.98
  795.63  115.14  864.33     115  887.15  115.18  951.73   115.2  960.63   115.5
   982.9   115.1 1053.25  115.15 1103.15  115.37 1143.42  115.33 1164.88  115.06
 1173.47  115.24 1216.41  115.32 1229.28  115.17 1280.81  115.32  1321.4  115.14
 1345.21  114.66 1361.48  114.53 1372.61  114.81 1385.97  113.25 1434.97  112.51
 1452.78  113.22 1463.91  112.51 1470.59  113.03 1488.41  113.17  1512.9  112.79
 1519.59  113.01  1537.4  112.77 1550.77  113.11 1559.68  112.63 1588.62   113.2
 1604.21  112.81 1637.62  112.81 1650.98  113.04 1657.66  113.53 1664.34  112.91
 1671.02   113.2 1706.65  113.53  1748.8  113.78 1777.91  113.69 1804.61  113.85
 1826.09  113.49 1856.14  114.25 1877.61  115.16  1886.2  115.27 1903.36  116.24
 1933.43  116.75  1946.3  117.68 1967.78  117.83 1989.24  116.71 2023.59  116.55
 2062.23  116.97 2070.82  116.03 2100.87  116.34 2113.76   115.4 2143.13  114.67
 2160.98  114.52 2182.45  112.87 2195.32  112.23 2208.21  112.58 2242.56  112.41
  2281.2  112.58 2289.79  112.36  2339.1  112.44 2435.77  112.46 2470.12   112.8
  2503.9  112.93 2541.75  113.31 2566.25  113.79 2608.56     114 2667.61  113.92
 2689.09  114.06 2717.68  113.77 2800.72  113.44 2880.25  113.63 2920.93  113.53
 2981.05  113.69  3000.5  113.58 3087.35   113.7 3127.02   113.7  3148.5  113.87
 3182.84  113.79 3195.73  113.95 3225.78  113.84 3290.18  114.05 3315.94  113.92
 3376.06  114.14 3393.22  114.04 3500.56  114.37 3517.74  114.85 3526.32  114.67
  3547.8  114.95 3560.67  114.72 3582.14  114.85  3607.9  114.75 3642.25  115.12
 3668.01  114.88 3706.65  115.14 3753.88  114.87 3783.93  115.18 3818.28     115
 3895.57  115.19 3929.91  115.21 3947.09  115.57 3968.56  115.16 4004.84  115.42
 4038.24   115.4 4071.64  115.01 4082.78  114.66 4127.42  114.47 4174.64  114.68
 4183.23  114.54 4213.29  114.76 4256.47  114.71 4329.21  115.01 4376.45   114.8
 4397.91  115.01 4415.09   114.9 4440.85  115.45  4466.6   115.1 4483.62   115.5
 4505.25  115.44    4531  114.97 4565.35  115.07  4630.6  114.77 4643.96  115.01
 4652.86  114.68 4657.32  115.11 4715.63  115.01 4753.07  115.16  4788.7  115.07
 4844.38  115.12 4859.97  115.23 4937.91  115.11  5003.3  115.32 5059.12  115.12
 5084.88  115.54 5149.28  115.49 5236.32  115.58 5254.13  116.09 5260.81  115.64
 5312.03  115.38 5347.66  115.31 5406.89  115.49 5454.55  115.55 5461.23  116.06
 5474.59  115.98 5487.95     117 5501.32   116.3 5512.45  117.16 5521.35  117.29
 5534.72  115.03  5541.4  114.42 5561.44  115.18 5577.03  114.89 5592.62  116.43
 5612.66  117.42 5621.57  117.25 5625.04  115.88 5636.33  109.94 5641.98  108.34
 5652.81  104.43 5663.22  102.95 5677.99  101.58  5684.4  101.43 5705.57   99.32
  5727.8   96.18 5750.01   94.33 5759.02   92.94 5777.02   91.25 5804.03   89.71
 5828.24   92.55 5846.81   96.44  5857.5   99.43 5861.78  100.04 5945.09  104.96
 5951.59   105.5 5954.76  106.55 5961.12   111.3 5973.16  115.47 5980.18  116.17
 5993.13  114.28 6003.28  114.21 6009.88  113.68 6019.79  113.83 6075.91  113.44
 6106.52  113.32 6125.42  113.45 6184.85  113.23 6191.45  113.46 6207.95  113.18
 6267.37  113.25 6277.27  113.11 6303.69  113.23 6326.79  113.07  6363.1  113.17
  6376.3  113.04 6448.93  113.02 6465.44  112.87 6551.27   112.8 6722.92  112.49
 6739.42  112.97 6755.93  117.06 6782.33  116.95 6802.15   117.1 6828.55  116.89
 6848.36  117.22 6851.66  117.61 6861.56  120.12 6868.16  119.71 6878.07  117.52
 6891.27  117.21 6897.87  116.61 6932.66  115.74 6947.39  115.73 7010.42   115.3
 7036.33  115.23 7109.14  114.77 7162.68   114.6 7227.48  113.99 7251.09   113.9
 7276.07  113.48 7282.55  113.57 7327.91  113.24 7389.46   112.9 7421.86  112.85
 7512.58  112.48  7538.5  112.67 7619.49  112.07 7648.65  111.95 7655.12   112.1
 7684.29  111.72 7700.04  111.84 7709.94  113.68 7713.24   115.1 7719.84  115.71
 7781.48   114.9 7836.55  114.86 7908.01  114.96 7924.51  114.87 7950.92   115.2
 7992.06  115.27 7998.54  115.67 8017.98  115.33 8043.89  115.11 8069.82  115.49
 8106.06  115.52 8150.81  115.89 8188.59  115.91  8264.2  115.73 8294.23  115.85
 8317.34  115.66 8345.19  115.74 8406.47  115.62 8436.17  115.76 8497.46  115.65
 8522.01  115.49 8555.01  115.49 8561.62  115.98 8571.52  115.92 8584.72  113.25
 8614.43  112.31 8630.93  112.04 8650.75  112.35 8700.26   111.9 8720.06  112.17
 8743.17  111.95 8776.19  112.53 8782.79     112  8815.8  111.96 8865.31  112.08
 8871.91  111.93 8951.14  112.15 8970.95  111.99 8997.35  113.06 9023.77  111.82
 9040.27  111.54 9046.87   113.4 9053.48  117.03 9060.08  117.97 9079.88  117.81
 9093.08  117.45 9129.39  117.22 9168.08  117.15 9219.91  117.19 9265.27  117.11
  9333.3  116.88  9446.3  116.76 9466.11  116.63 9524.44  116.64  9553.6  116.47
 9598.15   116.5 9687.28  116.28 9756.61  116.31 9852.33  116.13 9878.75  116.15
 9944.76  115.97 9984.37  115.9910017.39  115.89 10080.1  115.8810139.53  115.65
10185.74  115.6410291.38  115.4210324.38  115.52 10350.8  115.3610382.96  115.36
 10402.4  115.5410425.08  115.4710443.22  115.1110548.86  114.8810668.06  114.86
10697.41  114.7310740.33  114.8310813.85  114.7810859.17  114.6510895.47  114.67
10915.28  114.5311053.92  114.4711067.12   114.811080.34  114.5211096.84  114.69
11139.75  114.8611152.96  115.0811172.76  114.8911185.96  113.9711199.18  114.84
11209.08  115.8611215.68  117.4311222.28  117.9911242.09  115.4111261.89  114.96
 11294.9  114.8811321.32  114.9511347.72  114.3311384.03  114.5711452.08  114.04
11468.28   114.111486.37  113.5911519.38  113.3511535.88  113.39 11565.6  113.06
11598.61   113.111605.21  113.3311628.31  113.0611658.02  113.1311720.74  113.01
11743.85  113.0911865.99  112.97 11895.7  113.0111945.22  113.2312014.54  113.73
12021.14   114.212027.74  115.6112034.34  115.9912040.95  115.0912050.85  114.45
12057.46  113.1512073.96  113.2712080.56  115.0412097.07   116.312110.27  116.57
12126.77  114.7112133.38  116.0112156.48  116.1412163.09  115.48   12173  116.67
 12192.8  117.63 12202.7   118.712225.81  120.3912232.41  120.3212252.21  118.22
12275.32  118.4512298.44  118.4812311.64  118.8712338.04  119.2512351.25   119.2
12357.85  119.5212394.16  119.6112413.97  119.95 12440.2  120.0412466.12  120.57
12485.56  120.6312495.28  119.1412508.25  118.9512527.68  119.1112532.81  119.84
12542.71  119.2712550.35  119.62 12569.8  121.9612579.52  121.5912589.23  124.65
12605.43  125.3912610.51   124.8 12618.1  121.6412625.68  123.9612635.81  123.05
12645.92  120.3612673.74  119.3412686.38  120.5812709.15  120.1612724.32  120.83
12734.44  122.0712742.03     12112762.26  120.4512777.44  120.7612805.26  120.52
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 12817.9  120.8312853.31  120.6312871.02  121.4412883.66  123.08 12903.9  123.34
12916.54   122.712931.72  122.9812936.78  120.13 12939.3  120.1912944.36  123.02
12951.95  123.5512962.06  119.7612967.12   119.112982.29  118.2112997.47  120.11
13002.53  121.0913013.73  120.8113029.43  121.6813060.86  121.7413131.52  121.46

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .082 5621.57    .066 5677.99    .015 5861.78    .066 5980.18    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5621.57 5980.18          1987.52 1916.67 1916.38             .1       .3
Left Levee      Station=   74.32      Elevation=135.3633
Right Levee     Station=12599.96      Elevation=125.3867
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 3393.22  114.04 5980.18    9060  115.86

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 181.35

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     490
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  116.03   13.12  114.97   22.95  115.48   32.79  117.47   88.53  134.01
   98.36  135.19  111.48  135.26  118.04  133.65   124.6  117.68  147.55  116.79
  167.22  115.28  180.34  115.81  193.45  114.37  226.24  113.02  242.63  111.93
  259.03  112.49  272.14   112.3  285.26  111.63  344.28  111.47   432.8  111.65
  442.64   111.5  465.59  112.09  485.26  111.42  501.66   112.1   511.5  111.48
  527.89  111.25  544.28  111.48   619.7  111.65  629.53  111.43  662.32  111.66
  714.78  111.48  724.62  111.61  813.15  111.67  859.05   111.8  868.89  111.96
  911.51  112.11  927.91  112.02   944.3  111.62  950.86  111.91  983.65  112.04
  993.48  111.85 1032.83  112.07 1082.01  111.88  1098.4     112 1124.63  111.81
 1200.05  112.04 1242.67  111.92 1265.62  112.09  1285.3  111.88 1321.36  112.17
 1341.04  111.94 1370.54  111.95 1390.22  112.17 1406.61  112.03 1432.84  112.27
 1449.24  111.65 1472.19  112.83 1488.58  114.21 1495.14  114.25 1508.25  115.79
 1518.09  115.86 1531.21  116.51 1541.04  117.93 1557.44  118.12 1573.83   116.4
 1600.06  116.11 1629.57  116.75 1636.13  115.32 1659.08  115.98 1668.92  114.65
 1682.03  114.55 1704.98  115.06 1721.38  112.84 1731.21  111.92 1741.05   112.5
 1767.28  112.35 1796.79  112.66 1803.35  112.32 1839.41  112.21 1882.04  112.31
 1891.88  112.49 1914.83  112.35 1941.06  112.55 1983.68  112.47 2023.03  112.57
 2065.65  112.82 2091.88  112.61 2108.28  112.83 2131.23  112.77 2177.13  112.95
 2193.53   112.8 2268.94  112.99 2285.33  112.87 2331.24  113.05 2347.63  112.92
 2370.58  113.05 2442.71  113.13 2459.11  113.39 2485.34  113.21 2495.18  113.44
 2518.13  113.31 2567.31  113.52 2586.98  113.36 2632.89  113.65    2646  113.48
 2727.97  113.97 2741.09  114.65 2747.64  114.35 2764.04   114.8 2773.87  114.46
 2790.27  114.65 2809.94   114.4 2836.17  114.91 2855.84  114.55 2885.35  114.82
 2921.42  114.47 2944.37  114.87  2970.6  114.62 3023.06  114.74 3029.62  114.92
 3055.85  114.77 3068.97   115.4 3085.36  114.74 3118.15  115.15 3173.89  114.93
 3193.56  115.09 3206.68  114.92 3242.74  115.25  3249.3  115.03 3272.25  115.45
 3318.16  115.39 3360.78  115.83 3396.85   115.5 3413.24  115.89 3426.36  115.77
 3446.03  116.53  3465.7  116.06 3478.82  116.72 3495.21  116.61 3514.88  115.88
 3541.11  116.05 3587.02  115.76 3596.85  115.42 3655.87  115.38 3662.43  115.53
  3744.4  115.44  3760.8  115.59 3823.09  115.42 3875.55  115.69 3918.18  115.36
 3937.85  116.01 3987.03  115.87 4006.71  116.02 4016.54  115.84 4062.45  115.81
  4085.4  116.32 4121.46  116.03 4147.69  115.99 4183.76  116.19 4216.55   116.2
 4232.94  116.42  4239.5  116.11 4291.96  116.36 4311.63  116.22  4347.7   116.8
 4350.98  116.43 4373.93   107.1 4377.21  106.16 4387.05  105.35 4387.05  105.22
 4407.05  105.25 4427.05  102.73 4443.05   99.19 4447.05   98.33 4448.05   98.15
 4454.05   97.26 4458.05   96.83 4463.05   96.43 4470.05   95.65 4478.05   95.18
 4483.05   94.83 4485.05   94.82 4491.05   94.76 4495.05   94.73 4498.05   94.64
 4505.05   94.47 4512.05   94.14 4520.05   93.83 4521.05   93.86 4529.05   94.03
 4533.05   94.13 4545.05   93.96 4546.05   93.93 4561.05   93.93 4568.05   93.86
 4572.05   93.83 4582.05   93.92 4584.05   93.93 4589.05    93.8 4596.05   93.63
 4609.05   93.63 4613.05   93.65 4622.05   93.73 4627.05   93.82 4635.05   93.93
 4635.55   93.93 4644.05   94.05 4649.05   94.13 4652.05   94.09 4659.05   93.97
 4662.05   93.93 4668.05   94.09  4672.4  105.35 4675.68  106.35 4682.24  111.86
 4685.52  112.52 4701.92  113.03 4711.76   111.5 4724.88  111.38 4731.44   110.6
 4741.28  110.83 4764.24  110.72 4797.05  110.27 4836.41  110.15 4846.25  110.29
 4872.49  110.04  4905.3  110.05 4911.86  110.39 4928.26  109.95  4987.3     110
 4997.14  109.78 5023.39  109.96 5046.35  109.75 5082.43  109.88 5095.55  109.68
 5167.72  109.66 5184.12  109.43 5233.32  109.33 5256.29  109.47 5269.41  109.33
 5410.46   108.9 5439.98  108.85  5453.1   109.1 5456.38  109.56 5472.78  115.69
 5499.02  115.51 5518.71  115.72 5544.95  115.41 5564.63  115.91 5567.91   116.5
 5577.75  120.27 5584.31  119.65 5594.15  116.36 5607.27  115.86 5613.83  114.93
 5640.08  113.97 5663.04  113.97 5705.68  113.61 5810.65  113.18 5823.77  113.06
 5876.25  113.04 5932.02  112.62 5964.82  112.58 5981.22  112.34 6014.03  112.24
 6161.64  111.49 6178.04   111.6 6204.28  111.32 6214.12  111.44 6266.61  111.04
 6332.21  110.91 6378.14  110.54 6394.54  110.12 6410.94  110.23 6420.78  112.85
 6424.06  114.91 6430.62  115.89 6437.18  115.59 6469.98  115.29 6502.79  115.21
 6565.11  115.28 6584.79  115.16  6617.6  115.28    6634  115.11 6660.24  115.23
 6696.32  115.03 6725.84  115.21 6791.45  115.08 6814.41  114.89 6824.25  115.06
 6860.34  114.82 6896.42  114.91 6955.46  114.58 7001.39  114.77 7024.35  114.53
 7037.47  114.62 7112.92  114.47 7142.44  114.66 7185.08  114.53 7227.73  114.11
 7260.53  114.14 7267.09   114.9 7276.93  114.81 7290.05  110.76 7309.73  109.98
 7319.57  109.33 7335.97  108.94 7355.66   109.4  7365.5  109.36 7404.86  108.69
 7424.54   109.1  7447.5  108.76 7480.31  109.64 7486.87  108.85 7519.67  108.73
 7568.87  108.96 7575.43  108.74 7654.16  109.01 7673.84  108.77 7700.08  110.28
 7726.33   108.5 7742.73   108.5 7749.29  110.68 7755.85  115.94 7762.41  117.32
 7782.09  117.01 7795.21  116.48 7831.29  116.14 7860.82  116.01  7946.1  115.89
 8037.95  115.53  8146.2  115.19 8165.88     115 8241.33  114.87 8251.17   114.7
 8297.09  114.67 8375.82  114.37 8385.66  114.26 8454.55  114.28 8549.67  113.94
 8575.92  113.95 8641.52  113.66 8680.88  113.64 8713.69  113.46 8776.01  113.45
 8789.13  113.28 8835.06  113.11 8880.98  113.07 8913.78  112.88 8943.31  112.94
 8949.87  112.75 8985.95  112.65 9018.75  112.78    9045  112.47 9090.92  112.36
 9130.28  112.38 9136.84  112.17 9186.05  112.14 9215.57     112 9231.97  112.13
 9241.81   111.9 9287.74  111.97  9359.9  111.91 9389.42  111.75 9432.07  111.95
 9517.35  111.79 9550.16  111.65 9586.24  111.71 9605.92  111.52 9743.69  111.42
 9756.81  111.92 9769.94  111.52 9786.34  111.81 9828.98     112  9842.1  112.34
 9861.78  112.06  9874.9  110.69 9888.03     112 9897.87  113.53 9904.43  115.89
 9910.99  116.74 9924.11   113.9 9930.67  112.87 9950.35  112.21 9983.15   112.1
 10009.4  112.22 10025.8  111.8610035.64  111.2910071.72  111.63 10091.4  111.33
10140.61     11110157.01  111.0310173.41  110.5810206.21  110.3810222.61  110.45
10252.14  109.9910284.94  110.07 10291.5  110.4110314.46  109.9810343.98  110.13
10406.31  109.9510429.27  110.04 10524.4     11010550.64  109.8610580.16  109.95
10629.37  110.2710698.25  110.9910704.81  111.6910711.37  113.7710717.93  114.32
 10724.5  112.9510734.34  112.01 10740.9  110.07 10757.3  110.2610763.86  112.92
10780.26   114.810793.38  115.1810809.78  112.3410816.34  114.28 10839.3  114.43
10845.87  113.4510855.71  115.2410875.39   116.710885.23  118.2810908.19  120.76
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10914.75  120.6410934.43  117.4510957.39  117.7510980.36  117.7910993.48  118.37
11019.72  118.9911032.84  118.93 11039.4   119.411052.52  119.2711075.48  119.48
11095.17  119.9611118.13  120.0711144.37  120.4611170.61   120.611177.17  120.89
11200.13   120.911213.26   120.3 11223.1  117.1611229.66  116.5711259.18  121.42
11269.02  123.7911285.42  124.9211291.98  124.4611301.78  120.3511311.57  124.47
11314.84  124.8211324.64  123.95 11337.7  120.2111350.76   120.111373.62   119.3
11389.94  121.1911419.33  120.5211438.92  121.4711445.45  122.8211451.99  123.16
11461.78  121.4711481.37  121.03 11487.9  120.59 11507.5  121.0211543.42  120.59
11559.74  121.0211579.33  120.6711589.13  120.8911605.46  120.4811628.32  121.41
11644.64  123.3211670.77  123.3911687.09  122.8511706.69  123.7811713.22  119.62
11716.48  119.7211723.01  123.9911732.81  124.8311739.34  121.5511745.87  119.19
 11752.4  118.2211771.99  116.9611791.58  119.7611798.12  121.1611807.91  120.65
 11847.1  120.1611873.22  120.3311883.02   120.111909.14  120.1911964.65  120.05

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  111.48    .066 1082.01    .066 4387.05    .025  4672.4    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4347.7 4701.92          1561.05  1691.8 1675.24             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  4347.7   116.8       T
 4701.9211964.65  113.03       T
Left Levee      Station=  111.48      Elevation=  135.26
Right Levee     Station=11285.42      Elevation=  124.92

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            133.22    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.066      0.035      0.066
  W.S. Elev (ft)            133.19    Reach Len. (ft)          1561.05    1691.80    1675.24
  Crit W.S. (ft)            118.93    Flow Area (sq ft)       69208.02   12073.53   133957.20
  E.G. Slope (ft/ft)      0.000042    Area (sq ft)            81879.54   12073.53   141994.30
  Q Total (cfs)           235000.00    Flow (cfs)              64932.28   34099.18   135968.50
  Top Width (ft)          11846.42    Top Width (ft)           4229.47     354.22    7262.73
  Vel Total (ft/s)            1.09    Avg. Vel. (ft/s)            0.94       2.82       1.02
  Max Chl Dpth (ft)          39.56    Hydr. Depth (ft)           16.36      34.08      18.44
  Conv. Total (cfs)       36279420.0    Conv. (cfs)             10024280.0   5264249.0   20990890.0
  Length Wtd. (ft)          1647.43    Wetted Per. (ft)         4241.32     367.17    7295.35
  Min Ch El (ft)              93.63    Shear (lb/sq ft)            0.04       0.09       0.05
  Alpha                        1.68    Stream Power (lb/ft s)      0.04       0.24       0.05
  Frctn Loss (ft)              0.07    Cum Volume (acre-ft)    300432.50   90574.71   303440.90
  C & E Loss (ft)              0.00    Cum SA (acres)           29194.94    3470.83   30875.27


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 181.01*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  116.43    12.1  115.95   21.17  116.59   30.24  118.27   39.44  120.66
   74.95  131.89   81.66  133.65   92.49135.0159  102.08135.0478  108.74  133.97
  114.75  123.32   122.9  122.91  135.76  121.22  153.76  118.34  165.78  117.39
  177.78  115.81  199.33  114.93   222.8  112.38  237.82  112.19  261.83  111.52
  291.87  111.74  315.86  111.47  328.07  111.71  352.22   111.5  405.91  111.42
  426.92  112.01  444.93  111.54  459.94  111.87  468.95  111.47  483.95  111.35
   541.3  111.56  577.01  111.46  607.02  111.68  655.05  111.53   682.1  111.67
  745.11  111.68  787.13  111.79  835.16  112.03  865.18  111.69  871.18  111.89
   901.2  112.02   910.2   111.9  963.71  112.11  990.74112.1036 1006.25   112.1
 1030.27  111.86 1099.31  112.11 1159.34  112.16 1176.94  111.99 1210.37   112.2
 1228.39  112.03 1273.41  112.27 1288.42  112.14 1312.43  112.28 1327.44  111.91
 1348.45  112.68 1363.46  113.61 1369.47  113.65 1381.47  114.71 1402.49  115.19
 1411.49  116.18  1426.5  116.37 1441.51  115.17 1465.52  114.96 1492.53  115.37
 1498.54  114.43 1519.55  114.91 1528.56  114.04 1540.56  113.99 1561.57  114.34
 1576.59  112.88 1585.59   112.3 1594.59  112.72 1615.44  112.54 1631.53  112.74
 1699.92  112.48 1732.68  112.71 1753.69  112.63 1776.36  112.77 1792.45  112.63
 1816.58  112.77 1868.89  112.79 1891.76  113.02 1915.78  112.87 1945.32  113.11
  1977.5  113.09 1993.59   113.4 2001.65  113.04 2037.85  113.33 2090.15  113.39
 2106.24     114  2134.4  113.86 2146.48  114.18 2198.77  114.22 2218.89  113.76
    2239  114.06 2251.07  113.54 2263.14  113.57 2279.23  114.55 2303.37   114.3
 2319.46   113.6 2369.04  113.55 2411.07  113.77 2423.07  113.66 2464.29  113.95
 2510.12  115.04 2516.12  114.64 2531.13  114.63 2540.13  114.36 2548.77  114.58
 2573.16  114.66 2597.17  115.08 2615.18  114.82 2629.23  115.09 2669.46  114.85
  2677.5  114.64 2701.65  115.25 2717.74  114.73 2741.88  114.63 2774.27  114.82
 2798.28  114.79  2810.3   115.3  2825.3  114.77 2870.62  114.86 2894.75  115.05
 2914.86     115 2922.91  115.55 2943.02  115.53 2947.05  115.23 2959.11  113.34
 2975.39  112.84 3023.49  112.81 3047.62  112.91 3077.45  113.24 3110.47  113.14
 3125.47  113.35 3137.48   113.2 3155.49  113.61  3173.5  113.24 3185.51  113.57
 3200.51  113.52 3218.52  112.95 3256.83   113.1 3284.57  112.84 3293.57   112.6
  3347.6  112.83 3361.42  112.97 3397.63  112.82 3425.79  112.88 3441.88   113.1
 3482.11  113.04 3500.69   112.9 3526.37  112.98 3566.59  112.87 3587.74   112.6
 3605.75  113.03 3650.77  112.92 3719.82  112.98 3740.83   113.4 3763.72  113.39
 3779.82  113.56 3816.02  113.39  3860.9  113.87  3875.9  114.23 3881.91  114.11
  3916.6  114.81 3936.71   115.8 3964.87  115.64 3972.92  116.42 3980.96  116.68
 3984.31  116.19 3990.44   114.1 4006.23  107.26 4011.05  105.94 4021.09  105.11
  4029.6  104.89 4041.48  103.58 4050.78  101.82 4061.87  100.91 4083.28    97.2
 4105.72   94.83 4113.5294.29431 4118.97   93.92 4137.44   93.38  4156.7   92.07
 4164.69   92.68 4185.29   92.36 4204.64   93.84 4236.61   95.23  4244.6   96.08
 4260.58   98.92 4270.97  101.79 4328.03  105.15 4332.74107.1704 4342.21   112.3
 4345.97  112.77 4364.72  113.37 4374.32  112.38 4387.12  112.33 4393.52  111.83
 4425.52  112.21 4468.32  112.17  4551.2   111.8 4569.54  112.11 4585.54  111.81
 4652.73  111.29 4678.34   111.4 4700.74  111.25 4735.94  111.28 4748.74  111.13
 4819.15  111.05 4835.15  110.87 4868.88   110.8 4905.56  110.86 4993.19  110.48
 5084.76  110.27 5100.76  110.77 5116.76  114.84 5142.36  114.69 5161.57   114.8
 5187.17  114.59 5206.37  114.93 5209.57  115.31 5219.17  117.79 5225.57  117.39
 5235.17  115.22 5247.97  114.87 5254.37  114.25 5279.97  113.59 5314.33   113.4
 5417.92  113.06 5459.18  112.88 5510.38  112.84 5564.79  112.56 5596.78  112.55
 5612.78  112.38 5690.71  112.09 5701.07     112  5788.8  111.67  5804.8  111.73
 5891.21  111.33  5955.2  111.22 6000.01  110.95 6016.01  110.68 6032.01  110.75
 6041.61   112.5 6044.81  113.87 6051.21  114.52 6057.61  114.31 6089.61  114.07
 6121.62  113.97 6182.42  114.02 6201.62   113.9 6249.62  113.85 6275.22  113.96
 6310.42   113.8 6339.22  113.84 6425.63  113.68 6435.23  113.81 6512.53   113.7
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 6526.35  114.09 6540.17  115.04 6547.07   115.2 6560.88  114.74 6588.51  115.38
 6608.04  115.47 6629.94  115.28  6640.3  115.64 6650.66  115.53 6664.47  115.81
 6671.38  115.42 6681.73  115.48 6695.55  114.86 6716.27  114.59 6726.63  114.65
 6764.61  114.28 6774.97  113.87 6788.78  114.04  6809.5  113.93 6826.77  114.12
 6860.85  113.91 6867.25  114.36 6876.85  114.31 6889.65  111.63 6908.85  111.12
 6918.45  110.62 6934.45  110.38 6953.66  110.66 7001.66   110.1 7020.86  110.36
 7043.26  110.05 7075.27  110.64 7081.67  110.08 7120.28  109.94 7161.67  110.15
 7189.34  109.91 7196.24  110.03 7237.68  110.12 7264.07  109.87 7289.67  110.92
 7315.28   109.7 7331.28  109.63 7337.68  111.14 7344.08  114.65 7350.48  115.56
 7369.68  115.34 7393.06  114.78 7448.32  114.59 7517.38  114.44 7524.28  114.27
 7538.09  114.56 7558.81   114.3 7641.69  113.94 7690.03   113.8  7744.1  113.56
 7765.99  113.57 7879.95  113.22 7948.91  113.07 8004.26  112.89 8049.15   112.9
 8087.13  112.78 8135.47  112.79  8156.2   112.7 8228.71  112.78 8259.78  112.48
 8294.31   112.4 8342.66  112.45 8370.29  113.81 8380.64  112.74 8394.45  112.36
 8401.36  111.73 8415.17  111.74 8425.53  112.32 8442.79  112.43 8456.61  113.11
 8473.73  113.48 8508.94  113.05 8576.14  113.45 8646.55  113.35 8684.95  113.43
 8691.35   113.3 8784.15  113.33 8793.75  113.17 8838.56  113.24 8937.76  113.12
 8979.37  113.29 9094.57  113.15 9129.77  113.18 9178.29  113.05 9195.57   113.1
 9283.38  113.09 9296.18  113.42 9308.99  113.19 9324.99   113.4 9366.59  113.54
 9379.38  113.76 9398.58  113.55 9411.38  112.66 9424.19  113.56 9433.79  114.59
 9440.19  116.18 9446.59  116.75 9465.79  114.19 9484.99  113.75  9542.6   113.8
  9568.2  113.19  9603.4  113.42  9622.6  113.22 9670.61  113.03  9686.6  113.06
  9702.6  112.77  9750.6  112.66 9779.41  112.39 9811.41  112.41 9817.81  112.64
 9840.21  112.36 9869.01   112.5 9913.81  112.39 9952.22  112.5210070.62  112.46
10138.27  112.6910214.63  113.2710221.03  113.7610227.43  115.1610233.83  115.54
10240.24  114.6210249.84  113.9910256.24  112.6910272.24   112.810278.64  114.57
10294.64  115.8610307.44  116.1410323.43  114.2810329.83  115.5510352.23  115.66
10358.64  115.0210368.24  116.2110387.44  117.1910397.04  118.2410419.44  119.89
10425.84  119.8110445.04  117.7210467.44  117.9510489.85  117.9810502.65  118.36
10528.25  118.7910541.05  118.7710547.45  119.0810582.65  119.1310601.86   119.5
10624.25  119.5810649.33   119.910675.45  119.9610704.25  120.5910717.06  120.25
10726.66  117.6110732.21  116.9510746.03  119.8210756.38  120.9210771.46  123.65
10787.46  124.5610792.86  124.1510800.92  120.6110808.98     12310819.73  123.56
10830.48  121.3810845.07  121.0310860.03  119.9610873.46  120.6410897.64  120.23
10913.76  121.1810919.14  122.2610924.52  122.5510932.57  121.4710948.69  121.28
10954.06  120.9510970.19   120.9 10977.6  120.6110999.75  120.5311013.18  120.89
11029.44  120.6711050.79  120.9311058.25  121.4811083.03  122.6511104.53  122.42
11117.96  121.9811134.09  122.5811139.46  119.8411142.14  119.9311147.52  122.81
11155.58  123.4511166.33  119.8211187.82  118.1711203.94  119.9311209.32  120.82
11217.38  120.3511249.62   119.611271.11  119.7111279.18  119.5611346.34  119.85

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  102.08    .066 3980.96    .066 4113.52    .025 4364.72    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      3980.96 4364.72          1561.05  1691.8 1675.24             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3980.96  116.68       T
 4364.7211346.34  113.37       T
Left Levee      Station=99.50333      Elevation=135.0533
Right Levee     Station=10787.46      Elevation=  124.56

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 180.66*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  116.82   11.08  116.92   19.39   117.7    27.7  119.07   36.12  120.96
   44.31  123.54   68.64  131.76   83.97134.8208   92.67134.8288   99.44  134.29
  104.89  128.96   112.3  128.48  140.31   121.4  156.11  117.59  181.67  116.45
  207.24  112.18  221.85  111.63   240.1  111.41  265.66  111.94  287.44  111.47
  298.53  111.93  320.44  111.45     346  111.18  356.96  111.41  378.87  111.43
  393.47  112.09  404.59  111.66   426.4  111.46  448.25  111.52  459.21   111.3
  492.07  111.53  524.48  111.48  551.73  111.71  595.32  111.57  619.88  111.72
  638.13  111.67  700.22  111.72  747.68  111.93  786.05  111.77  818.75  111.99
  846.28  111.95  875.49  112.22  899.47112.2081  915.65   112.2  933.92  111.92
  998.58  112.18 1036.16  112.26 1069.03  112.09 1079.99  112.25 1115.74  112.11
 1153.01  112.36 1205.65  112.17 1243.79  113.06 1254.68  113.64 1273.76  113.88
 1281.93  114.43 1295.56  114.61 1309.18  113.94 1330.98   113.8  1355.5  113.98
 1360.95  113.53 1380.02  113.83  1388.2  113.43 1418.16  113.62 1439.96  112.67
 1452.45  112.96 1467.06  112.71 1481.67  112.99 1492.62  112.81 1507.22  112.96
 1543.74  112.72 1576.61  112.93 1613.12  112.99 1627.73  112.75 1649.64  113.06
 1697.12   112.9 1719.02  113.24 1755.54  113.17 1766.49  113.44  1795.7  113.31
 1810.31  113.85 1817.62  113.22 1839.53  113.41 1850.48  113.77 1897.95   113.9
 1912.55  115.08 1923.51  115.16 1938.11  114.68 1949.08   115.4 1981.94  115.15
 1996.55  115.36  2014.8   114.4 2033.06  114.96 2044.01   113.7 2054.97  113.83
 2069.57   115.8 2091.49  115.28  2106.1  113.82 2151.09  113.73 2179.12  113.88
  2219.3  113.86 2237.56  114.15 2255.81  115.11 2277.72  115.49 2292.33  114.47
 2306.93  114.26  2339.8  115.05 2358.17  115.26 2372.67  115.05 2387.27  115.49
 2401.88  115.14 2423.78  115.18 2431.09  114.77 2453.01  115.68 2467.61  114.82
 2489.52  114.58 2529.68  114.65 2551.62  115.21 2565.24   114.8 2595.42  114.53
 2628.28  115.13 2646.54     115 2653.84  116.02 2661.14  116.33  2672.1  116.07
 2675.75  115.44 2683.05  112.27 2694.02  110.94 2719.57  110.23 2745.13  110.21
 2759.74  110.51 2767.04  110.32 2810.86  110.93 2848.61  110.64 2876.59  110.67
 2887.55  110.29 2905.82  110.43 2927.71  109.97 2956.93  110.24 2990.28  109.78
 3015.35  110.12 3051.87  110.41 3084.74  110.16  3110.3  110.31 3124.91  110.64
 3135.86  110.46 3161.42   110.6 3179.67  110.36 3201.59  110.39  3230.8  110.07
 3238.11  110.21 3256.36  109.84 3273.65  110.04 3314.52  109.97 3377.19  110.15
 3417.03  110.66 3431.65  111.11 3464.51  110.69 3486.42  110.96 3518.86  112.04
 3548.49   112.9 3555.81  113.33 3574.06   115.3 3581.36  115.44 3599.62  114.77
 3606.92  116.19 3614.23  116.57 3623.88  114.21 3630.32  111.51 3639.98  106.83
 3646.42  105.49  3663.8  104.48 3675.91  101.91 3685.39   99.54 3695.21   99.21
 3705.02   98.17 3714.83   96.61 3734.46   94.61 3756.9892.93158 3773.72   92.22
 3783.54   91.52 3793.35   90.32 3802.35   91.37 3811.34   90.81 3829.33   90.85
 3847.32    92.2 3856.32   92.14 3874.31   92.56  3883.3    92.5  3892.3   93.57
 3901.29   95.45 3910.29   97.99 3919.29   102.2 3921.98  102.93 3986.22  105.18
 3989.17  106.38 3993.08109.5014 3995.07  111.09 4002.19  112.75 4027.53   113.7
 4036.89  113.25  4055.6  113.07 4074.66  113.25 4084.77  113.66  4101.6  113.94
 4128.53   114.1 4155.46  113.94 4165.56  114.11 4175.66  113.77 4209.33  113.56
 4227.21  113.84 4242.81  113.66 4259.83  113.71 4286.76     113 4308.33  112.79
  4333.3  112.85 4389.45  112.68  4414.7  112.53 4428.17  112.63 4488.77  112.29
 4519.07  112.24 4542.63  112.34 4640.27  111.86 4684.03  111.89 4714.33  111.65
 4742.02  111.82 4760.74     114 4829.38  113.76 4851.22  114.12 4860.58   115.3
 4866.82  115.13 4876.18  114.08  4894.9  113.57 4919.87   113.2    4950  113.12
 4953.37  112.94 4982.27  112.95 5054.36  112.83 5074.56  112.72 5165.46  112.62
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 5175.56   112.5 5228.75  112.51 5276.55  112.26 5320.33  112.17 5330.43  112.06
 5415.96  111.84 5431.56  111.86  5515.8  111.62  5578.2  111.53 5653.08  111.28
 5665.56  112.84 5678.04  113.03 5737.78  112.74 5795.01  112.77 5818.44  112.65
 5865.25  112.59 5899.38  112.69 5949.88  112.46 6000.39  112.38 6046.21  112.55
 6098.01  112.57 6104.75  112.25 6121.58  112.54 6135.04   113.4 6148.52  115.37
 6155.25  115.72 6161.98   114.9 6168.72  114.88 6195.65  116.08 6214.69  116.18
 6236.05  116.03 6246.15  116.67 6256.24  116.45 6269.71  117.05 6276.44  116.27
 6286.54  116.41 6300.01   115.2 6320.22   114.7 6330.32  114.77 6353.88  114.12
 6367.35  113.95 6377.45  113.16 6390.91  113.56 6411.11  113.56 6427.94  114.11
 6461.18  113.68 6476.78  113.81 6489.26   112.5 6505.38  112.33 6518.85  111.88
 6551.66  111.91 6582.81   111.5 6617.18  111.63 6646.77  111.29 6663.61  111.66
 6683.81  111.21 6704.01  111.29 6828.57  111.25 6842.03  110.92  6854.3  110.97
 6879.26  111.57 6912.74  110.65 6919.83  110.77 6926.07   111.6 6932.31  113.35
 6938.55   113.8 6957.27  113.67 6980.07  113.19  6986.8  113.36 7033.94  113.17
 7044.04  112.86 7057.51  113.12 7074.34  112.95 7101.27  112.97    7108  112.63
 7121.47  113.27 7141.67  112.82 7185.43  112.67 7222.47  112.43 7306.63  112.12
 7343.66  112.18 7404.27  111.84 7424.47  112.01 7454.76   111.8 7491.79  111.83
 7575.97  111.51 7619.73  111.61 7656.76   111.5 7703.89  111.63  7724.1  111.51
  7764.5  111.83 7794.79  111.92 7804.89  111.56 7825.09   111.4 7899.16  111.35
  7905.9   111.5 7922.73  113.55 7932.83  114.41 7942.93  112.32 7956.39  111.59
 7963.13  110.36 7976.59  110.39 7986.69  111.56 8003.52  111.79 8016.99  113.24
 8033.82  114.09 8043.92  114.15 8050.65  113.61 8068.01  113.35 8094.43  113.84
 8161.75  114.29 8185.32  114.29 8239.61  114.47 8276.22  114.39 8299.79  114.59
 8346.92  114.43 8389.38  114.51 8468.12  114.44 8508.52  114.49 8526.67  114.63
 8599.42  114.58 8629.72  114.66 8692.02  114.66 8720.61  114.59 8737.45  114.71
 8767.75  114.63 8777.85  114.76 8823.07  114.75 8835.54  114.92 8916.67  115.17
 8935.39  115.04 8947.87  114.63 8969.72  115.65  8982.2  116.77 9000.91  115.52
 9019.63   115.3  9075.8  115.39 9100.76  115.09 9135.07  115.21 9153.79  115.12
  9216.2  115.09    9263  114.87 9323.25  114.73 9344.12  114.87 9365.96  114.74
 9394.04  114.87 9437.72  114.79 9488.23  115.01 9508.43   114.9 9531.99  115.02
 9562.29  114.99 9639.73   115.2 9656.56  115.17 9683.49   115.4  9723.9   115.5
 9737.25  115.82 9749.73  116.75 9765.33  115.96 9771.57  115.31 9787.17  115.35
 9793.41  116.23 9809.01  116.91 9821.49  117.09 9837.09  116.21 9843.33  116.83
 9865.17  116.88 9871.42  116.59 9880.78  117.19  9899.5  117.67 9930.69  119.03
 9936.93  118.99 9955.65     118 9999.34  118.16 10055.5  118.7710089.81  118.78
10111.07  119.07   10138  119.1310154.83  119.3510164.93  119.25 10188.5  119.45
10201.96  119.8610212.07  120.4710220.86   120.210230.22  118.0510235.64  117.24
   10239  117.81 10249.1  120.88 10259.2  121.34 10273.9  123.52 10289.5   124.2
10294.02  123.7610300.06  120.8710303.06  120.7410316.62  123.3510323.25  122.54
10334.71  122.1210346.45  120.6210366.36  119.7510384.45  120.4210392.82  121.71
10425.13  121.2810438.69  120.3110466.61  120.7610479.38  120.6710492.94  121.11
10501.98   122.110511.04  122.4310529.12  121.5610548.83  121.1110561.49  121.39
 10565.7  120.0710572.02  121.6210578.35  122.0610586.78  120.4510603.65  119.38
10620.52  120.4810642.13   119.310652.14  119.0410678.31  119.0210728.04  119.65

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   83.97    .066 3630.32    .025 4027.53    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3614.23 4027.53          1561.05  1691.8 1675.24             .1       .3
Left Levee      Station=87.52667      Elevation=134.8467
Right Levee     Station=10289.51      Elevation=   124.2
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 2661.14  116.33 4259.8310728.04  113.71

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 180.32

INPUT
Description: RGV-03, New Section, Begin Wall, Bathymetric elevations translated
             from IBWC 2008 Cross-sections
Station Elevation Data    num=     457
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  117.22    6.56  117.47   22.96  119.47    32.8  121.26   42.64  124.52
   62.33  131.64   75.45  134.64   99.45  134.88  100.12  134.88  100.12  124.88
  110.12  124.68  201.12  114.71  204.12  115.46  228.12  114.98  234.12  113.48
  244.12  113.28  250.12  111.78  288.67   111.4  311.63  110.97  321.47  111.29
  341.15  111.24  354.27  112.19  373.95  111.39  403.48  111.59  413.32   111.2
  442.84   111.5  462.52   111.4  492.04  111.73  521.57  111.73  541.25  111.57
  557.65  111.77  574.05  111.69  629.82  111.71  672.46  111.87  718.38  111.83
  741.35  112.01  761.03  111.93  787.27  112.33  823.35   112.3  839.76  111.96
   931.6  112.42  961.13   112.2  970.97  112.38 1000.49  112.18 1036.57  112.48
 1069.38  112.24 1079.22  112.44 1108.74  112.37 1134.98  112.63 1141.54  112.51
  1164.5  112.86 1174.35  112.71 1216.99  112.59 1269.47  112.97 1279.31  112.84
 1305.56   113.2 1318.68  112.88  1331.8  113.23 1341.64   112.9 1354.76   113.3
 1387.56  112.95 1417.09  113.16 1449.89  113.22 1463.01  112.86 1482.69  113.36
 1525.34  113.01 1545.02  113.45 1577.82  113.35 1587.66  113.76  1613.9  113.52
 1627.02   114.3 1633.59  113.39 1653.27  113.69 1663.11  114.22 1695.91  114.21
 1705.75   114.4 1718.87  116.16 1728.71  116.25 1741.83  115.49 1751.68  116.63
 1774.64  116.45  1781.2   116.2 1794.32   116.5 1810.72  115.05 1827.12  115.85
 1836.96  113.86  1846.8  114.09 1859.92  117.05 1879.61  116.26 1892.73  114.05
 1918.97  113.85 1958.33  114.04 1994.42  113.98 2010.82  114.35 2027.22  115.72
 2037.06  116.08  2046.9  115.96 2060.02   114.4 2073.14  114.16  2079.7  114.61
 2089.55  114.63 2102.67  115.34 2115.79  115.47 2132.19  115.28 2145.31  115.89
 2158.43  115.31 2178.11   115.5 2184.67   114.9 2204.36  116.12 2217.48  114.91
 2237.16  114.53 2250.28   114.7 2273.24  114.55 2292.92  115.11 2332.29  114.22
 2342.13   114.4 2361.81   115.2 2378.21     115 2384.77  116.49 2391.33  116.99
 2401.17  116.61 2404.45  115.64 2411.01  110.85 2414.29  109.73 2420.86   108.8
 2443.82  107.63 2466.78  107.61  2479.9  108.07 2486.46  107.74  2512.7   108.1
 2525.82  108.57 2548.79  108.29 2575.03  107.77 2584.87   107.9 2594.71  107.21
 2607.83  107.39 2630.79  106.99 2657.04  107.39 2683.28  106.94 2699.68  107.03
 2709.52  107.48 2742.32  107.86 2771.85   107.5 2794.81  107.75 2807.93  108.17
 2817.77  107.91 2840.73  108.16 2857.13  107.83 2876.82   107.8 2903.06   107.3
 2909.62  107.54 2926.02  107.08 2988.35     107 2994.91  107.22 3040.83  107.33
 3070.35  107.93 3083.48  108.65    3113  107.98 3132.68  108.35 3188.44  111.23
 3195.01  111.85 3211.41   114.8 3217.97  115.04 3234.37   113.9 3240.93  115.95
 3247.49  116.45 3257.33  114.32 3263.89  111.53 3273.73   106.4 3280.29  105.21
    3298  104.06    3320   97.26    3330   97.36    3340   96.76    3350   95.46
    3360   95.06    3370   93.76    3390   92.16    3410   91.06    3420   90.16
    3430   88.56    3440   90.06    3450   89.16    3470   89.16    3490   90.56
    3500   90.16    3520   90.16    3530   89.76    3540   91.06    3550   93.56
    3560   97.06    3570  103.06    3573  104.06 3644.41  105.21 3647.69   106.9
 3650.97  110.71 3654.25  113.03 3670.65  113.36 3690.33  114.04 3736.25  114.48
  3746.1  115.12  3762.5  115.66 3788.74  116.03 3814.98  115.84 3824.82  116.03
 3834.66  115.56 3867.47  115.32 3874.03  115.64 3893.71   115.5 3916.67  115.58
 3926.51  114.99 3942.91  114.51 3962.59   114.3 4001.96  114.29 4067.56  113.96
 4080.69  114.11 4139.73  113.73 4169.25  113.68 4192.21  113.81 4202.05  113.65
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 4234.85  113.58 4287.34  113.24 4329.98  113.35  4359.5  113.03  4392.3  113.21
 4461.19  112.89 4487.43  113.02 4500.55  112.81 4516.95  112.94 4589.12  112.73
  4592.4  112.47 4612.08  112.63  4690.8  112.59 4710.48  112.47 4736.73  112.54
 4762.97  112.42 4799.05  112.49 4808.89  112.35 4848.25   112.5 4890.89  112.42
 4907.29  112.28 4949.94  112.26 4959.78  112.12 5002.42  112.11 5081.15  111.94
 5179.55  111.88 5238.59  111.77 5284.52  111.81 5356.68   111.5 5412.44  111.52
 5461.65  111.25 5514.13  111.45 5550.21  111.29 5563.33  111.09 5612.54  111.02
 5625.66  111.16 5697.82  111.48 5707.66  111.42 5714.22  110.94 5730.62  111.37
 5743.74   112.7 5756.87   115.7 5763.43  116.24 5769.99  115.03 5776.55  115.02
 5792.95  116.32 5802.79  116.78 5819.19  116.89 5842.15  116.77 5851.99  117.71
 5861.83  117.37 5874.95  118.28 5881.51  117.12 5891.35  117.35 5904.47  115.54
 5924.16  114.82    5934  114.89 5956.96  113.86 5970.08  113.63 5979.92  112.46
 5993.04  113.09 6012.72  113.19 6029.12   114.1 6042.24  113.98 6068.48  113.26
 6104.57  113.45 6117.69  113.18 6134.09  113.26 6170.17  113.05 6180.01  112.76
 6196.41  112.93 6225.93  112.86 6242.33  112.45 6258.74  112.76 6278.42   112.4
  6298.1  112.57 6307.94  112.29 6317.78  112.51  6363.7  112.52 6373.54  112.11
  6380.1   112.4 6419.46  112.39 6432.58  111.92 6458.83  112.26 6494.91  112.08
 6501.47  111.72 6514.59  112.07 6557.23  111.97 6567.07  111.59 6573.63  111.88
 6619.56  111.75  6629.4  111.29 6642.52   111.7 6658.92  111.45 6685.16   111.5
 6691.72     111 6704.84  111.98 6724.52  111.35 6767.16  111.21 6803.25  110.91
 6849.17   110.8 6885.25   110.6 6921.33  110.79 6941.01  110.55 6980.38  110.41
 7000.06  110.67 7029.58  110.38 7065.66   110.5 7095.18  110.47 7147.67  110.13
 7190.31  110.32 7226.39  110.23 7272.31  110.47    7292  110.32 7331.36  110.89
 7360.88  111.05 7370.72  110.52  7390.4  110.32 7400.24  110.45  7423.2   110.3
 7462.57   110.3 7469.13  110.54 7485.53   113.7 7495.37  115.01 7505.21  111.89
 7518.33  110.83 7524.89  108.99 7538.01  109.04 7547.85   110.8 7564.25  111.15
 7577.37  113.37 7583.93  113.57 7593.77  114.69 7603.61  114.77 7610.17  113.96
 7626.57  113.65  7639.7  113.82 7652.82  114.42 7682.34  114.65 7718.42  115.21
 7741.38  115.23 7816.83  115.64 7829.95  115.51 7852.91  115.83 7898.83   115.7
 7948.03  115.79 8016.92  115.73 8026.76  115.89 8056.28   115.8 8066.12  115.95
  8102.2  116.03 8144.85  115.97 8174.37  116.15 8220.29  116.12 8243.25   116.3
 8262.93  116.14 8279.34  116.32 8308.86  116.22  8318.7  116.41 8377.74  116.42
 8390.87  116.56 8443.35  116.63 8469.59  116.52 8531.92  116.86 8545.04  116.81
 8590.96  116.96 8699.21  117.02 8761.54  117.16 8810.74  117.08 8830.42  117.22
  8850.1  117.08 8892.75  117.12 8902.59  117.26 8961.63  117.19 8981.31  117.43
 9010.84   117.5 9030.52  117.34 9053.48  117.52    9083  117.48 9102.68  117.64
 9158.45  117.76 9174.85  117.65 9201.09  117.87 9240.46  117.79 9263.42  117.97
 9309.34  117.88 9351.99  118.16 9368.39  117.96 9381.51  118.16 9450.39  118.16
 9479.92  118.36 9542.24  118.34  9548.8  118.46 9601.29  118.43 9617.69  118.62
 9643.93   118.6 9660.33   118.8 9670.17  118.62 9693.13  118.73 9706.25  119.34
  9716.1  120.34 9722.66  120.51 9739.06  117.54 9742.34  118.21 9752.18  121.95
 9762.02  121.76 9771.86  123.25 9791.54  123.84 9794.82  123.51 9801.38  119.96
 9804.66  120.09 9811.22  123.45  9814.5   123.8 9824.34  123.21 9840.75  119.48
 9847.31   119.2 9860.43  120.05 9866.99  121.24 9883.39  121.77 9889.95  121.54
 9899.79  120.01 9919.47  120.63 9929.31  120.67 9939.15  121.36 9945.71  122.73
 9952.28  122.93 9958.84  121.41  9965.4  120.67 9985.08  120.07  9998.2  120.49
10011.32 121.3510017.88  120.65   10031   120.2 10047.4  118.7710053.96  118.48
10073.65 118.4710109.73  119.45

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   75.45    .066 3247.49    .025 3690.33    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3247.49 3690.33          557.41  674.61  694.11             .1       .3
Left Levee      Station=   99.45      Elevation=  134.88
Right Levee     Station= 9791.55      Elevation=  123.84
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 2391.33  116.99 3814.9810109.73  115.84

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            133.00    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                 0.066      0.025      0.066
  W.S. Elev (ft)            132.90    Reach Len. (ft)          557.41     674.61     694.11
  Crit W.S. (ft)            120.12    Flow Area (sq ft)       57055.81   15146.89   105158.20
  E.G. Slope (ft/ft)      0.000049    Area (sq ft)            57055.81   15146.89   105158.20
  Q Total (cfs)           235000.00     Flow (cfs)             62152.34   65722.71   107125.00
  Top Width (ft)          10009.61    Top Width (ft)           3147.37     442.84    6419.40
  Vel Total (ft/s)            1.32    Avg. Vel. (ft/s)            1.09       4.34       1.02
  Max Chl Dpth (ft)          44.34    Hydr. Depth (ft)           18.13      34.20      16.38
  Conv. Total (cfs)       33436540.0    Conv. (cfs)             8843230.0   9351234.0   15242080.0
  Length Wtd. (ft)          660.32    Wetted Per. (ft)         3158.72     452.47    6437.52
  Min Ch El (ft)             88.56    Shear (lb/sq ft)            0.06       0.10       0.05
  Alpha                       3.45    Stream Power (lb/ft s)      0.06       0.45       0.05
  Frctn Loss (ft)             0.05    Cum Volume (acre-ft)    292923.70   89018.78   288861.20
  C & E Loss (ft)             0.01    Cum SA (acres)           28798.09    3424.40   30085.99


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 180.3

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     461
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  114.96   16.12   115.3   22.57  116.44   45.13  118.72   48.35  119.31
   87.04   132.3   96.71  135.32  103.16  136.17  127.16  136.41  127.83  136.41
  127.83  126.41  137.83  126.21  228.83   113.2  231.83  113.95  255.83  113.47
  261.83  111.97  271.83  111.77  277.83  110.27  381.32  110.27  387.88   110.4
  397.72  111.42  420.68   111.4  440.37  111.16  460.05   111.6  505.98  111.85
  555.19  111.66  568.31  111.81  617.52  111.63  679.85  111.88  719.21  111.79
  722.49  111.91  817.63  111.99  843.87  111.92  886.52  112.14   906.2  112.03
  935.73  112.26  978.37  112.28 1050.55  112.44 1093.19  112.37 1152.24  112.59
 1175.21  112.75 1201.45  112.64 1224.41  112.76 1267.06  112.65 1273.62  112.84
 1312.99  112.74 1352.36  112.95 1375.32  112.87 1391.72   113.1 1414.69  112.93
 1421.25  113.23 1450.77  113.02 1463.89   114.1 1477.02  114.11 1503.26   113.6
 1536.07  113.59 1618.08  113.08 1644.32  113.31 1660.73   113.1 1709.93  113.19
 1742.74  113.12 1759.14  113.56 1768.98  113.36 1795.23  114.12 1808.35  113.86
 1818.19  114.23 1828.03  115.22    1851  114.13 1864.12  114.26 1873.96  114.86
  1883.8  114.46 1890.36  115.68 1896.92  116.21 1916.61  115.62 1923.17   114.3
 1939.57  115.62 1952.69  115.81  1969.1  116.52 1978.94  116.09 1988.78  116.42
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 1998.62  117.17 2011.74  117.08 2021.59  116.65 2031.43  116.86 2057.67  114.53
 2074.07  114.34 2100.32  114.63 2129.84  115.21 2133.12  114.58 2156.09  114.74
 2179.05  114.16 2202.01  114.48  2238.1  114.56 2244.66  114.76 2264.34  116.44
 2270.91  116.62 2293.87  115.25 2316.83  115.69 2323.39  115.45  2339.8   115.5
 2349.64   115.1 2375.88  115.09    2389  114.75 2402.13  115.17 2428.37  115.35
 2448.05   115.1 2464.46  114.42 2471.02  114.63 2480.86  114.32 2497.26  115.45
  2507.1   116.8 2513.66  116.13 2523.51  116.93 2536.63  117.32 2539.91  116.83
 2549.75  110.62 2559.59  106.24 2585.84  106.14 2621.92  106.77  2641.6  106.47
 2654.73  106.72 2671.13  106.14 2677.69  106.63 2687.53  108.09 2703.93  109.37
 2723.62  109.76 2733.46  109.14 2749.86  109.54 2756.42  109.29 2772.82  109.51
 2792.51  108.99 2822.03  109.18 2828.59  108.82 2848.28   108.6 2867.96  109.03
 2884.36  108.05 2890.92  106.97 2900.76  106.24 2910.61  106.16 2940.13  106.62
 2953.25   105.9 2966.37  105.98 2982.78  106.63  2995.9  106.73 3018.86  107.82
 3035.27  108.27 3045.11  109.76 3064.79  111.88 3071.35  111.68 3074.63  110.21
 3077.91  107.06 3081.19  105.21 3087.19  103.18 3107.19   97.18 3117.19   97.28
 3127.19   96.68 3137.19   95.38 3147.19   94.98 3157.19   93.68 3177.19   92.08
 3197.19   90.98 3207.19   90.08 3217.19   88.48 3227.19   89.98 3237.19   89.08
 3257.19   89.08 3267.19   89.98 3277.19   90.48 3287.19   90.08 3307.19   90.08
 3317.19   89.68 3327.19   90.98 3337.19   93.48 3347.19   96.98 3357.19  102.98
 3360.19  103.98 3409.22  105.21  3412.5  105.55 3422.34  114.89  3428.9  117.51
 3435.46  117.22 3442.02  115.89 3448.58  115.55 3468.26     116  3478.1  115.61
 3514.18  115.82 3527.31  116.84 3569.95  117.39 3583.07  116.82 3592.91  115.96
 3609.31  116.43 3619.15  115.94 3635.55  116.17 3645.39  116.77 3651.95  115.72
 3661.79  116.26 3668.35  115.54 3691.31  115.11 3714.27  115.27 3724.11  115.07
 3766.75   114.9 3773.31  115.16 3786.43  115.03 3832.35  115.08 3858.59  114.71
 3874.99  114.66 3881.55  114.96 3911.07     115 3947.15  114.77 3973.39  114.72
 4006.19  114.83 4035.71  114.58 4058.67  114.54  4088.2  114.73 4134.12  114.45
 4163.64  114.53 4176.76  114.42 4225.96  114.37 4281.72   114.1 4321.08  114.23
 4344.05  114.01 4350.61  114.16 4373.57  113.95 4403.09  114.09 4426.05  113.85
 4465.41  113.93 4485.09  113.75 4494.93   113.9 4511.34  113.73 4560.54  113.82
 4593.34  113.55 4698.31  113.52 4724.55  113.39 4757.35  113.48 4763.91   113.3
 4783.59  113.43 4888.56  113.39  4931.2  113.19 4950.88  113.25 4990.25  113.12
 5013.21  113.16 5068.97     113 5082.09  113.06 5118.17  112.89 5187.06   112.8
 5314.99  112.77 5351.07  112.86 5370.75  112.77 5475.72  112.84 5505.24  113.28
 5531.48  113.46 5547.88  113.18    5561  114.49 5583.97  114.77 5597.09  114.37
 5603.65  114.66 5669.25   114.8 5715.17  114.49 5757.82  114.52 5787.34  114.27
 5820.14  114.26 5856.22  113.83 5872.62  113.89 5898.86  113.46 5915.27  113.73
 5931.67  113.56 5944.79  113.67 5961.19   113.3 5967.75  113.54 6000.55  113.23
 6007.11  113.37 6020.23  112.94 6043.19   113.2 6069.44  113.02 6082.56  112.71
  6092.4  112.95 6112.08  112.66 6135.04  112.74 6148.16  112.36 6167.84  112.66
 6200.64   112.5  6207.2   112.2 6220.33  112.42 6249.85  112.12 6266.25   112.1
 6272.81  111.69 6292.49  112.13 6315.45  111.81 6328.57  111.86 6335.13  111.55
 6364.66  111.77  6374.5  111.59 6394.18  111.64 6397.46   111.3  6407.3  111.63
  6456.5  111.53 6463.06  111.15 6476.18  111.36 6528.67  111.15 6551.63  110.92
 6558.19  110.32 6561.47  110.73 6571.31   110.7 6581.15  111.36 6597.55  111.72
 6607.39  111.16 6620.51  111.43 6640.19  113.29 6653.31  113.58 6659.87  111.68
 6666.43  111.43  6689.4  109.18 6702.52  108.11 6718.92  108.05 6732.04  108.79
  6738.6  109.84 6745.16  112.09 6751.72  112.72 6761.56  112.88 6768.12  113.81
 6781.24  117.62 6791.08  119.39 6807.48  119.32 6814.04   118.8 6827.16  115.88
 6837.01   114.5 6850.13  113.33 6859.97  112.96 6876.37  113.71 6882.93  114.45
 6896.05  114.52 6912.45     114 6932.13  114.58 6948.53  115.44 6968.21  118.03
 6981.33  118.41 6987.89  118.93  7004.3   118.8 7027.26   119.6 7033.82  119.38
 7066.62  119.63 7079.74  119.88 7112.54  119.56 7151.91  120.01 7158.47  119.77
 7174.87   119.8 7191.27  120.19 7207.67  119.92 7217.51  120.24 7227.35  119.88
 7237.19  120.15 7247.03  119.92 7269.99  119.87  7302.8  120.37 7332.32  120.43
 7338.88  120.24 7361.84   120.3  7384.8  121.08  7401.2  120.81 7411.04  121.45
 7427.44  121.78 7437.28  122.29  7450.4  121.89 7460.25  121.14 7466.81  121.46
 7479.93  120.89 7499.61  119.43 7512.73  119.22 7542.25  117.88 7598.01  117.47
  7634.1   117.7 7680.02  117.53 7696.42  117.72 7745.62  117.61 7798.11  117.87
 7837.47  117.76 7880.11  117.77 7896.51  117.96 7906.35  117.81 7945.72  117.95
 7968.68  117.86 8086.77  118.01 8122.85     118 8155.65  118.18 8178.61  118.06
 8244.22  118.26 8290.14  118.27 8303.26  118.12 8322.94  118.31 8339.34  118.24
 8411.51  118.38 8463.99  118.21  8496.8  118.38 8506.64   118.3 8565.68  118.55
 8588.64  118.39  8611.6  118.55 8641.13  118.56 8670.65  118.42 8693.61  118.57
 8736.26  118.58  8746.1  118.38 8775.62  118.42 8782.18  118.65  8811.7  118.27
  8828.1  118.51 8847.78  119.07 8860.91  119.65 8877.31  119.49 8880.59  119.06
 8896.99  118.96 8903.55   118.3 8919.95  117.57 8942.91  117.38 8975.72  117.79
 8982.28  117.68 9024.92  118.03    9061  117.98 9067.56   118.1 9106.93  118.11
 9152.85  118.28 9241.42  118.27 9300.46  118.45 9343.11  118.44 9379.19  118.59
 9438.23  118.52  9461.2  118.69  9526.8  118.62 9556.32   118.8 9618.65  118.89
 9625.21  118.78 9658.01  118.97 9700.66  118.93  9743.3  119.09 9766.26  119.27
  9792.5  119.24 9805.62  119.54 9825.31  120.61 9828.59  120.31 9838.43  117.45
 9841.71  116.97 9854.83  120.13 9864.67  120.69 9874.51  123.17 9884.35  123.94
 9894.19  123.92 9897.47  123.46 9904.03  120.31 9907.31  119.67 9913.87   122.8
 9920.43  124.01 9933.55  122.95 9949.96  118.99 9956.52  118.55 9972.92  121.85
 9986.04  122.22  9992.6  121.9110005.72   119.410012.28  119.85 10025.4  119.44
10028.69  119.74

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .157 3064.79    .066 3087.19    .015 3360.19    .066 3422.34    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      3064.79 3422.34          1062.5 1652.05    1250             .1       .3
Left Levee      Station=  127.16      Elevation=  136.41
Right Levee     Station= 9920.43      Elevation=  124.01
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 2536.63  117.32  3428.910028.69  117.51

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            132.94    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.17    Wt. n-Val.                 0.157      0.031     0.074
  W.S. Elev (ft)            132.77    Reach Len. (ft)          1062.50    1652.05    1250.00
  Crit W.S. (ft)            122.24    Flow Area (sq ft)       49953.86   13141.84   96826.00
  E.G. Slope (ft/ft)      0.000120    Area (sq ft)            49953.86   13141.84   96826.00
  Q Total (cfs)           235000.00    Flow (cfs)              34118.56   73759.75   127121.70
  Top Width (ft)            9900.86    Top Width (ft)           2936.96     357.55     6606.35
  Vel Total (ft/s)             1.47    Avg. Vel. (ft/s)            0.68       5.61       1.31
  Max Chl Dpth (ft)           44.29    Hydr. Depth (ft)           17.01      36.76      14.66
  Conv. Total (cfs)       21486250.0    Conv. (cfs)              3119489.0  6743918.0  11622850.0
  Length Wtd. (ft)          1337.05    Wetted Per. (ft)         2947.41     368.08    6624.56
  Min Ch El (ft)              88.48    Shear (lb/sq ft)            0.13       0.27       0.11
  Alpha                        5.04    Stream Power (lb/ft s)      0.09       1.50       0.14
  Frctn Loss (ft)              0.15    Cum Volume (acre-ft)    292239.00   88799.73   287251.90
  C & E Loss (ft)              0.02    Cum SA (acres)           28759.17    3418.20   29982.21


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.
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CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 180.08*

INPUT
Description: RGV-03,
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	117.21	8.53	117.38	16.88	116.32	23.63	117.07	47.25	118.78
59.69	121.5	68.22	124.93	79.59	128.42	99.49	136.08	123.49	136.32
124.16	136.32	124.16	126.32	134.16	126.12	225.16	110.31	228.16	111.06
252.16	110.58	258.16	109.08	268.16	108.88	274.16	107.38	420.18	107.4
431.77	107.31	474.89	107.43	483.54	107.55	496.52	108.33	501.32	108.32
512.91	109.83	552.77	110.05	567.42	110.39	573.13	110.84	588.34	111.35
595.94	112.38	616.85	112.23	652.98	112.31	706.21	112.15	721.42	112.29
757.54	112.22	831.69	112.28	873.51	112.53	890.62	112.34	913.43	112.43
957.16	112.43	979.98	112.84	987.58	112.47	1095.95	112.46	1126.36	112.66
1181.5	112.61	1210.01	112.84	1257.54	112.78	1265.15	113.06	1280.36	112.72
1314.58	111.11	1357.57	111.16	1413.81	111.11	1491.7	111.27	1521.99	111.39
1556.6	111.31	1586.88	111.4	1643.14	111.32	1651.79	111.46	1703.72	111.38
1755.64	111.54	1785.93	111.48	1807.56	111.65	1837.85	111.53	1846.51	111.75
1885.44	111.6	1902.75	112.4	1938.17	112.35	1947.68	112.58	1993.3	112.7
2016.12	112.58	2073.16	112.81	2103.58	112.68	2130.19	113.44	2156.81	113.46
2162.51	113.18	2177.72	113.35	2183.42	112.7	2187.22	113.22	2198.63	113.23
2244.26	112.54	2270.54	112.42	2292.17	112.73	2305.15	112.53	2339.77	113.21
2357.07	113.07	2370.05	113.3	2383.03	114.1	2413.33	113.24	2430.63	113.33
2443.61	113.8	2456.59	113.48	2465.24	114.42	2473.89	114.84	2499.86	114.4
2508.51	113.4	2530.14	114.39	2547.45	114.55	2569.09	115.14	2582.07	114.78
2608.03	115.55	2625.33	115.56	2638.33	115.25	2651.3	115.42	2685.91	113.73
2707.54	113.54	2744.27	113.95	2755.67	114.3	2767.08	114.31	2781.1	114.78
2785.43	114.3	2803.2	114.63	2831.72	114.47	2843.13	114.22	2864.04	114.67
2869.74	114.29	2888.76	114.73	2903.96	114.43	2913.47	113.52	2923.89	113.73
2936.28	114.78	2949.59	115.58	2964.8	116.04	2972.4	115.41	2985.72	113.51
2997.45	113.1	3027.73	113.37	3036.38	113.18	3058.03	113.22	3080.77	113
3109.29	113.46	3128.3	112.81	3135.9	113	3145.41	115.62	3151.11	116.15
3162.52	115.83	3170.12	114.89	3191.03	113.62	3222.45	112.78	3244.08	112.61
3265.71	113.36	3278.69	114.4	3287.34	113.92	3300.33	114.53	3317.64	114.99
3321.96	114.69	3334.94	110.12	3347.92	106.86	3382.54	106.82	3413.47	107.29
3430.13	107.81	3455.29	107.67	3468.6	108.3	3487.61	108.2	3495.04	107.76
3506.62	107.69	3516.13	108.48	3538.3	109.36	3557.95	109.85	3577.25	108.99
3598.88	109.04	3607.53	108.75	3629.16	108.97	3651.11	108.39	3670.13	108.59
3700.54	108.65	3710.05	108.16	3728.69	108.02	3754.65	108.65	3776.28	107.99
3784.93	107.3	3797.91	106.84	3827.92	108.12	3845.03	107.84	3852.63	107.21
3867.85	106.85	3873.55	107.26	3888.76	106.67	3906.09	107.77	3923.39	107.53
3942	107.88	3949.61	108.58	3957.21	108.52	3970.52	108.92	3989.54	110.88
3999.04	111.53	4014.25	112.04	4022.47	111.44	4026.58	109.81	4032.64	105.42
4034.8	104.62	4059.43	99.08	4067.37	97.45	4092.43	96.72	4104.96	95.67
4117.49	95.33	4142.9	93.41	4172.79	91.9	4192.66	90.02	4205.19	88.06
4215.67	89.39	4226.15	89	4235.95	89.31	4253.53	91.81	4268.07	92.49
4278.55	92.22	4299.52	92.25	4310	91.97	4320.48	92.96	4330.96	94.85
4341.44	97.49	4351.92	102	4355.07	102.75	4366.03	102.94	4383.61	104.77
4406.46	106.24	4409.89	106.65	4420.21	114.14	4426.01	116.1	4431.81	115.87
4437.62	114.87	4443.42	114.61	4460.83	114.93	4469.53	114.63	4501.45	114.75
4513.06	115.54	4533.44	115.87	4550.78	115.96	4571.09	114.86	4585.59	115.22
4594.3	114.85	4608.8	115.02	4617.51	115.47	4623.31	114.69	4632.01	115.08
4637.82	114.51	4658.13	114.15	4678.44	114.29	4687.14	114.15	4730.66	114.2
4742.27	114.07	4782.88	114.03	4820.6	113.64	4826.4	113.84	4867.72	113.74
4883.9	114.29	4900.05	114.28	4921.6	113.89	4943.14	112.63	4959.31	112.52
4970.08	113.03	4986.25	114.73	4997.02	115.55	5009.2	115.57	5023.95	115.25
5075.93	114.83	5153.24	114.79	5174.79	114.64	5215.19	114.74	5261.62	114.58
5287.74	114.73	5308.04	114.59	5336.41	114.7	5352.57	114.91	5383.49	114.71
5465.7	114.59	5508.79	114.82	5572.08	114.71	5601.1	114.79	5606.9	114.67
5638.08	114.88	5697.35	115	5754.88	114.75	5794.31	114.81	5826.62	115.16
5837.39	114.99	5858.95	114.25	5880.5	115.03	5912.81	114.47	5977.45	114.41
5998.99	114.8	6009.77	114.3	6020.54	114.84	6036.69	114.46	6094.36	114.33
6236.54	114.37	6285.86	114.82	6300.37	114.63	6311.97	115.62	6332.29	115.83
6343.9	115.52	6349.7	115.73	6407.73	115.81	6448.34	115.57	6486.07	115.59
6512.18	115.4	6541.2	115.4	6573.11	115.06	6587.62	115.1	6610.83	114.76
6625.34	114.96	6651.46	114.9	6665.96	114.62	6671.77	114.8	6718.19	114.36
6738.5	114.56	6761.72	114.43	6773.32	114.19	6782.03	114.36	6799.43	114.12
6819.74	114.16	6831.35	113.88	6848.76	114.1	6935.81	113.7	6941.61	113.4
6959.02	113.73	6996.73	113.27	7022.85	113.43	7104.09	113.22	7109.9	112.93
7121.5	113.09	7167.93	112.93	7188.24	112.75	7194.04	112.29	7214.35	113.06
7228.86	113.33	7237.56	112.91	7249.17	113.12	7266.58	114.51	7278.18	114.73
7283.98	113.31	7289.79	113.12	7321.71	110.64	7336.22	110.58	7347.82	111.13
7353.63	111.91	7359.43	113.6	7373.94	114.18	7379.74	114.88	7391.34	117.73
7400.05	119.05	7414.55	118.99	7420.36	118.6	7431.96	116.41	7440.67	115.38
7452.28	114.5	7460.98	114.22	7475.49	114.79	7481.29	115.34	7492.9	115.39
7507.41	115.01	7524.81	115.44	7539.32	116.09	7556.73	118.03	7574.14	118.71
7588.65	118.6	7608.96	119.19	7614.76	119.03	7655.38	119.43	7684.4	119.18
7719.22	119.5	7739.53	119.36	7754.04	119.66	7768.54	119.47	7777.25	119.7
7785.95	119.43	7794.66	119.63	7823.67	119.4	7852.69	119.76	7904.92	119.7
7925.23	120.29	7939.73	120.11	7948.44	120.61	7971.65	121.32	7983.25	121.06
7991.97	120.53	7997.77	120.79	8009.37	120.34	8026.78	119.17	8038.39	119.05
8064.5	118.03	8113.82	117.67	8145.75	117.8	8186.36	117.68	8200.87	117.84
8244.39	117.75	8290.82	117.97	8325.64	117.88	8386.57	117.89	8421.39	118.01
8441.7	117.95	8578.07	118.04	8607.09	118.15	8627.39	118.04	8681.47	118.19
8726.05	118.18	8737.65	118.07	8769.57	118.17	8833.41	118.25	8879.83	118.11
8917.56	118.17	8969.78	118.37	8990.09	118.24	9036.52	118.35	9062.63	118.24
9082.94	118.35	9120.67	118.34	9129.37	118.18	9155.48	118.17	9161.29	118.35
9187.4	118.07	9201.91	118.25	9230.93	119.11	9245.43	118.99	9248.34	118.67
9262.84	118.58	9268.64	118.08	9283.15	117.52	9303.46	117.35	9332.48	117.66
9338.29	117.59	9376	117.85	9407.92	117.8	9489.17	118.01	9543.3	118
9657.46	118.12	9689.38	118.22	9741.6	118.18	9761.92	118.31	9819.94	118.22
9846.06	118.37	9936.01	118.45	9973.73	118.4110031.76		118.6810054.97		118.66
10066.58	118.8810083.99		119.6910086.89		119.47 10098.5		116.9610110.11		119.32
10118.81	119.7310127.51		121.5710136.22		122.1410147.82		121.9610153.63		119.76
10156.53	119.3610162.33		121.8710168.13		122.9410186.61		121.2610209.72		118.38
10218.96	117.8810224.22		118.1810242.06		120.0310252.26		120.5310262.77		120.67
10271.54	121.410288.26		119.6810299.58		119.5710311.85		118.710320.61		119.12

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.157	4014.25	.066	4059.43	.015	4351.92	.066	4420.21	.074

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4014.25	4420.21	1062.5	1652.05	1250 .1	.3

Left Levee Station= 123.49 Elevation= 136.32
Right Levee Station=10170.59 Elevation=122.9425

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	2339.77	113.21	4420.21	7539.32	116.09

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 179.85*

INPUT
Description: RGV-03,
Station Elevation Data num= 458

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	119.46	8.91	119.63	17.82	117.29	49.37	118.84	62.37	120.77
71.28	124.9	77.22	126.94	83.16	128.24	103.96	135.18	112.86	135.99
136.86	136.23	137.53	136.23	137.53	126.23	147.53	126.03	238.53	110.12
241.53	110.87	265.53	110.39	271.53	108.89	281.53	108.69	287.53	107.19
294.42	105.54	299	104.68	313.4	104.52	500.52	104.54	514.91	104.35
579.2	104.7	601.28	105.22	615.67	108.25	665.18	108.94	683.37	109.36
690.45	110.17	699.9	110.22	709.34	111.06	718.78	113.1	723.51	113.25
744.75	112.71	836.83	112.68	850.99	112.85	855.72	112.61	874.6	112.76
919.46	112.73	938.34	113.01	947.79	112.85	973.76	112.92	1011.54	112.79
1042.23	113.1	1054.03	112.97	1063.47	113.19	1084.72	112.84	1113.05	113.07
1127.26	112.94	1167.35	112.93	1183.88	113.19	1195.69	113.74	1205.13	112.98
1219.29	113.12	1268.88	112.95	1301.92	113.03	1309.01	113.17	1339.7	112.96
1428.16	113.17	1445.94	113.1	1471.91	113.22	1481.35	113.43	1530.93	113.4
1540.38	113.28	1549.82	113.83	1568.71	113.13	1589.96	111.35	1599.4	110.95
1611.2	109.84	1664.59	109.88	1734.43	109.85	1868.77	110.04	1911.75	109.98
1949.36	110.04	2019.21	109.99	2029.96	110.08	2094.44	110.03	2158.93	110.13
2196.53	110.1	2223.4	110.21	2261.02	110.12	2271.76	110.28	2320.11	110.17
2341.6	110.71	2371.42	110.67	2385.59	110.86	2397.4	111.47	2416.28	111.42
2425.73	111.72	2442.26	111.83	2470.58	111.61	2503.64	112.02	2517.8	112.01
2553.22	112.39	2567.38	112.17	2591	112.26	2624.05	113.63	2633.49	113.45
2657.1	113.76	2664.18	113.27	2683.07	113.59	2690.15	112.28	2694.87	113.3
2709.04	113.32	2732.65	112.57	2739.73	112.64	2749.17	112.17	2784.59	111.73
2825.19	111.89	2850.69	111.74	2867.23	112.17	2921.91	112.38	2938.03	112.98
2959.3	112.52	2975.65	112.35	2997.14	112.4	3013.26	112.75	3029.37	112.51
3050.86	113.46	3083.11	113.18	3093.86	112.5	3120.72	113.17	3142.21	113.29
3169.09	113.75	3185.95	113.46	3226.08	114.04	3255.06	113.85	3271.18	113.98
3292.18	113.38	3325.24	112.7	3365.38	112.99	3370.1	113.35	3386.62	113.23
3400.79	113.76	3414.95	113.61	3431.48	114.34	3437.74	114.02	3450.37	114.03
3459.81	114.58	3476.33	114.21	3495.22	114.5	3509.39	114.22	3518.83	114.86
3528.27	114.64	3535.36	114.99	3542.44	114.18	3566.05	114.96	3584.94	114.33
3596.74	112.5	3608.54	112.8	3625.07	114.56	3641.6	115.29	3653.4	115.2
3660.48	115.52	3669.93	114.45	3686.46	111.23	3701.03	110.96	3738.63	111.06
3749.38	110.9	3783.25	110.86	3797.41	111.18	3804.5	110.91	3825.75	111.29
3839.91	111.9	3863.52	110.75	3872.96	110.94	3877.68	112.19	3884.77	116.04
3891.85	117.07	3898.93	116.1	3906.02	116.37	3915.46	114.45	3927.26	113.19
3941.43	112.04	3957.96	111.48	3991.01	111.01	4012.25	110.9	4034.16	111.27
4050.28	112.01	4061.02	111.71	4098.65	112.67	4104.02	112.54	4120.13	109.62
4136.25	107.48	4179.25	107.5	4217.65	108.03	4248.34	109.15	4253.06	108.85
4269.59	108.85	4286.12	109.96	4309.73	110.07	4333.33	108.42	4345.14	108.94
4364.03	109.29	4387.63	109.46	4397.08	110.04	4421.03	108.83	4441.94	108.74
4458.64	108.2	4496.24	108.44	4512.76	107.71	4536.38	108.11	4552.9	107.95
4574.15	108.39	4585.95	107.56	4607.2	107.43	4628.45	107.78	4642.61	108.3
4654.41	107.86	4668.19	107.92	4687.47	107.37	4701.63	107.65	4708.71	108.68
4722.88	109.2	4732.33	109.89	4744.13	109.24	4753.57	109.12	4763.02	107.92
4772.47	107.63	4781.91	107.8	4788.99	108.59	4807.88	107.22	4829.13	108.92
4848.02	108.31	4862.18	108.56	4873.99	108.36	4883.44	109.49	4892.88	109.15
4909.41	109.66	4933.02	111.9	4944.83	112.41	4956.63	111.81	4963.72	112.19
4973.6	111.21	4978.54	109.41	4985.82	104.65	5018.01	99.08	5027.56	97.72
5057.67	96.76	5072.73	95.96	5093.62	95.48	5118.32	93.97	5130.67	93.79
5154.25	92.49	5167.73	91.34	5193.18	87.63	5204.14	88.8	5215.1	88.91
5225.35	89.53	5243.74	93.99	5258.96	94.5	5291.84	94.42	5302.8	94.26
5313.77	94.94	5324.73	96.22	5335.69	98	5346.65	101.02	5349.94	101.51
5361.41	101.64	5379.8	104.88	5407.29	107.76	5418.08	113.38	5423.12	114.68
5438.26	113.67	5453.39	113.86	5460.96	113.64	5488.71	113.69	5498.81	114.25
5516.53	114.59	5531.6	114.52	5549.26	113.76	5561.88	114	5569.44	113.76
5589.63	114.18	5594.67	113.65	5602.24	113.91	5607.28	113.49	5624.94	113.2
5675.92	113.33	5698.1	113.11	5750.94	112.87	5766.21	112.63	5807.19	112.59
5821.25	113.8	5835.29	113.83	5854.03	113	5863.4	111.45	5872.76	110.5
5886.82	110.43	5896.18	111.5	5910.24	114.9	5919.6	116.45	5924.29	116.61
5943.03	115.86	5957.07	115.72	5985.18	115.09	6003.91	115.24	6041.4	115.16
6055.44	115.32	6074.18	115.15	6092.91	115.34	6126.97	115.17	6172.38	115.38
6214.7	115.48	6228.75	115.99	6284.97	115.43	6303.7	115.65	6327.12	115.64
6364.59	116.1	6449.89	116.03	6477.01	116.33	6528.54	116.61	6578.56	116.32
6612.85	116.45	6640.94	117.15	6650.3	116.85	6664.36	115.5	6669.05	115.44
6687.78	117.04	6706.52	116.52	6715.88	116.02	6758.03	115.92	6772.08	116.01
6790.81	116.81	6800.18	115.82	6809.54	116.88	6823.59	116.13	6873.74	115.89
6997.35	115.91	7040.24	116.18	7052.85	116.07	7062.94	116.76	7146.2	116.82
7181.52	116.66	7214.32	116.67	7262.25	116.53	7322.8	116.07	7335.42	116.19
7375.78	116.06	7416.14	115.78	7433.8	115.92	7471.65	115.78	7514.54	115.39
7529.67	115.55	7605.36	115.31	7610.41	115.1	7625.54	115.33	7653.29	115.16
7658.34	114.99	7681.05	115.09	7751.68	114.91	7807.19	114.71	7824.85	114.57
7829.9	114.26	7860.17	114.94	7867.74	114.66	7877.83	114.8	7892.96	115.74
7903.05	115.89	7908.1	114.94	7913.14	114.82	7940.9	113.16	7953.51	113.11
7963.61	113.47	7973.7	115.11	7986.31	115.49	7991.36	115.95	8001.45	117.84
8009.01	118.71	8026.67	118.4	8036.76	116.94	8054.43	115.67	8062	115.49
8079.66	116.23	8102.36	116.01	8130.11	116.74	8145.25	118.03	8160.38	118.48
8173	118.39	8190.66	118.78	8195.71	118.67	8231.03	118.98	8256.25	118.8
8286.53	119	8304.19	118.92	8316.8	119.14	8336.99	119.17	8377.35	118.93
8402.58	119.15	8447.99	119.11	8465.65	119.5	8478.26	119.41	8506.01	120.35
8523.68	119.91	8538.82	119.79	8553.95	118.92	8565.85	118.84	8586.75	118.17
8629.63	117.86	8692.71	117.84	8725.09	118	8734.45	117.86	8762.56	118.08
8813.81	118	8897.06	118.07	8973.32	117.98	9058.52	118.12	9081.04	118.01
9123.19	118.14	9172.05	118.03	9255.31	118.12	9295.67	118	9373.88	118.18
9391.54	118.09	9431.91	118.15	9454.61	118.06	9505.08	118.1	9563.1	117.86
9575.71	117.99	9600.95	118.57	9628.7	118.2	9646.35	117.46	9664.01	117.32
9727.09	117.68	9778.88	117.65	9797.62	117.77	9872.55	117.72	9881.91	117.81
9928.75	117.75	10044.97	117.84	10078.62	117.93	10102.04	117.81	10135.79	117.94
10246.81	117.91	10327.53	118.23	10342.68	118.77	10355.29	116.95	10365.38	118.5
10372.95	118.76	10380.52	119.98	10398.18	120.46	10405.74	119.05	10410.79	120.94
10415.83	121.87	10422.62	121.72	10429.4	120.28	10469.49	117.76	10488.19	117.06
10511.21	118.21	10517.58	118.28	10524.36	119.01	10537.92	119.19	10549.23	121.12
10585.4	119.33	10601.23	117.86	10612.54	118.5				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	2683.07	.12	5018.01	.025	5418.08	.066

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
      4963.72 5418.08          1062.5 1652.05    1250            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4963.72  112.19       T
 5418.0810612.54  113.38       T
Left Levee      Station=  136.86      Elevation=  136.23
Right Levee     Station=10420.75      Elevation= 121.875
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1589.96 3365.38  111.35

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 179.63*

INPUT
Description: RGV-03,
Station Elevation Data    num=     458
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   121.7     9.3  121.87   12.39  121.23   18.58  118.28    51.5  118.89
   65.05  120.05   68.15  121.08   74.35  124.88   80.54  127.02   86.74  128.07
   92.93  129.92  108.42  135.38  132.42  135.62  133.09  135.62  133.09  125.62
  143.09  125.42  234.09  117.68  237.09  118.43  261.09  117.95  267.09  116.45
  277.09  116.25  283.09  114.75  285.96   114.1  294.42  110.54  305.71  109.32
   340.1  101.66  512.07   101.7  546.47   101.6  580.86  101.67  598.06   101.4
  674.87  101.85  701.24  102.13  718.44  106.68  777.58  107.83  799.31  108.34
  807.78   109.5  819.06  109.53  830.35  110.78  841.63  113.81  847.27  114.03
  858.55  113.53  864.19  113.74  872.65  113.18   920.6   113.1  982.66  113.18
  999.58  113.45 1005.22  113.08 1027.94  113.24 1044.72  113.08    1056  113.28
 1081.38  113.24 1103.94  113.69 1115.23  113.46 1146.26  113.54 1182.92  113.46
 1191.39  113.31 1228.05  113.73 1242.15  113.52 1253.44  113.84 1278.83  113.34
 1295.75  113.36 1312.67   113.7 1318.31  113.41 1360.63   113.5 1377.55  113.42
 1397.29  113.81  1411.4  114.63 1422.68   113.5  1439.6   113.7 1459.34  113.51
 1490.38  113.62 1498.84  113.44 1538.32  113.56 1546.78  113.78 1583.46  113.46
 1690.64  113.75 1710.39  113.59 1741.41  113.72 1752.69  114.01 1811.93  113.96
 1823.21  113.79 1834.49  114.61 1857.06  113.54 1882.44  110.85 1893.72  110.25
 1902.19  108.93 1907.83  108.58 2055.05  108.58 2215.55  108.68 2395.29  108.65
 2485.17  108.67 2697.02   108.8 2754.78  108.74 2780.46  109.01 2816.09  108.99
 2833.02  109.37 2847.12  110.35 2869.68  110.33 2880.97  110.78 2900.71  110.95
 2934.56  110.65 2948.67  110.73 2974.05  111.31 2990.97  111.33 3033.29  111.96
 3050.21  111.67 3061.49  111.94 3078.42  111.85 3106.62  113.41  3117.9  113.83
 3129.18  113.53 3140.47  113.92  3157.4  114.07 3165.86  113.35 3188.42  113.82
 3196.88  111.85 3202.52  113.38 3219.45   113.4 3247.65  112.26 3256.12  112.37
  3267.4  111.67 3309.71  111.03 3343.56   111.1 3388.69  110.85 3408.44  111.35
  3416.9  111.23 3450.74  111.54 3470.49  111.41 3501.52  111.88 3518.44  111.48
 3566.39  111.48 3572.03   111.7 3602.16  111.53 3627.83  112.09 3666.37  111.96
  3679.2   111.6 3711.29  111.94 3736.97  112.03 3780.76  112.41 3808.97   112.2
 3837.17  112.49 3891.05  112.55 3916.15   112.2 3938.72  112.25 3955.64  111.82
 4003.59  112.23 4009.23  112.75 4028.98  112.52  4045.9  113.23 4062.82  112.92
  4074.1  113.19 4082.57  113.91 4105.13  113.73 4116.41  114.54 4136.16  113.95
 4158.73  114.53 4175.65  114.23 4186.93  115.19 4198.21  114.81 4206.67   115.3
 4215.13  114.06 4243.35  115.18 4251.81  115.09 4265.91  114.23 4280.01  111.48
 4294.11  111.92 4313.86  114.34  4333.6     115 4347.71  114.57 4356.17  114.99
 4367.45  113.48 4381.55     110  4387.2  108.96 4404.61  108.81 4449.54  108.74
 4466.18  108.61 4502.84  108.62 4519.76  109.22 4528.22  108.81 4553.61  109.38
 4570.54  110.34 4584.64  109.72 4598.74  108.68 4610.02  108.88 4615.66  110.71
 4624.13  116.46 4626.95  117.54 4632.59     118 4641.05  116.53 4649.51  116.92
 4655.15  115.98 4660.79  114.01  4674.9  112.14 4691.82  110.47 4711.57  109.72
 4731.31  109.76 4751.05   109.2 4765.15  109.37 4776.44  109.08 4799.01  109.13
 4821.87  109.61  4834.7   109.5 4861.06  109.75 4886.07   110.4 4905.33  109.13
 4924.58   108.1 4971.06  108.13 5021.84  108.77  5058.5  110.38 5064.14  109.96
 5083.88  110.04 5103.64  111.61 5109.28   111.5 5131.84  111.93  5140.3   111.3
 5160.04  109.15 5174.15  109.39 5179.79  109.17 5196.71  109.45 5224.92  109.42
  5236.2  110.23 5264.41  108.69 5289.79  108.38 5303.89  107.67 5329.29  107.74
 5354.67     108 5374.41  107.03 5385.69  107.07 5402.62  107.64 5422.36  107.37
 5433.65  107.48 5447.75  108.13 5461.85  106.96 5487.24  106.84 5512.62  107.24
 5529.55  107.95 5543.65  107.51 5580.32  108.11 5583.14  107.76 5600.06  108.37
 5608.52  109.93 5625.44  110.67 5636.73  111.65 5650.84  110.62 5662.12   110.4
  5673.4  108.62 5684.69  108.35 5695.97  108.75 5704.43  109.93 5712.89  109.36
    5727  107.78 5738.28  108.54 5746.74  109.77 5752.38  110.06 5760.85  109.47
 5774.96  109.11 5791.88  109.32 5805.99  108.85 5817.27   110.4 5828.55  109.77
  5848.3  110.41 5856.76  111.55 5868.04  111.99 5876.51  112.91 5890.61   113.3
 5904.72     112 5913.19  112.35 5918.92  111.99 5927.52  110.32 5936.13  106.11
 5938.99  103.89  5962.6  101.14 5976.59   99.08 5987.74   97.99 6003.69   97.13
 6022.91    96.8 6050.03      96 6064.89   95.98 6079.76   95.51 6093.75   94.52
 6108.17   94.59 6135.71   93.09 6151.45   91.66 6181.18   87.21 6214.76   89.76
 6233.96   96.17 6249.84   96.51 6295.61   96.54 6307.06   96.91 6329.94   98.51
 6344.82  100.28 6356.79  100.33 6375.98  104.99 6404.68  108.86 6415.94  112.63
 6420.23  113.27  6433.1  112.73 6475.98  112.62 6499.62  113.32 6527.44  112.66
 6561.74  112.88 6583.29  112.27 6619.15  112.32 6635.09  112.52 6653.94  112.15
 6698.85  111.93 6726.73  111.35 6746.65  111.43  6758.6  113.32 6770.54  113.38
 6786.46  112.12 6794.43  109.77 6802.38  108.36 6814.33  108.33 6822.29  109.97
 6834.24  115.06 6842.19  117.36 6846.18  117.57  6862.1  116.48 6874.04  116.32
 6897.93  115.37 6913.85  115.65  6945.7  115.58 6957.64  115.86 6973.56  115.65
 6989.49  115.93 7001.44  115.76 7037.73  115.83    7093  116.27 7104.94  117.08
 7152.71  116.25 7168.63  116.62 7188.54  116.68 7220.38  117.39 7267.16  117.35
 7303.99  117.48 7315.93  117.78 7359.72  118.21 7403.51  117.88 7431.38  118.09
 7455.26  119.15 7463.21  118.71 7475.16  116.71 7479.14  116.63 7495.07  119.05
 7510.99  118.28 7518.94  117.56 7554.77  117.47 7566.71  117.61 7582.63  118.82
  7590.6  117.33 7598.55  118.93 7610.49  117.81 7638.36  117.51 7670.21  117.41
 7702.05  117.49 7777.68  117.41 7805.34  117.52 7813.92  117.89 7983.31  117.67
 8034.77  117.37 8045.49  117.42  8114.1   117.2 8161.28  117.19 8197.72  116.91
 8210.59  116.99 8292.07  116.93 8319.94  116.71 8367.12  116.74 8403.56  116.49
 8430.48  116.57 8461.46   116.4 8465.75  116.23 8491.48  116.54 8506.48  116.49
 8527.92  117.04  8536.5  116.51 8560.09  115.69 8579.39  115.81 8587.96  116.62
 8602.97  117.01 8617.98  118.37 8632.99   118.2 8641.57  117.47 8663.01  116.75
 8678.02  117.13 8697.32  117.02  8720.9  117.38 8733.76  118.03 8808.62  118.52
 8828.11  118.42 8896.72  118.63 8931.03  118.46 8991.07  118.51  9016.8  118.72
 9040.38  119.38 9063.37  119.43  9079.3  118.69 9091.23  118.71    9109  118.32
 9145.45  118.06 9182.79  117.93 9226.58  118.16 9234.53  117.97 9258.42  118.25
  9282.3  118.12 9330.06  118.17    9347  118.05 9372.73  118.13 9437.54  117.99
 9488.52  118.13 9529.09  117.98 9564.92  118.08 9580.84  117.95 9616.66  118.05
 9711.51   117.9 9771.91     118 9889.48  117.86 9907.24  117.67  9938.8  117.66
 9970.96  118.03 9994.55  117.8210009.56  117.4110034.61   117.310062.47  117.49
10122.19  117.4310138.11  117.59 10201.8  117.4510209.75  117.5810249.57  117.43
10269.47  117.5310301.32  117.4410376.94  117.5710396.85  117.3810416.74  117.51
 10508.3  117.3710579.91  117.4910601.36  117.8510612.08  116.9510633.52  118.38
10648.53  118.9610654.96  118.7410663.54  120.7910671.84  120.7310680.15  118.72
10691.23  117.86 10738.3  117.1110752.15  115.9410788.16  116.4410796.46  117.48
10813.07  117.7110821.38  119.9410826.92  120.8510843.54  120.6810857.38  120.18
```

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10871.23  119.0910890.61  117.0310904.46  117.89

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2974.05     .12 5976.59    .025 6415.94    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5913.19 6415.94           1062.5 1652.05    1250             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5913.19  112.35       T
 6415.9410904.46  112.63       T
Left Levee      Station=  132.42      Elevation=  135.62
Right Levee     Station=10670.91      Elevation=120.8075
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1857.06 3106.62  113.54

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 179.4

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  123.95    9.68  124.12    12.9  123.25   19.35  119.26   22.58  118.97
   54.83  118.95   67.73  119.33   70.96   120.4   77.41  124.85   83.86   127.1
   90.31  127.89   96.76  129.75  112.89  135.57  136.89  135.81  137.56  135.81
  137.56  125.81  147.56  125.61  238.56  120.72  241.56  121.47  265.56  120.99
  271.56  119.49  281.56  119.29  287.56  117.79  288.71   117.8  295.27  117.34
  311.67  114.57  318.23     113  328.07  108.44   341.2  107.32   381.2   98.64
   401.2   98.77   581.2   98.84   621.2   98.71   661.2    98.8   681.2   98.44
   701.2   98.64   781.2   99.06   801.2   99.03   821.2   105.1  915.26  107.32
   925.1  108.83  938.23  108.84  951.35  110.49  964.47  114.52  971.03  114.81
  984.15  114.13  990.71  114.41 1000.55  113.66 1016.95  113.52 1056.32  113.53
 1062.88  113.82 1079.28  113.62 1128.49  113.67 1148.17  114.04 1154.73  113.55
 1180.97  113.72 1200.66  113.52 1213.78  113.79  1243.3  113.75 1262.98  113.98
 1269.54  114.36 1282.67  114.06 1318.75  114.16 1331.87  113.99 1361.39  114.03
 1371.24  113.82 1413.88  114.36 1430.28  114.07  1443.4   114.5 1463.09  114.28
 1472.93  113.84 1492.61  113.87 1512.29  114.33 1518.85  113.95 1568.06  114.02
 1587.74  113.92  1594.3  114.32  1610.7  114.44 1627.11  115.53 1640.23  114.02
 1659.91  114.28 1682.87  114.03 1718.96  114.17  1728.8  113.92 1774.72   114.1
 1784.56  114.39 1827.21  113.96 1866.57  114.06 1879.69   114.4 1886.25  114.11
 1951.86  114.32 1974.83  114.08 2010.91  114.21 2024.03  114.59 2050.27  114.67
  2063.4  114.47 2092.92  114.52 2106.04  114.29 2119.16  115.38 2145.41  113.95
 2168.37  111.36 2174.93  110.36 2188.05  109.55 2197.89  107.79 2204.45  107.32
 3260.75  107.32 3280.44  107.88 3296.84  109.23 3323.08  109.24 3336.21  109.84
 3346.05  109.65 3359.17  110.07 3362.45  109.69 3375.57  110.04 3398.53  109.68
 3414.94   109.8 3444.46  110.61 3464.14  110.65 3490.39  111.17 3503.51  111.08
 3513.35  111.54 3533.03  111.16 3546.15  111.54 3565.84  111.43 3598.64  113.48
 3611.76  114.03 3624.88  113.61 3638.01  114.14 3657.69  114.37 3667.53  113.43
 3693.77  114.05 3703.61  111.43 3710.17  113.46 3729.86  113.48 3762.66  111.96
  3772.5   112.1 3785.62  111.16 3808.59  110.68 3828.27  110.66 3834.83  110.33
  3874.2  110.35 3926.68  109.96 3949.65  110.53 3959.49  110.33 3998.85  110.75
 4021.82  110.49  4057.9  110.84 4077.58  110.44 4087.42  110.58 4133.35  110.53
 4139.91  110.76 4166.15  110.51 4221.92  110.81 4277.69  110.66 4353.13  110.82
 4382.66  111.13  4392.5  110.82 4402.34   111.1 4415.46  110.77 4438.42  110.66
 4448.26  110.94 4510.59  111.11 4540.11  111.03 4566.36  111.43 4586.04  110.94
 4641.81  111.47 4648.37  112.16 4671.33   111.8 4691.01  112.69 4710.69  112.22
 4723.81  112.55 4733.66  113.48  4759.9  113.43 4773.02  114.49 4795.98  113.69
 4822.23  114.56 4841.91  114.23 4855.03  115.52 4868.15  114.98 4877.99  115.62
 4887.83  113.94 4907.52  114.88 4917.36  114.83 4920.64  115.41 4930.48  115.28
 4946.88  114.13 4963.28  110.46 4969.84  110.33 4979.68  111.04 5002.65  114.12
 5015.77  114.19 5025.61  114.71 5042.01  113.94 5051.85  114.46 5064.97  112.51
 5081.37  108.01 5087.94  106.68  5110.9  106.66 5179.79  106.33 5222.43  106.39
 5242.11  107.26 5251.95  106.72 5281.48  107.48  5294.6  108.64 5301.16  108.78
 5317.56  108.02 5333.96  106.61 5347.08  106.82 5353.64  109.23 5363.49  116.88
 5366.77  118.32 5373.33  118.92 5383.17  116.95 5393.01  117.46 5399.57  116.21
 5406.13  113.57 5422.53  111.08 5442.21  108.89 5465.18  107.97 5488.14  108.15
  5511.1  107.39  5527.5  107.69 5540.62  107.27 5566.87  107.07 5612.79  107.32
 5639.04  107.32  5678.4  108.58 5730.89  108.79 5766.97  108.79 5826.02  109.51
 5868.66  111.62 5875.22  111.07 5898.18  111.23 5921.15  113.26 5927.71   113.1
 5953.95   113.8 5963.79  113.01 5986.75  109.88 6003.16  109.84 6009.72  109.46
  6029.4  109.62 6035.96  109.34  6062.2  109.37 6075.32  110.42 6088.45   109.4
 6108.13  108.53 6121.25  108.51 6137.65  108.02 6154.05  107.09 6183.58  107.18
  6213.1  107.55 6236.06  106.35 6249.18  106.42 6268.87  107.16 6291.83  106.78
 6304.95  106.92 6321.35  107.87 6337.75  106.36 6367.28  106.25  6396.8   106.7
 6416.48  107.61 6432.88  107.16 6475.53  108.58 6478.81  108.15 6498.49  109.09
 6508.33  111.18 6528.01  112.13 6541.14  113.41 6557.54     112 6570.66  111.68
 6583.78  109.33 6596.91  109.07 6610.03   109.7 6619.87  111.26 6629.71   110.5
 6646.12  108.34 6659.24  109.28 6669.08  110.86 6675.64  111.21 6685.49   110.4
 6701.89  109.91 6721.57  110.07 6737.98  109.33  6751.1  111.31 6764.22   110.4
 6787.19  111.15 6797.03  112.61 6810.15  112.91    6820  113.93  6836.4  114.19
  6852.8   112.2 6862.65  112.51 6869.21  112.06 6879.05   110.1 6888.89  105.77
 6892.17  103.12 6919.17  101.03 6935.17   99.08 6966.17   97.08 7002.17   96.68
 7019.17   96.28 7036.17   96.48 7053.17   96.18 7069.17   95.08 7085.67   95.38
 7117.17   93.68 7135.17   91.98 7169.17   86.78 7186.17   87.98 7204.17   89.98
 7220.17   96.98 7224.17   98.35 7252.17   98.64 7332.17   99.06 7352.17   99.03
 7372.17   105.1 7413.81  111.88  7466.3  111.53 7482.71  112.05 7495.83  111.56
 7541.76  111.59  7551.6  111.24 7581.13  111.41 7594.25  111.72  7604.1  111.26
 7633.62  110.89 7646.75  110.99 7669.71  110.14 7686.11  110.28 7695.95  112.83
 7705.78  112.93 7718.89  111.23 7725.45  108.09    7732  106.23 7741.84  106.24
 7748.39  108.44 7758.23  115.23 7764.78  118.26 7768.06  118.53 7781.17   117.1
    7791  116.92 7810.67  115.66 7823.78  116.06 7850.01  115.99 7859.84   116.4
 7872.95  116.16 7886.06  116.52  7895.9  116.27 7918.84  116.37 7971.29  117.05
 7981.12  118.16 8020.46  117.07 8033.57  117.59 8049.96  117.73 8076.18  118.67
 8125.35  118.67 8145.02  118.84 8154.85  119.23 8190.91  119.82  8207.3  119.49
 8226.96  119.44 8249.91  119.73 8269.57  121.15 8276.12  120.57 8285.96  117.92
 8289.24  117.82 8302.35  121.06 8315.46  120.05 8322.01  119.11 8351.51  119.02
 8361.34  119.21 8374.45  120.83 8381.01  118.84 8387.56  120.98 8397.39  119.48
 8420.34  119.09 8446.56  118.93 8472.78  119.06 8521.94  118.97 8535.05  118.78
 8567.82  119.05 8603.88  118.85 8705.48   118.8 8780.86  118.57 8843.13  118.67
 8872.63  118.41  8964.4  118.54 8990.62  118.38 9016.84  118.46 9049.62  118.27
 9072.56  118.34 9115.17  118.14 9174.16  118.23 9236.43     118 9331.48  118.04
 9351.15  117.94 9383.92  118.08 9419.97  117.98 9449.47  118.12 9498.63  117.93
 9544.52  117.91 9557.63  118.04 9593.68  118.83 9606.79  118.38 9616.62  118.57
 9692.01  118.03 9728.06  118.33 9734.61  118.08 9754.28  118.42 9773.94  118.21
 9813.27   118.3 9826.38  118.13 9859.16  118.21 9901.77     118 9944.37  118.17
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 9977.15  117.9510006.65  118.0310019.76  117.8510049.25  117.9710137.75  117.77
10177.08  117.83 10275.4  117.6210288.51  117.4210350.79  117.5110393.39  117.21
10416.33  117.37 10465.5   117.210478.61   117.4   10495  117.2210531.05  117.17
 10537.6  117.3510570.38   117.110586.77  117.2310612.99  117.0810675.26   117.2
10691.65  116.9610708.03  117.1110783.42  116.8510868.63  116.9410894.85  116.72
10911.24  119.7210921.07  119.74 10930.9  117.1610944.01  116.15 10960.4  116.43
10999.73  116.5711016.12  114.8211039.06  114.5111058.73  114.6111068.56  115.96
11088.22  116.2311098.06  119.2611104.61  120.5711124.28  120.8311140.66   120.4
11147.22   119.411157.05  118.8511179.99  116.1911189.83  117.2511196.38  117.27

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3693.77     .12 6919.17    .025 7372.17    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6862.65 7413.81          1754.79  1830.6 1749.92             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6862.65  112.51       T
 7413.8111196.38  111.88       T
Left Levee      Station=  137.56      Elevation=  135.81
Right Levee     Station=10921.07      Elevation=  119.74
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 2145.41 3611.76  114.03

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            132.51    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.085      0.043      0.066
  W.S. Elev (ft)            132.47    Reach Len. (ft)          1754.79    1830.60    1749.92
  Crit W.S. (ft)            117.34    Flow Area (sq ft)       127443.40   19006.87   56863.51
  E.G. Slope (ft/ft)      0.000060    Area (sq ft)            142732.50   19006.87   57165.77
  Q Total (cfs)           235000.00     Flow (cfs)             121716.90   53370.94   59912.20
  Top Width (ft)          11058.82    Top Width (ft)           6725.09     551.16    3782.57
  Vel Total (ft/s)            1.16    Avg. Vel. (ft/s)            0.96       2.81       1.05
  Max Chl Dpth (ft)          45.69    Hydr. Depth (ft)           18.95      34.49      15.03
  Conv. Total (cfs)       30460010.0    Conv. (cfs)            15776580.0   6917783.0   7765643.0
  Length Wtd. (ft)          1768.48    Wetted Per. (ft)         6747.18     557.35    3806.23
  Min Ch El (ft)              86.78    Shear (lb/sq ft)            0.07       0.13       0.06
  Alpha                        1.91    Stream Power (lb/ft s)      0.07       0.36       0.06
  Frctn Loss (ft)              0.10    Cum Volume (acre-ft)    282520.30   86354.37   278079.00
  C & E Loss (ft)              0.00    Cum SA (acres)          28287.74    3349.27   29385.96


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 179.10*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  126.73    6.45  126.85    12.9  123.61   36.55   123.4   45.15  123.65
   51.61  127.33   64.51   130.6   75.26  134.63   99.26  134.87   99.93  134.87
   99.93  124.87  109.93  124.67  200.93  120.49  203.93  121.24  227.93  120.76
  233.93  119.26  243.93  119.06  249.93  117.56  256.99  117.59  263.91   117.3
  281.21  115.62  288.13  114.61  298.51  111.42  312.36  110.66  354.56  104.85
  378.72  105.08  408.42   104.9  417.33  105.12  441.09  104.82  470.79  104.82
  497.52  105.11  521.29  104.92  568.81  105.12  595.54  104.45  625.24  105.01
  634.15  104.82   669.8  105.05  687.61  104.76  705.43  105.49  732.17  104.51
  747.02  102.59  761.86  102.45  797.64  102.51  818.74  106.58  833.15  106.81
  850.97  108.25  880.68  109.19  917.97  109.18  928.35  110.18   942.2  110.22
  956.04  111.35  969.88  113.93  997.57  113.89 1007.95  113.36 1023.24  113.28
 1049.97   113.6 1130.16  113.62 1163.68  113.93  1170.6  113.58 1183.63  113.72
 1219.05  113.26 1251.95  113.16  1284.8  113.39 1357.47  113.66 1388.62  113.94
 1412.33  113.92 1443.99   114.4 1461.29  114.27 1475.13  114.59 1495.91  114.59
 1506.29  114.33 1547.81  114.69 1554.73   114.4 1605.39  114.34 1627.41  114.48
 1634.33  114.81 1651.63  114.82 1668.94  115.43 1682.78  114.22 1703.54   114.4
 1750.93  114.43 1798.45  114.31 1840.04  114.89 1866.76  114.71 1905.38  114.73
  1935.4   115.1 1942.32  114.89 1976.66  114.89 1988.54  114.39 1994.48  113.29
 2015.27  112.49    2042  112.44  2062.8  113.78  2071.7  114.91 2087.67  115.33
 2129.21  115.01 2148.92  115.19 2174.19  114.82 2188.03  115.03 2215.72  112.96
 2246.86  110.14 2260.71  109.52 2278.01  107.95 2315.25  108.01 2368.71  108.61
  2419.2   108.2 2442.97  107.83 2505.34  107.76 2543.95  108.04 2567.71   108.4
 2588.51  109.15 2621.17  108.77 2633.05  108.97 2683.54  108.03 2799.38  108.05
 2843.93  108.34 2864.72  108.28 2894.42  108.53 2953.83  108.22 2998.37  108.41
 3019.17  108.28 3069.66  108.37 3129.06  108.66 3209.25  108.71 3253.81  109.02
 3339.94  108.77 3357.76  108.91 3372.61  108.69 3413.13  109.11 3430.43  110.05
 3440.93  109.93 3471.96  110.53 3499.65  110.38 3513.49  110.68 3555.02   110.6
 3586.16  111.24 3606.92  111.22 3648.46  111.58 3675.56  112.16 3714.21  112.27
 3743.87  113.69 3762.66  114.28  3776.5  113.65 3790.35  114.31 3811.11  114.78
 3830.01  114.25 3849.17  114.71 3859.55   112.7 3866.47  113.96 3874.56  114.53
 3892.38  114.77 3901.29  113.68 3921.85  112.62 3933.97   113.2 3963.66  112.04
 3972.58  111.88 3991.06   112.2  4020.1  111.86 4037.92  112.16 4091.38  111.62
  4109.2  112.51 4119.12  112.57 4141.88  111.95 4201.28  112.18 4254.08     112
 4269.59  112.37 4284.44  112.07 4317.11  112.08 4328.99  112.67 4343.85  112.01
 4355.73  112.31 4373.54  112.22 4400.28  112.46 4409.19   112.2 4429.97  112.36
 4453.74  111.98 4504.23  112.62 4519.08  112.58 4539.87  112.96 4548.78   112.5
 4563.64  112.51 4578.48  113.28 4610.52  112.42 4634.75  112.26 4670.56  113.17
 4712.14  112.73  4765.6  112.95 4786.39  111.01 4804.21  110.42 4830.95  110.37
 4849.31  110.61 4856.23  111.07 4880.46  110.91 4901.22  111.69 4921.98  111.57
 4946.21  112.43 4973.89  112.36 4987.73  113.06 5011.96  112.52 5039.65  113.09
 5060.41  113.01 5074.25  113.85 5088.09  113.49 5098.47  114.05 5108.85  113.06
 5129.63  114.28 5148.75   114.8 5171.15  114.36 5188.45  111.61 5205.75  111.97
 5214.09  112.61 5229.98  114.54 5246.77  114.01 5254.21  114.45 5271.51  114.06
 5281.89  114.17 5295.73  112.82 5306.17   111.4 5312.11  109.96 5319.96   109.3
 5329.93  109.45 5356.66  108.99 5389.33  109.11 5398.24  108.88 5424.97  108.96
 5442.79  109.37 5461.84  109.21  5482.6  109.84 5492.98  109.65 5524.14   110.3
 5537.98  111.14  5562.2   110.9  5579.5  109.85 5593.34  110.01 5600.26   111.6
 5610.65   116.7 5614.11  117.67 5621.03  118.07 5631.41  116.77 5641.79  117.11
 5648.72  116.44 5655.64  114.85 5672.94  113.14 5701.19  111.28 5717.93  110.84
  5730.9  110.88 5775.44  109.86 5783.68  110.06 5805.15  109.81 5831.88  110.38
 5855.64  110.23 5864.55  110.83 5876.43  110.42  5900.2  110.25 5909.11  110.84
 5920.98  110.58 5950.69  111.01 5962.57  111.48 5995.24   111.8 6010.09  111.72
    6019  111.04 6069.49  111.91 6087.31  112.52 6128.89  112.76 6143.58   113.3
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 6150.51  112.96 6174.73  113.19 6198.96  114.76 6209.09  114.55 6233.56  115.18
 6250.67  114.14 6268.16  112.36  6292.4  112.11 6313.16  112.41 6347.76  111.95
  6361.6  112.91 6396.21  111.62 6405.11   111.9 6411.05  111.46 6427.36   111.4
 6444.66  110.81 6475.81  110.59 6506.95  110.86 6517.98  110.51 6531.18  109.37
 6545.02   109.2 6565.79  109.85 6583.33  109.55 6621.15  110.51 6638.45  109.16
 6669.46  109.35 6700.75   109.3 6721.51  109.79 6738.81  109.66 6758.56  110.27
 6787.27  110.18 6808.03   110.9 6818.41  112.39 6839.17  112.95 6853.02  113.75
 6870.32  112.83 6884.16  112.63    6898  111.03 6911.86  110.76  6925.7  111.16
 6936.08  112.21 6946.46  111.71 6963.77  110.28 6977.61  110.92 6994.91  112.28
  7005.3  111.79 7060.68  110.74 7074.52  111.79 7100.13  110.79 7112.59   111.1
 7122.97  111.98 7136.81  112.09 7147.65  112.95 7156.56  114.42 7164.51  114.71
 7181.81  113.63  7192.2  113.62 7205.18  111.32 7212.98  107.76 7215.57  105.75
 7233.73  102.91 7249.62  100.98 7274.16    98.7 7316.12   95.66 7343.04   94.78
 7355.71   93.88 7368.77    93.9 7393.71   92.43 7407.96   91.26 7434.88    87.7
 7470.71   90.43 7491.19   96.18 7520.87   97.08 7539.98   97.48 7549.54   98.08
 7559.09   98.11  7578.2   98.81 7597.31  100.54 7622.25  100.72 7642.72  104.91
 7672.82  108.41 7685.36  112.23 7700.51  111.44 7723.25  110.63 7764.94  111.91
 7772.52  111.78 7795.26  110.66 7805.23  110.79 7833.16  109.92 7854.41  110.51
 7874.85  110.71  7903.6  110.21 7925.11  109.56 7940.47  109.65 7949.69  111.35
  7958.9  111.42 7971.19  110.27 7983.47  106.91 7992.69   106.9 7998.82  108.35
 8008.04  112.86 8017.25  115.03 8029.53  114.05 8038.74  113.93 8057.17   113.1
 8069.46  113.38 8094.03  113.36 8178.05  113.73 8207.66  114.17 8216.87  114.96
 8231.12  114.76 8246.27  115.45 8253.72  115.32 8305.93  116.37    8352  116.48
 8413.42  117.38 8447.19  117.12  8468.7  117.36 8487.12  118.34 8493.25  117.94
 8505.54  116.08 8517.83  118.22 8536.25  116.96 8573.09   117.1 8585.38  118.18
 8591.52  116.85 8597.66  118.28 8606.87  117.28 8652.94  117.02  8677.5  117.11
 8735.84  116.91 8766.54  117.15 8800.33  117.08 8895.52  117.17 8966.14  117.07
 9024.48  117.25 9087.66  117.17 9187.23  117.55 9217.94  117.36 9279.35  117.21
 9334.62  117.26 9392.96  117.11 9466.65  117.16 9500.44  117.06 9564.92  117.05
 9592.56  117.15 9681.61  117.03 9727.67  117.65 9739.95  117.36 9819.79  117.06
 9853.57  117.27 9896.55  117.12  9933.4  117.16    9948  116.9910001.05  117.25
 10023.8  117.0710046.53  116.5410065.48  117.4210088.23  118.8510095.81  118.79
10118.54   117.2 10133.7  116.7110179.18  116.7710228.46  116.69 10289.1  116.86
10315.62  116.7210366.37  116.76   10437  116.6210476.91  116.38 10498.4  116.47
10544.47  116.3610556.75   116.510642.73  116.3410728.74   116.410796.96  116.34
10861.39  116.4310880.34  116.2610910.65  116.98 10933.4   117.310946.73  117.25
10962.08  119.2910971.29  119.3310978.94  117.4910989.14  116.6611009.54  116.56
11032.48   116.111045.23  114.8811078.37  114.6111086.02  115.4811101.31  115.59
11114.06  118.4411129.36  118.59 11142.1  118.2911172.69  115.4711185.44  116.18

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3430.43     .12 7249.62    .025 7597.31    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        7192.2 7685.36          1754.79  1830.6 1749.92             .1       .3
Left Levee      Station=   99.93      Elevation=  134.87
Right Levee     Station=10971.29      Elevation=  119.33
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  2246.8 3471.96  110.53

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 178.80*

INPUT
Description: RGV-03,
Station Elevation Data    num=     461
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  129.52    6.45  127.95   22.58  127.98    25.8  129.82   37.63  133.47
   61.63  133.71    62.3  133.71    62.3  123.71    72.3  123.51   163.3  120.35
   166.3   121.1   190.3  120.62   196.3  119.12   206.3  118.92   212.3  117.42
  225.26  117.37  258.03  116.22  268.95   114.4  283.52  114.01  327.92  111.05
  353.34  111.39  384.58  111.01  393.96  111.46  418.96  110.85  437.71  111.12
  450.21  110.84  478.33   111.4  503.33  111.01  518.95  111.46  528.33  111.08
  553.33  111.42  565.83  110.51  581.46  110.16   612.7  111.27  622.08  110.88
  640.83  111.04  659.58  111.64  678.32  110.93  697.07  112.27   725.2  110.19
  740.83  106.27  756.44  105.91  794.08     106  816.28  108.06  831.44   108.2
  840.81  109.07  850.19  110.69  881.44  111.89  920.68  111.03  946.17   111.6
  960.74  112.21   975.3  113.34  993.93  113.59 1015.34  113.06 1031.44  113.03
 1059.55  113.67 1077.24   113.2 1103.31  113.65 1143.93  113.57 1159.55  113.82
 1186.47  113.61 1200.18  113.81 1209.55  113.37 1272.05  112.56  1313.9  112.92
 1328.47  112.83 1383.08  113.34 1431.42  114.03 1440.79  113.86  1474.1  114.43
 1528.72  114.89 1572.04  115.09 1603.28  114.71 1643.91  114.66 1678.28  115.38
 1697.03  115.22 1703.28  115.59 1725.33  114.42 1797.03  114.75 1809.53  114.42
 1822.03  114.76 1847.02  114.62 1862.65  115.18 1890.78  115.43  1918.9  115.34
 1937.65  115.64 1959.52  115.45 1984.53  115.93 1998.39  115.67 2034.52  115.56
 2047.02  114.54 2053.27   112.3 2062.64  111.21 2075.14   110.7 2103.27  110.79
 2112.64  111.68 2122.02  113.81 2125.14   113.4 2134.51  115.61 2140.76   115.3
 2150.14  116.08 2181.39  115.59 2206.38  115.56 2215.76  115.88 2247.01  115.39
    2272  112.97  2318.8  109.91 2344.28   108.8 2362.62  108.47 2390.75   108.7
 2406.38  109.17    2447   109.9 2500.12  109.07 2525.12  108.34 2590.74   108.2
 2631.36  108.75 2656.36  109.47 2678.24  110.99 2712.61  110.21 2725.11  110.62
 2734.48  109.91 2743.86  109.98 2778.23  108.74 2803.23  108.86  2837.6  108.73
 2881.35  108.94 2900.09  108.79 2946.97  109.35 2968.84  109.23 3000.09  109.75
 3062.59  109.12 3109.46   109.5 3131.33  109.23 3184.45  109.42 3246.95     110
 3331.32  110.11  3378.2  110.71 3396.94  110.41 3418.82  110.57 3468.81  110.23
 3487.57  110.51 3503.19  110.06 3531.31  110.52 3546.94  110.35 3564.02  110.87
 3607.72  111.23 3625.06  111.02  3651.4  111.31  3695.1  111.41 3734.43  111.91
  3756.3  111.78 3815.67  112.41 3821.92  113.08 3853.17  112.73 3893.79  114.19
 3903.17  113.97 3912.54  114.56  3931.3  113.59 3937.55  114.26 3964.53   115.2
 3984.41  114.87 4003.17  115.42  4015.5  113.98 4031.28  115.59 4048.53116.2337
 4065.66  113.91 4087.54  113.14 4093.79  114.43 4103.16  114.41 4134.41  113.09
 4162.54  113.92  4184.4  113.37 4203.15  113.96  4259.4  113.25 4268.77  113.56
 4278.15  114.73 4303.15  114.26 4312.53  113.45 4325.02  113.29 4368.77  113.49
 4375.02  113.82 4409.39  113.22 4440.65  113.66  4446.9  114.17 4462.52  113.59
 4490.64  113.84 4496.89  113.48 4509.39  114.67 4525.02  113.48 4537.52  114.07
 4556.26  113.79 4584.39  114.15 4593.76  113.59 4615.63  113.96 4640.63  113.28
 4693.75  114.51 4709.38  114.38 4731.26   115.1 4740.63  114.15 4756.26     114
 4771.88   115.5 4796.88  114.25    4825   113.8 4846.87  114.17 4868.75  115.33
 4912.49  114.36 4968.75  114.54 4978.12  113.34 4990.61  110.98 5009.37  109.77
 5037.49  109.43  5064.1  109.97 5089.58  110.02 5111.42   110.7 5146.86  111.26
 5187.89  111.29 5202.45  111.64 5227.93  111.36 5249.98  111.42 5293.47  112.18
 5308.03     112 5318.96  112.48 5337.48  112.48  5365.6  114.79 5371.85  114.26
 5387.48  114.84 5399.98  114.24 5412.48   112.8 5440.59  113.12  5453.1  114.96
 5462.47  114.76 5474.97  113.69 5487.47  114.35 5511.92  113.88 5531.22  112.72
 5537.47     113 5543.72  111.67 5562.47  112.24 5571.85  111.67 5590.59  111.37
 5624.97  111.76 5634.34  111.35 5662.46  111.57 5681.21  112.37 5687.46  112.08
 5718.71  112.22 5737.46  112.73 5753.08  112.74 5778.08  113.64 5809.33  113.78
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 5821.83  113.07  5839.6   113.2 5846.88  113.97 5857.82  116.53 5868.74  117.22
 5879.66  116.58 5897.86  116.68  5931.2  114.87 5953.07  113.96 5984.32   113.7
 5999.95  112.97 6012.45  112.96 6031.19  112.18 6056.19  112.64 6062.45   112.4
  6081.2  113.54 6090.57  113.66 6103.06  113.05 6115.56  113.23 6124.94  114.38
 6137.44  113.53 6162.44  113.18 6171.82  114.13 6184.31  113.25 6215.56   113.4
 6228.06   114.3 6262.43  114.82 6278.06  114.65 6287.44  113.29  6321.8  114.43
 6340.55  114.64 6359.31  115.65 6374.93  115.31 6403.05   114.6 6451.27  115.15
 6468.68  116.29 6487.42  115.93 6506.17  116.72 6531.18  116.15 6549.58  114.84
 6562.42  114.66 6596.92  115.21 6634.29  114.54 6656.17  115.52 6684.29   114.7
 6693.66  115.28 6699.91  114.45 6709.29  114.84 6740.54  114.55 6765.54     114
 6800.81  114.17 6812.41  114.01 6824.91  112.46 6840.53  111.97 6871.78  112.63
 6881.16  112.22 6903.03   113.2 6920.96  113.16 6934.28  112.02 6971.93  112.44
  7004.7  111.89 7044.74  112.16 7065.52  112.76 7095.72  112.21 7117.56  112.71
 7131.15  113.69  7164.9  114.08 7197.67  113.58 7212.23  112.73  7226.8  112.46
 7252.29  113.16 7281.42  112.21 7314.19  113.36 7343.32  112.95 7365.51  112.23
 7393.63  111.99 7412.39  112.27 7424.89  110.81 7448.92  111.35 7462.38  111.22
 7474.88  111.97 7484.26  114.78 7506.13  115.42 7521.75  114.74 7531.32  112.55
 7538.97  108.39 7552.35  104.47 7562.13103.2716 7566.37102.7521 7576.18  101.55
 7607.28   95.87 7622.83   93.86 7651.87   92.41 7680.75   90.53 7700.59   88.63
 7729.92   90.77 7737.26   90.88 7749.48   92.33 7759.25   94.09 7788.59   95.52
 7808.14   96.21 7817.92   97.36  7827.7   97.38 7850.5899.25404  7866.8  102.05
 7892.32   102.4 7913.28  104.72 7924.03105.4948 7944.08  106.94  7956.9  112.57
 7964.08112.3779 7971.03   111.1 7992.25  109.65 8009.92  110.79 8016.99  110.77
 8031.12  112.27 8038.19     112 8059.41  109.74 8073.55  110.05 8094.75  108.48
 8112.43  109.13 8133.64  110.32 8154.84  109.47 8180.51  108.97 8194.84  109.02
 8203.44  109.87 8223.48  109.31 8234.93  107.59 8249.26  108.26 8257.85  110.48
 8266.44  111.54  8277.9  111.01 8303.68  110.55 8315.13   110.7 8416.41  110.82
  8465.9  111.77 8480.03  113.62 8578.64  114.29 8635.93  114.95 8667.43   114.8
 8687.48  114.99 8704.66  115.52 8721.85  114.34  8733.3  115.38 8750.48   114.8
 8784.85  114.98  8796.3  115.53 8802.03  114.87 8807.76  115.58 8816.35  115.08
 8844.12  115.16 8925.18  115.11 9042.06  115.49 9158.71  115.58 9205.83  115.84
 9264.75  115.88 9314.24   116.2 9349.58  116.66 9413.21  116.35 9549.49  116.22
 9618.22  116.28 9709.87  116.12  9818.7  116.15 9861.65  116.48 9897.47  116.18
 9947.57  116.09 9975.23  116.2110019.17  116.0210045.93  116.0810067.14  115.85
10102.49  116.1110113.09  115.7710116.63  116.4310137.84  116.1210159.04  114.96
10176.72  116.7310183.79  118.0810197.93  119.74   10205   119.6 10226.2  116.42
10240.34  115.5510275.69   115.410282.75  115.6410328.71  115.5810385.27  115.93
   10410  115.7110473.64  115.9210560.43  115.5610623.44  115.5110650.37  115.73
10742.28  115.5410770.55  115.77 10795.3  115.6210805.91  115.9110858.92  115.66
10919.01  115.9810936.69  115.6210964.96  117.0410986.17  117.7510998.61  117.78
11012.93  118.8611021.52  118.9211034.26  117.1811048.84  116.6611074.34  114.94
11098.01   114.6 11114.4  114.9611123.51   116.311143.54  116.19 11165.4  114.74
11174.51  115.08

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154  7956.9    .066 7992.25    .015 8223.48    .066 8266.44    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7521.75  7956.9          1754.79  1830.6 1749.92             .1       .3
Left Levee      Station=    62.3       Elevation=  133.71
Right Levee     Station=11021.52       Elevation=  118.92
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 6812.41 7521.75  114.01  7956.9   10000  112.57

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 178.5

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     462
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   132.3      24  132.54   24.67  132.54   24.67  122.54   34.67  122.34
  125.67  119.93  128.67  120.68  152.67   120.2  158.67   118.7  168.67   118.5
  174.67     117  203.33  117.24  226.29  117.91  236.13  117.39     305  117.25
  327.96   117.7  360.75  117.13  370.59  117.79  396.83  116.88  416.51  117.28
  429.62  116.86  459.14   117.7  485.38  117.11  501.77  117.78  511.61   117.2
  537.85  117.71  550.97  116.37  567.37  115.86  590.32  116.76  600.16  117.53
     610  116.93  629.68  117.17  649.36  118.23  669.03  117.09  688.71  119.05
  718.23  115.86  734.63  109.95  751.02  109.37  829.73  109.59  839.57  110.79
  849.41  113.12  865.81  114.15  882.21  114.59  924.84  112.83  967.48  113.08
  987.15   112.6 1000.27  113.24 1013.39  112.76 1039.63  112.77 1049.47  113.43
  1059.3  113.14 1069.14  113.74  1092.1  112.86 1115.06  113.67 1138.01  113.67
 1147.85  114.15 1157.69  113.53 1174.09  113.88 1203.61  113.63 1216.73   113.9
 1226.56  113.22 1239.68  113.24 1272.48  112.25 1292.16  111.96 1321.67  112.23
 1347.91  112.17 1400.38  112.83 1459.42  114.11 1469.25   113.8 1515.17  114.68
 1531.57  114.63 1564.36  115.25    1607  115.59 1639.79  115.08 1682.43  114.98
  1718.5   115.9 1738.18  115.47 1744.74  115.85 1757.86  114.81 1774.26  114.51
 1843.13  115.07 1856.25  114.55 1869.37  115.16  1895.6  114.93    1912  115.74
 1931.68  115.57 1941.52  115.98 1971.03  115.97 1990.71  116.48 2013.67  116.16
 2039.91  116.77 2046.46   116.5 2092.38  116.23  2105.5  114.68 2112.06  111.32
 2121.89  109.67 2135.01  108.91 2164.53  109.13 2174.37  110.45 2184.21  113.64
 2187.49  113.01 2197.32  116.32 2203.88   115.8 2213.72  116.84 2246.52  116.06
 2272.75   116.1 2282.59  116.57 2315.39  115.76 2341.62  112.14 2354.74  111.06
 2384.26  109.78 2436.73  109.04 2466.25  109.39 2482.65  110.09 2525.28  111.19
 2581.03  109.95 2607.27  108.85 2676.14  108.64 2718.77  109.47 2745.01  110.55
 2767.97  112.82 2804.04  111.66 2817.16  112.27    2827  111.21 2836.84  111.31
 2853.23  110.19 2872.91  109.45 2899.15  109.63 2935.22  109.44 2981.14  109.75
 3000.81  109.52 3050.01  110.37 3072.96  110.19 3105.76  110.96 3171.35  110.02
 3220.54  110.59  3243.5  110.19 3279.58  110.53 3299.25  110.47 3364.84  111.34
  3387.8  111.06 3397.64  111.39 3423.88  111.28 3453.39   111.5 3502.59  112.41
 3522.26  111.96 3545.22   112.2 3597.69  111.68 3617.37   112.1 3633.77  111.43
 3663.28  112.02 3679.68  111.54 3699.36  111.71  3709.2  111.32 3719.04  111.92
 3751.83  111.92 3761.67  111.61 3814.14  112.25 3827.26  112.15 3876.46  112.55
 3899.41  112.29 3925.65  112.39 3961.72  112.95 3968.28     114 3978.12  113.39
 3987.96  113.76 4001.08  113.35 4007.64  113.88 4043.71  114.69 4053.55  114.13
 4063.39  114.84 4083.07  113.52 4089.63  114.42 4132.26  116.21 4138.82   115.5
  4158.5  116.12 4178.18   114.8 4188.01  116.65 4201.13  116.93 4207.69  117.81
 4217.53   115.3 4224.09  114.56 4247.05  113.69 4253.61  115.65 4263.44  115.93
  4286.4  114.51 4296.24  114.29 4325.76  115.71 4348.71  114.89 4368.39  115.77
 4378.23  115.11 4388.07  115.55 4427.42  114.89 4437.26   115.3  4447.1  116.95
 4473.34   116.2 4483.18  114.94 4496.29  114.65 4542.21  114.99 4548.77  115.46
 4584.84  114.42 4597.96  115.06 4617.64  115.21  4624.2  115.97  4640.6   115.1
 4656.99     115 4670.11  115.49 4676.67  114.89 4689.79  116.66 4706.19  114.95
 4719.31  115.83 4738.98  115.36  4768.5  115.83 4778.34  114.98 4801.29  115.57
 4827.53  114.57 4853.77  115.61 4883.28  116.39 4899.68  116.19 4922.64  117.25
 4932.48  115.79 4948.88   115.5 4965.27  117.72 4971.83  117.73 4991.51  115.89
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 5021.03  115.35 5043.98  115.78 5066.94  117.49 5093.18  116.66 5103.02  116.81
 5112.85  115.98 5135.81  116.25 5171.89  116.12 5181.73  114.35 5194.84  110.95
 5214.52  109.13 5244.04  108.49 5253.88  108.93 5286.67  108.84 5358.82  110.62
 5375.22  110.25 5457.21  110.18 5467.05  109.96 5493.29  110.59 5526.08  110.45
 5558.88  111.58 5588.39  114.53 5594.95  113.72 5611.35  114.94 5624.47  114.75
 5637.59  113.86 5644.15  114.13  5667.1  113.63 5680.22  115.63 5690.06  115.07
 5703.18  113.36  5716.3  114.27 5729.42  114.36 5742.53  113.55 5762.21  113.41
 5768.77   114.6 5775.33  113.38 5781.89  114.44 5795.01  115.02 5804.85  114.17
 5824.52  113.76 5850.76  113.95  5860.6  114.42 5870.44  113.82 5899.95  114.19
 5919.63  115.37 5926.19  114.93 5958.99  114.78 5978.66  115.69 5995.06  115.53
  6021.3  116.27 6031.14  115.86 6054.09  116.75 6067.21  116.17 6080.33  116.78
 6086.89  116.32 6139.36  116.42 6155.76  117.47    6182  117.16 6195.12  117.37
 6204.95  116.64 6237.75  116.52 6254.15  115.44 6267.27  115.61 6286.94   114.5
 6313.18  115.33 6319.74  114.99 6339.42  116.76 6349.26  116.94 6362.37  115.99
 6375.49  116.23 6385.33  117.94 6398.45  116.63 6424.69  116.11 6434.53  117.41
 6447.64  115.91 6480.44   115.8 6493.56  117.12 6529.63  117.84 6546.03  117.58
 6555.87  115.54 6591.94  117.16 6611.62  117.37  6631.3  118.79 6637.86  117.88
  6647.7  118.13 6677.21  116.43 6739.53  117.27 6746.09  118.13 6765.76   117.3
 6785.44  118.26 6798.56  117.71 6811.68  118.15 6818.24  117.56 6844.47  117.07
 6883.83  118.08  6919.9  117.09 6942.86  118.36 6972.38  117.79 6982.21  118.66
 6988.77  117.43 6998.61  118.14 7031.41  118.27 7057.65  117.41 7106.84  117.51
 7119.96  115.49 7136.35  114.75 7169.15  115.43 7178.99  114.89 7201.95  116.33
 7221.62  115.78 7234.74  114.65  7274.1  115.54 7306.89  114.52 7329.85   114.1
 7372.48  115.25 7395.44  114.21  7418.4  114.29 7441.36  114.88 7474.15  114.41
 7520.07  114.55  7546.3  114.07 7611.89  114.17 7647.97  114.61 7664.37  114.46
 7687.32  113.32 7703.72  113.78 7716.84  112.63 7736.52   113.2 7749.64  110.84
 7762.75  111.01 7788.99  110.39 7802.11  110.98 7811.95  115.13 7834.91  116.77
  7851.3  115.85 7857.86  113.63 7870.98  106.04  7886.3  103.45  7906.3   95.55
  7916.3   92.55  7946.3   89.95  7966.3   89.55  7996.3   91.55  8016.3   90.95
  8026.3   91.95  8046.3   92.95  8056.3   93.95  8076.3   94.95  8086.3   96.65
  8096.3   96.65  8116.3   98.55  8136.3  103.55 8212.05  105.12 8215.33  105.47
 8228.45  112.92    8235  112.68 8241.56  110.77 8261.24  108.67 8277.64  110.29
  8284.2  110.13 8297.31  112.62 8303.87  112.21 8323.55  108.82 8336.67  109.38
 8356.34  107.05 8372.74  107.87 8392.42  109.92 8412.09  108.73 8431.77  108.39
 8471.12  108.39 8530.16  107.93  8585.9   108.1 8654.77  107.91 8700.69  108.79
  8713.8  111.78  8746.6  111.96    8763  111.74 8854.82  112.52 8881.06  112.44
 8920.41  112.72 8949.93  112.53 8992.56  112.87 9038.47  112.89 9051.59  113.22
 9136.85  113.18 9235.24  113.83 9343.46  114.08 9412.33  114.62 9441.85  114.59
 9487.76  115.04 9520.55  115.78 9579.58  115.38 9681.25   115.3 9769.79  115.41
  9832.1  115.17 10009.2  115.3110028.87  115.0510101.02  115.1710137.09  114.92
10166.61  114.9810186.29   114.710219.08  115.0810228.92   114.6 10232.2   115.6
10251.88  115.1610271.55  113.3710287.95  116.0510294.51  118.0910307.63  120.64
10314.19  120.4110333.86  115.6510346.98  114.3810379.78  114.1410386.33   114.5
10428.97  114.4810481.44  114.9910504.39   114.710563.43  115.1710602.78  114.87
10665.09  114.66   10711  114.67 10727.4  114.9910812.67  114.74 10838.9   115.1
10861.86  114.85 10871.7  115.2710920.89  114.9810976.64  115.5410993.04  114.98
11019.27  117.0911038.95  118.2111071.74  118.5111088.14  116.7511097.98  115.15
11134.05  114.1411163.57  113.99

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154  7851.3    .066  7886.3    .015  8136.3    .066    8235    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        7851.3 8228.45         1087.82    1400 1513.92             .1       .3
Left Levee      Station=   24.67      Elevation=  132.54
Right Levee     Station=11071.74      Elevation=  118.51
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7664.37 7811.51  114.94    8235 8854.82  112.52

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            132.08    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                 0.154      0.037      0.061
  W.S. Elev (ft)            132.00    Reach Len. (ft)          1087.82    1400.00    1513.92
  Crit W.S. (ft)            118.73    Flow Area (sq ft)       139070.40   12814.49   51933.30
  E.G. Slope (ft/ft)      0.000104    Area (sq ft)            139070.40   12814.49   51933.30
  Q Total (cfs)           235000.00     Flow (cfs)             92986.85   54840.95   87172.20
  Top Width (ft)          11138.90    Top Width (ft)           7826.63     377.15    2935.12
  Vel Total (ft/s)            1.15    Avg. Vel. (ft/s)            0.67       4.28       1.68
  Max Chl Dpth (ft)          42.45    Hydr. Depth (ft)           17.77      33.98      17.69
  Conv. Total (cfs)       23047400.0    Conv. (cfs)             9119595.0   5378473.0   8549328.0
  Length Wtd. (ft)          1316.06    Wetted Per. (ft)         7849.39     384.91    2955.26
  Min Ch El (ft)              89.55    Shear (lb/sq ft)            0.11       0.22       0.11
  Alpha                        4.13    Stream Power (lb/ft s)      0.08       0.92       0.19
  Frctn Loss (ft)             0.13    Cum Volume (acre-ft)    265137.30   84350.13   271412.10
  C & E Loss (ft)             0.00    Cum SA (acres)           27408.43    3290.75   28981.16


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 178.23*

INPUT
Description: RGV-03,
Station Elevation Data    num=     463
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  132.95      24  133.19   24.67  133.19   24.67  123.19   34.67  122.99
  125.67  117.27  128.67  118.02  152.67  117.54  158.67  116.04  168.67  115.84
  174.67  114.34  178.77  114.03  211.46  113.92  234.35  114.49  246.35  114.39
  262.85  115.02  282.65  116.58  319.38116.6406  328.85  116.82  368.45   116.1
  378.22  116.56  404.38     116     424  116.31  437.07  116.03  464.15  116.58
  492.66   116.1     509   116.5  518.81  116.09  544.97  116.43  558.05  115.56
   574.4  115.28  607.09  116.37   616.9  115.99  636.52  116.14  656.14  116.82
  675.76  116.06  695.38  117.36  724.81  115.28  741.16  111.33   757.5  110.83
  790.84  110.98  835.97  110.94  845.78   111.8  855.59  113.31  871.94  113.93
  888.29  114.16  906.34  113.51  922.84  112.13  936.04  111.46   973.3  111.66
  992.91  111.37 1005.99  112.18 1040.45112.0571 1074.66   112.6 1097.55  112.05
 1120.44  112.63 1143.32  112.78 1153.13  113.13 1162.94  112.76 1200.04  112.61
  1221.8   112.8  1231.6  112.41 1244.68  112.55 1256.14  112.11    1297  111.49
 1325.44  111.72 1352.58  111.66 1398.04  112.01 1463.76  112.97 1473.56   112.8
 1516.84  113.44 1553.14  113.65 1592.74  114.42 1629.04  113.96 1648.84  114.08
 1665.34  113.76 1678.54   113.9 1698.34  114.75 1728.04  114.36 1748.22   114.7
  1761.3   113.1 1777.65  112.63 1846.31  112.98 1859.39  112.65 1883.14  113.12
 1898.62  112.86 1914.97  113.39 1939.24  113.59 1965.64  113.53 1998.64  113.86
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 2016.33  113.69 2042.49   114.1 2054.74  113.87 2094.81  113.71 2107.89  112.69
 2114.43  110.46 2124.23  109.38 2137.31  108.88 2166.74  109.01 2176.55  109.89
 2186.36  111.98 2189.63  111.55 2199.43  113.77 2205.97  113.45 2215.78  114.18
 2248.48  113.65 2274.63  113.68 2284.44  113.99 2317.14  113.51 2343.29  111.01
 2356.37  110.29  2385.8  109.51 2438.11  109.02 2467.24  109.15  2483.9  109.68
  2526.4  110.43 2581.98  109.59 2608.14  108.85  2676.8  108.77 2718.03  109.27
 2737.83  109.95 2747.73  111.61 2757.63   112.5 2774.13  112.78 2804.32  112.26
  2817.4  112.45 2827.21  111.56 2837.02  111.62 2863.23  110.57 2916.03   110.4
 2949.03  110.43 2975.43  111.06 3000.49   110.8 3061.23  111.59 3074.43  111.28
 3087.63  111.69 3133.83  111.77 3166.83  110.56 3183.33   111.4 3189.93  110.98
 3213.03  110.95 3229.53  109.63 3242.45  109.48 3298.03  109.67 3363.42  110.25
 3386.31  110.06 3396.12  110.28  3451.7  110.36 3500.75  110.96 3520.37  110.66
 3552.93  111.14 3595.57   110.8 3615.19  111.05 3631.54  110.62 3660.96  111.06
 3677.31  110.73 3696.93   110.8 3706.74  110.52 3716.55  110.93 3749.24  110.95
 3759.05  110.75 3811.36   111.2  3873.5  111.36 3922.54  111.26  3958.5  111.65
 3965.04  112.35 3974.85  111.95 3997.74  111.94 4004.28  112.31 4040.24  112.93
 4050.05  112.68 4059.86  113.57 4079.48  113.56 4086.02   114.4 4113.93  115.26
 4135.06  115.07 4154.68  115.42  4174.3  114.58  4184.1  115.89 4197.18  116.03
 4203.72  116.62 4213.53  114.97 4220.07   114.5 4242.97     114 4249.51  115.29
 4259.31  115.43 4292.01  114.26 4321.44  115.22 4344.32  114.71 4363.94  115.44
 4373.75  115.01 4384.53  115.18 4422.79  114.89  4432.6   115.2 4442.41  116.19
 4468.57   115.7 4478.38  114.85 4491.45  114.63 4537.23  114.85 4543.77  115.27
 4579.73  114.42 4592.82  114.88 4612.44  115.02 4618.98  115.55 4651.67  114.97
 4664.75  115.43 4671.29  115.17 4684.37  116.28 4700.72  114.91  4713.8  115.45
 4733.41  115.19 4762.84  115.44 4772.65  114.91 4795.53  115.27 4821.69  114.62
 4856.44  115.59 4877.27   115.8 4893.62  115.67 4916.51  116.37 4926.32   115.4
 4942.68  115.22 4959.02  116.73 4965.56  116.75 4985.18  115.53 4998.34  115.29
 5037.49  115.41 5060.38  116.71 5086.54  116.01 5096.35  116.11 5106.15  115.55
 5129.04   115.9 5165.01  115.68 5174.82   114.6 5187.89  112.28 5207.51  110.89
 5236.94  110.17 5265.65  110.01 5298.65  110.51 5311.85   111.1 5364.65  111.05
 5387.75  109.51 5449.47  109.48 5459.28  109.33 5485.44  109.75 5518.13  109.66
 5550.83  110.41 5580.25  112.38 5586.79  111.84 5603.14  112.65  5629.3  111.93
 5635.84  112.11 5658.73  111.78 5671.81  113.11 5681.62  112.74  5694.7   111.6
 5707.78   112.2 5720.86  112.26 5733.93  111.72 5753.55  111.63 5760.09  112.42
 5766.63  111.61 5786.25  113.79 5806.86  115.64 5829.96  114.61 5851.64  114.89
 5861.45  114.44 5890.87  114.85 5910.49  115.63 5917.03  115.33 5949.73  115.12
 5969.34  115.71 5985.69  115.65 6011.85  116.11 6021.67  115.85 6044.55  116.44
 6057.63  116.04 6070.71  116.49 6077.25  116.21 6129.56   116.2 6145.91  116.89
 6172.07  116.68 6185.15  116.87 6194.95  116.38 6227.65   116.3    6244  115.74
 6257.08  115.72 6272.17  115.16 6309.39  115.77 6321.67  116.51 6338.82  116.67
  6351.9  116.07 6364.98   116.1 6374.79  117.15 6387.87  116.35 6414.03  116.02
 6423.84  116.85 6436.91  115.83 6469.61  115.86 6482.69  116.65 6518.65  117.22
    6535  117.03 6544.81  115.71 6580.77  116.88 6600.39  116.88 6620.01  117.75
 6626.55  117.19 6636.36  117.31 6665.78  116.15 6727.92  116.83 6734.46   117.5
 6754.07  116.88 6773.69  117.37 6786.77  116.97 6799.85  117.33 6806.39  116.97
 6832.54  116.58 6871.78  117.23 6907.74  116.55 6930.63  117.41 6960.06     117
 6969.86  117.62  6976.4  116.82 6986.21  117.25 7018.91  117.32 7054.29  116.89
 7094.12  117.04 7110.39  115.53 7133.49  116.11 7143.39  115.88 7166.05  114.09
 7188.94  114.19 7208.55  113.77 7221.63  113.04 7260.87   113.6 7278.69  113.18
 7316.45  112.66 7364.49  113.31 7381.84  112.69 7427.62  113.26  7456.9  112.93
  7476.7  113.15  7516.3  113.08    7546  113.59  7572.4  112.58  7585.6  111.83
  7615.3  111.62 7633.61  111.71  7664.8  111.33 7672.84  110.96 7689.19  111.25
 7702.27  110.54 7721.89  110.94 7734.97  109.33  7763.8  109.64 7774.21  109.39
 7787.29  110.16  7797.1  113.48  7806.7  115.16 7819.99  116.25 7836.33  115.63
 7839.86  114.64 7846.94  110.89 7870.02  105.41 7873.33105.1185 7896.25   103.1
 7930.05   96.38 7947.62   93.67 7955.13 93.0989 7986.28   90.73 7998.98   89.98
 8033.22   89.18 8056.33   90.61 8071.73   90.27 8117.94   93.45 8125.64    94.7
 8137.6795.30705 8148.74   96.45 8164.14  100.11 8177.15  101.48 8184.59  100.96
 8192.03  102.02 8214.37  102.89 8225.01  106.07 8227.57108.0017 8235.11  113.69
 8240.62113.5607 8246.19  112.31 8262.82  110.99 8276.68  112.04 8282.23  111.87
 8293.31  113.54 8298.85  113.32 8315.49  111.13 8326.58  111.53  8343.2  109.95
 8357.06  110.44  8373.7  111.85 8389.76   110.8 8406.95   110.6 8462.12  110.64
 8477.63   110.3 8518.98  110.33 8570.68  109.66 8595.43  109.62 8634.24  109.98
 8645.32  111.93 8686.91  111.78 8764.51  112.01 8819.95  112.01  8844.9  111.78
 8880.93   111.9 8919.73  111.81 8930.82  111.97 8979.01  111.82 9086.04  112.14
 9177.51  112.24 9235.71  112.68 9260.66  112.69 9299.47  113.01 9327.18   113.5
 9377.07   113.3    9463  113.25 9537.84  113.37  9590.5  113.28 9650.97  113.34
 9723.34  113.57 9756.81  113.37 9817.79  113.48 9873.23  113.39 9889.86  113.21
 9917.57  113.46 9925.89  113.14 9928.66  113.81 9945.29  113.52 9961.92  112.32
 9975.78  114.11 9992.41   117.2 9997.96  117.0610014.58  113.9110025.67  113.06
10053.39  112.9310058.93  113.1910139.32  113.3710158.71  113.1810208.61   113.6
10240.24  113.5910276.42  113.9310333.34  114.11 10347.2  114.3610384.96  114.16
10419.27  114.2910441.44  114.6810460.84  114.5610469.16  114.8510510.74  114.77
10557.86  114.9810571.72  114.5410602.05   116.610622.74  118.3410638.23  118.97
10656.66  116.75   10682  116.1110702.73  116.03

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154 7836.33    .066 7896.25    .015 8177.15    .066 8235.11    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7836.33 8235.11          1087.82    1400 1513.92             .1       .3
Left Levee      Station=   24.67      Elevation=  133.19
Right Levee     Station=10641.51      Elevation=  119.04
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7110.39 7836.33  115.53 8235.11 8645.32  111.93

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 177.97*

INPUT
Description: RGV-03,
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  129.06   13.12  133.59   37.12  133.83   37.79  133.83   37.79  123.83
   47.79  123.63  138.79  114.01  141.79  114.76  165.79  114.28  171.79  112.78
  181.79  112.58  187.79  111.08  201.73  110.66  234.63  110.65  254.37   111.4
   277.4  113.49  290.56  115.85  318.77115.9255  336.62  116.08  346.49  115.44
  376.06  115.07  385.84  115.33  411.93  115.13  431.49  115.34  458.35  115.15
  471.51  115.52  499.94  115.09  516.23  115.23  526.01  114.98  552.09  115.15
  563.63  114.77  593.24   114.8  603.11  115.13  643.37   115.1  662.93  115.42
  682.48  115.03  702.04  115.67  721.55  114.84  731.38  114.69  747.68   112.7
  763.98   112.3  797.21  112.49  842.21   112.3  861.77   113.5  894.37  113.72
  912.36  113.17  918.94  112.66  928.81  111.09  941.97  110.05  971.58  110.31
  988.03  110.06 1004.48  110.33 1014.35  111.33 1038.46111.4544 1050.84   111.3
 1080.17  111.46 1116.34   111.3 1158.41  112.12 1205.17  111.52 1218.33  111.92
 1236.64   111.6 1251.23  111.86  1261.1  111.32 1301.85  111.03 1330.19  111.22
 1343.35  111.09 1376.25  111.31 1402.57  111.27 1412.44   111.5 1445.34  111.56
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  1458.5  111.83 1474.95  111.69 1488.11  112.32 1494.69  112.05 1521.01  112.24
 1527.59  112.72 1540.75  112.29  1557.2  112.34 1596.68  113.39 1606.55  112.89
 1632.87  112.61 1652.61  113.09 1669.06  112.49 1682.22  112.81 1701.96  114.21
 1724.99  112.89 1748.02  113.76  1754.6  113.25 1761.18  111.62 1777.63  110.77
 1873.04  110.81  1886.2  111.18 1901.64  110.79 1928.97  110.98 1942.13  111.41
    1952  111.03 1961.87  111.37 1968.45  111.08 1981.61   111.3 2037.54  111.19
 2057.28  111.28 2097.23  111.18 2110.27   110.7 2116.79   109.6  2139.6  108.85
 2168.94   108.9 2178.73  109.33 2188.51  110.32 2191.77  110.09 2201.54  111.21
 2217.84  111.52 2234.94   111.3 2276.51  111.26 2286.29   111.4 2318.89  111.27
 2344.96  109.89 2366.54  109.38  2412.6  109.02 2425.76  109.16 2468.53  108.92
 2488.27  109.32 2527.51  109.67 2582.93  109.23 2609.01  108.84 2636.31  108.79
 2718.56   109.1  2738.3  109.66 2748.17  112.45 2758.04  113.24 2767.91  112.67
 2774.49  112.92 2794.23  112.72 2810.68  113.09 2827.41  111.92 2846.87  111.93
 2863.32  111.33 2873.19  111.58 2906.09  111.14 2929.12  111.05 2948.86  111.32
 2975.18   112.4 3000.17  112.09 3024.53  112.22 3060.72   112.9 3073.88  112.33
 3087.04  112.84 3096.91  112.62  3133.1     113    3166  111.05 3175.87  112.44
 3182.45  112.64 3189.03  111.72  3198.9  111.89 3212.06  111.38 3228.51  108.85
  3241.4  108.78 3296.81  108.87    3362  109.16 3450.02  109.21 3498.92  109.52
 3537.77  109.43 3550.93  110.18 3577.25  109.84 3613.01  109.99 3629.31  109.82
 3658.64   110.1 3704.28  109.73 3714.06  109.93 3756.43  109.88 3808.59  110.16
 3840.45  110.07 3870.53  110.17 3919.42  110.13 4000.92  110.73 4047.72  111.29
 4056.33   112.3 4075.89   113.6 4083.91  114.51 4093.78  114.87 4110.23  114.92
  4120.1  114.35 4133.26  114.85 4170.43  114.36  4180.2  115.14 4199.76  115.42
 4216.06  114.45 4238.88   114.3  4245.4  114.94 4271.44  114.67 4287.77  114.24
 4317.12  114.72 4339.93  114.53 4363.56  115.17 4380.01  114.82 4418.16  114.89
 4432.65   115.4  4463.8  115.19 4478.72  114.59 4501.75  114.78 4514.91  114.57
 4532.26  114.71 4538.78  115.09 4560.97  114.48 4574.63  114.41 4607.23  114.84
 4630.05  115.33 4639.93  114.96 4653.09     115 4678.95   115.9 4695.25  114.88
 4712.31  115.13 4732.05  115.04 4745.21  115.33 4766.96  114.84 4789.77  114.98
 4815.85  114.67 4834.04  114.79 4850.49  115.34 4887.57  115.14 4910.39  115.49
 4920.17     115 4936.03  114.91 4942.61  115.55 4965.64  115.75 4991.96  114.92
    5015  115.38 5024.87  114.99 5041.32  115.32 5053.82  115.92  5079.9  115.37
 5103.83  115.14 5123.57  115.56 5133.44  115.31 5158.13  115.25 5172.92  114.52
 5182.79  113.51 5192.66  113.37 5205.82  112.29 5225.56  112.24 5238.72  111.25
 5258.46  111.14 5271.62  111.89 5291.36  111.71 5304.52  112.55  5311.1  112.13
 5320.97  112.32 5330.84  111.73 5347.29  111.43 5357.16  111.78 5363.74   111.3
 5373.61  109.24 5380.19  108.79 5441.73  108.77 5477.59  108.91 5510.18  108.86
 5542.78  109.24 5572.12  110.22 5578.64  109.95 5594.94  110.36 5650.35  109.92
 5663.39  110.59 5686.21  109.83 5712.29  110.17 5744.89  109.85 5751.41  110.25
 5757.93  109.84 5771.71  110.98 5788.16  115.45 5801.32  117.47  5807.9  116.12
 5821.06  115.35 5842.68  115.35 5853.96  115.06 5870.41  115.48 5901.35  115.89
 5940.48  115.46 5985.57  115.93 6012.19  115.84    6035  116.12 6048.04  115.92
 6061.08   116.2 6084.27  116.01 6119.76  115.98 6136.06   116.3 6156.65  116.19
 6175.18  116.37 6184.95  116.11 6232.32  116.09 6261.93  115.56 6278.38  115.81
 6311.28  116.93 6321.15  116.25 6328.39   116.4 6354.46  115.98 6364.24  116.36
 6377.28  116.07 6403.36  115.93 6413.14  116.28 6426.17  115.76 6442.89  115.79
 6452.76  116.14 6462.63   115.9 6492.24  116.51 6523.97  116.48 6533.75  115.88
 6551.46  116.09 6567.91   116.6 6589.16  116.38 6608.73  116.72 6654.36  115.88
 6692.93  116.26  6702.8  116.74 6712.67  116.27 6729.12  116.95 6742.37  116.46
 6774.97  116.23 6788.02  116.51 6820.61  116.09 6850.85   116.4 6895.58  116.01
  6918.4  116.47 6947.74  116.21 6957.51  116.57 6964.04  116.21 7031.81  116.43
 7041.68  116.35 7061.42   116.7 7081.39  116.57 7097.61  115.72 7114.06  117.16
 7120.64  117.27 7130.51  116.59 7153.11  113.29 7169.99     112 7175.93  112.05
 7208.52  111.44 7247.64  111.66  7265.4  111.38 7303.05  111.21 7350.94  111.61
 7373.97  111.12    7397  111.57 7420.04  111.59  7429.9  111.83 7443.07  111.41
 7462.81  111.85 7482.55  111.56 7502.29  111.79 7512.16  112.39  7531.9  113.08
 7541.77  111.93 7558.22  111.02 7571.38  109.51 7600.99  108.85 7637.18  108.63
 7650.34  108.93 7660.21  108.56 7674.67  108.72 7687.71  108.45 7707.27  108.68
 7720.31  107.83 7742.46  108.25 7749.04  108.65 7758.91  108.37 7772.46  109.34
 7791.81   114.5 7804.97  115.72 7821.35   115.4 7826.36  114.14 7831.37  110.51
 7836.38  108.03 7860.37105.7566 7869.06  104.77  7906.2  102.74 7923.14  100.87
  7946.6 97.8594 7966.43   96.27 7979.57   94.74 8033.67   90.86 8060.73   89.66
 8100.15   88.82 8116.35   89.67 8127.16   89.59 8139.05 90.4521 8159.57   91.94
 8181.18   94.36 8194.15   96.83 8201.11   99.05 8206.33   97.82 8211.55   99.73
 8227.22  100.89 8233.82106.0042 8241.77  114.46 8246.23114.2334 8264.41  113.31
 8280.26  113.61 8289.31  114.46 8307.42  113.44 8316.48  113.69 8330.06  112.85
 8341.39  113.02 8354.97  113.77  8368.1  112.84 8382.14  112.81  8427.2  113.08
 8439.87  112.55 8460.99  112.41 8473.64  112.62 8490.53  111.91 8515.88  111.32
  8541.2  111.39  8567.8  111.17 8576.85  112.07 8599.49  111.98 8642.54  111.57
 8719.49   111.3 8748.08  110.97 8810.05  110.72 8849.42  110.45 8878.97  110.53
 8967.64  110.36 9011.55   110.4  9059.1  110.74 9111.17  110.98 9133.81  111.23
 9267.42   111.2 9305.88  111.34  9398.3  111.46 9427.85  111.74 9457.41  111.85
  9474.3  111.68 9508.07  111.84 9593.43  111.72 9625.12  112.02 9638.71  111.87
 9652.29  111.28 9663.61  112.17  9677.2  113.76 9681.73   113.7 9695.31  112.18
 9704.37  111.73 9727.01  111.71 9740.29  111.96 9765.62  111.98 9813.04  111.66
 9845.84  111.89 9879.63  112.29 9909.19  113.14 9972.52  113.76 9997.85  113.47
10027.41  113.8510043.98  114.2610107.62  114.6410154.07  114.1910175.17  115.57
10192.07  118.3510204.73  119.4410215.35  118.3510241.89  118.06

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154 7821.35    .066  7946.6    .015 8194.15    .066 8241.77    .061

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7821.35 8241.77          1087.82    1400 1513.92             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 7804.97  115.72       T
 8241.7710241.89  114.46       T
Left Levee      Station=   37.79      Elevation=  133.83
Right Levee     Station=10211.28      Elevation=  119.57
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 3201.38 3566.27  109.75 5184.17 5803.79  113.48 7132.53 7518.07  112.62

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 177.7

INPUT
Description: RGV-03, elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  127.44   19.68  133.41   26.24  134.24   50.24  134.48   50.91  134.48
   50.91  124.48   60.91  124.28  151.91  110.82  154.91  111.57  178.91  111.09
  184.91  109.59  194.91  109.39  200.91  107.89  209.92  107.45  242.72  107.14
   262.4   108.4   278.8  110.37  285.36  111.57  298.48  115.12  305.04  114.92
  318.16  115.48  331.28  115.11   344.4  115.34  354.24  114.34  383.76  114.04
  449.36  114.43  465.76   114.1  478.88  114.47  485.44  114.25  537.92  113.84
  570.72  113.89  580.56  114.18  600.24  114.04  610.08  114.33   623.2  113.98
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   639.6  114.27  652.72  114.02  711.76  113.98  728.16  113.79  744.56  114.32
  767.51  113.74  803.59  114.01  816.71  113.75  849.51  113.65  856.07  113.84
  905.27  113.23  918.39  112.84  924.95  112.21  934.79  110.06  947.91  108.65
  977.43  108.95  993.83  108.66 1010.23  109.05 1020.07  110.42 1036.47  110.94
 1062.71  110.45 1088.95   110.3 1102.07   110.5 1121.75  110.29 1141.43  110.84
 1174.23  111.23 1184.07  110.82 1210.31  110.43 1223.43  111.02 1233.27  110.55
 1256.23   111.2 1266.07  110.54 1282.47  110.66 1311.99  110.54 1334.95  110.72
 1348.07  110.53 1380.87  110.76 1407.11  110.54 1416.95   110.8 1449.75  110.53
 1462.87   110.8 1479.27  110.59 1492.39  111.48 1498.95  111.02 1525.19  111.05
 1531.75  111.75 1544.87  111.11 1561.27  111.03 1600.63  112.36 1610.47  111.57
 1636.71  111.26 1656.39   112.1 1672.79  111.22 1685.91  111.71 1699.03  113.38
 1705.59  113.67 1715.43   112.4 1728.55  111.39 1735.11  111.55 1751.51  112.82
 1758.07  112.06 1764.63  109.89 1781.03  108.87 1840.07  108.71 1863.03  108.88
 1876.15  108.69 1889.27  109.24 1899.11  108.74 1931.91  108.65 1945.03  109.23
 1954.87  108.55 1964.71  109.06 1971.27  108.64 1984.39   108.9 1997.51  108.55
 2004.07  108.78 2033.59  108.72 2040.15  108.49 2053.27  108.94 2059.83  108.68
 2102.47  108.66 2135.27  108.83 2181.19  108.77 2197.59  108.59 2223.83   108.9
 2236.95  108.74 2259.91  108.87 2299.27   108.8 2312.39  109.12 2341.91  108.77
 2368.15  108.73 2381.27  109.01 2414.07  108.82 2427.19  109.13 2469.83  108.69
 2489.51   108.9 2505.91  108.76 2532.15  108.94  2637.1   108.8 2663.34  109.06
  2719.1  108.93 2738.78  109.37 2748.62  113.29 2758.46  113.98  2768.3  112.63
 2774.86  113.07 2794.54  113.08 2810.94  113.66 2820.78  112.44  2833.9  112.12
 2847.02  112.58 2863.42  112.08 2873.26  112.65 2906.06  111.91  2915.9  112.13
 2929.02  111.84 2938.86  112.36  2948.7  112.21  2965.1  113.41 2974.94  113.74
 2988.06  113.38 3024.14  113.36  3047.1  113.66 3060.22  114.21 3073.34  113.38
 3086.46  113.98  3096.3  113.54  3112.7   113.6 3132.38  114.22 3165.18  111.54
 3175.02  113.62 3181.58  113.87 3188.14  112.45 3197.98  112.66  3211.1  111.82
  3227.5  108.07 3535.82  108.07 3548.94  109.22 3575.18  108.84 3585.02  109.11
3601.42   108.9 3663.74  109.17 3706.38   108.9 3722.78  109.02 3775.26  109.02
3821.18  109.16 3837.58  108.96 3935.98  109.01 3985.18  109.09  4031.1  109.34
4044.22  109.83 4067.18  113.06  4080.3  114.53 4090.14  114.86 4106.54  114.58
4116.38  113.52 4122.94  113.53  4129.5  114.49 4139.34  113.99 4165.58  114.11
4175.42  114.39 4191.82  114.19 4237.74  114.64 4254.14  114.37 4267.26  114.54
4280.38  114.21 4323.02  114.23 4349.26  114.47  4359.1     115  4375.5  114.46
4427.98  115.06 4434.54  114.57 4467.35  114.73 4473.91  114.47 4496.87  114.79
4509.99  114.42 4529.67  114.59 4532.95  114.92 4555.91  114.31 4611.67  114.72
4624.79  115.45 4634.63  114.92 4647.75  114.88 4660.87  115.76 4677.27  115.45
4696.95  114.49 4706.79  114.83 4726.47  114.85 4739.59  115.17 4749.43  114.64
4765.83  114.81 4792.07  114.62 4808.47  114.74 4828.15  114.53 4844.55  115.09
4860.95  114.62 4929.83  114.61 4936.39  115.16 4949.51  114.63 4959.35  115.06
4985.59  114.56 5008.56  115.33  5018.4  114.65  5034.8   114.7 5041.36  115.23
5074.16  114.71 5097.12  114.69  5116.8  115.22 5126.64  114.86  5149.6  114.76
   5166  115.26 5175.84  114.88 5185.68  115.12  5198.8  113.93 5205.36  114.33
5218.48  114.07  5231.6  112.43 5251.28  112.27  5264.4  113.41 5284.08   112.9
 5297.2  114.01 5303.76  113.29  5313.6  113.46 5323.44  112.45 5339.84  111.88
5349.68  112.51 5356.24  111.82 5366.08  108.74 5372.64  108.07 5753.13  108.07
5762.97  109.09 5772.81  112.93 5779.37   116.1 5789.21  119.03 5792.49  119.27
5799.05   117.3 5812.17   116.1 5844.97  115.67 5861.37  116.19 5897.46  116.15
5933.54  115.77  5956.5  115.75 5976.18     116  5989.3  115.78 6018.82  115.89
6031.94  115.73 6058.18  115.98 6074.58  115.84 6146.74  115.67 6166.42  115.89
6192.66  115.76 6209.06  115.88 6222.18  116.37 6238.58   115.9  6251.7  115.96
6261.54  116.64  6268.1  116.28  6284.5  116.65 6287.78  117.32  6300.9  117.35
6310.74  115.97 6327.14  116.35 6353.38  115.57 6379.62  116.01 6412.43  115.59
6425.55  115.98 6432.11  115.76 6441.95   116.3 6451.79  115.76 6464.91  115.69
6481.31     116 6520.67  115.92 6527.23  116.35 6540.35  115.96 6556.75  116.36
6592.83  115.56 6602.67  115.82 6628.91  115.49 6681.39  115.91 6691.23  116.57
6701.07   115.8 6717.47  116.49 6740.43  115.71 6760.11  115.44 6783.07  115.79
6799.47  115.58 6838.83  115.68 6858.51  115.32 6874.91  115.56 6888.03  115.41
6910.99  115.55 6930.67  115.36 6953.64  115.63 6966.76  115.34 7002.84  115.44
7019.24  115.93 7029.08  115.81 7048.76  116.32 7084.84  115.91 7101.24  118.33
 7107.8  118.43 7117.64  117.31 7130.76  114.12 7147.16  111.28     7157  110.02
 7173.4   109.7 7209.48  109.91 7252.12  109.58 7265.24  109.88 7327.56  109.59
 7337.4  109.92 7360.36  109.57 7383.32  110.14 7406.29  109.99 7416.12  110.42
7429.25  109.88 7448.93  110.54 7468.61  110.08 7488.29  110.51 7498.13  111.49
7517.81  112.58 7527.65  110.84 7544.05  109.47 7557.17  107.19 7586.69  106.08
7622.77  105.76 7635.89  106.54 7645.73  106.16 7668.69  106.21 7678.53  106.53
7711.33  106.28 7727.73  106.98 7734.29  107.66 7744.13  107.36 7753.97  107.92
7767.09  110.06 7776.93  113.84 7790.05   115.2 7806.38  115.18 7812.86  113.63
7819.34  108.54 7825.82  105.17 7829.07  105.12 7849.07  104.88 7891.07  103.25
7917.07  102.36 7938.07  100.96 7961.07   98.75 7978.07   97.84 7994.07   97.35
8011.07   95.85 8040.07   93.93 8060.07   92.35 8081.07   90.99 8116.07   89.55
8150.07   88.65 8167.07   88.45 8184.07   88.95 8203.07    90.6 8221.07   93.43
8225.07   96.63 8228.07   94.68 8231.07   97.45 8240.07   98.88 8248.43  115.23
8271.24  115.74 8281.02  115.19  8290.8  115.62 8313.67  115.95 8320.22  115.54
 8336.6   115.7 8346.43  114.87 8392.28  115.53 8402.11   114.8 8418.49  114.62
8428.31  114.91 8441.41  113.82 8461.07  112.99 8480.72  113.06 8503.65  112.28
8533.12  111.89 8559.33  111.29 8624.84  110.52 8641.21  110.15 8680.52  109.71
8696.89  109.27 8719.82  109.08 8742.75  109.15 8811.53  108.57 8837.74  108.51
8903.24  108.93  8949.1  108.96  8975.3  109.18 9044.09  109.13 9116.14  109.55
9145.62  109.58 9168.55  109.98 9191.48  110.13 9204.58   109.9 9230.78  110.21
9260.26  110.07 9273.36  110.22 9351.97  110.23 9378.18  110.46 9391.28  110.33
9410.93  110.69 9430.58  110.69 9456.79  110.08 9492.81   110.3 9519.02  110.99
9541.95  112.34 9558.32  112.72 9591.08  113.15 9610.73  112.77 9620.55  113.29
9633.66  113.39 9650.03  113.96 9669.69  114.03 9695.89  114.42 9731.92  113.58
9748.29  114.53  9761.4  118.35 9771.22   119.9 9781.05   120.1

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  318.16     .12 7938.07    .025 8240.07    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7806.38 8248.43          2073.72    1400 1374.03             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 7806.38  115.18       T
 8248.43 9781.05  115.23       T
Left Levee      Station=   50.91      Elevation=  134.48
Right Levee     Station= 9781.05      Elevation=   120.1
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 3121.13 3554.93   109.4 5205.63 5780.28  114.37 7076.06 7515.49  112.68

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            131.54    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                 0.119      0.062      0.066
  W.S. Elev (ft)            131.48    Reach Len. (ft)          2073.72    1400.00    1374.03
  Crit W.S. (ft)            119.10    Flow Area (sq ft)       124972.10   15338.09   24760.29
  E.G. Slope (ft/ft)      0.000184    Area (sq ft)            146585.60   15338.09   30859.09
  Q Total (cfs)           235000.00     Flow (cfs)             135348.30   51594.45   48057.26
  Top Width (ft)           9730.14    Top Width (ft)           7755.47     442.05    1532.62
  Vel Total (ft/s)            1.42    Avg. Vel. (ft/s)            1.08       3.36       1.94
```

Max Chl Dpth (ft)	43.03	Hydr. Depth (ft)	16.11	34.70	16.16	
Conv. Total (cfs)	17327110.0	Conv. (cfs)	9979552.0	3804182.0	3543376.0	
Length Wtd. (ft)	1803.06	Wetted Per. (ft)	7773.71	458.53	1545.04	
Min Ch El (ft)	88.45	Shear (lb/sq ft)	0.18	0.38	0.18	
Alpha	1.94	Stream Power (lb/ft s)	0.20	1.29	0.36	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	254425.50	82981.83	267017.20	
C & E Loss (ft)	0.01	Cum SA (acres)	26824.40	3251.26	28748.25	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 177.40*

INPUT
Description: RGV-03,
Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	124.44	9.8	125.8	19.61	127.64	23.81	127.63	26.61	126.41
56.01	128.38	61.62	130.87	75.62	134.05	99.62	134.29	100.29	134.29
100.29	124.29	110.29	124.09	201.29	111.63	204.29	112.38	228.29	111.9
234.29	110.4	244.29	110.2	250.29	108.7	255.04	108.52	286.33	108.49
305.74	109.7075	327	111.95	339.52	114.47	358.29	115.18	370.81	114.92
383.32	115.16	392.71	114.55	420.87	114.34	453.82	114.58	483.45	114.55
499.09	114.34	511.61	114.6	537.33	114.37	555.49	114.41	567.93	114.13
636.77	114.48	649.28	114.23	664.93	114.41	677.44	114.26	733.76	114.27
749.41	114.13	765.05	114.46	786.95	114.06	821.36	114.25	833.88	114.08
896.81	114.06	930.88	113.58	937.13	113.16	946.52	111.73	959.04	110.78
996	110.86	1018.49	111.12	1027.87	111.97	1043.52	112.28	1068.55	111.9
1124.87	111.94	1169.13	112.69	1190.92	111.98	1205.44	109.28	1216.34	109.49
1234.49	110.55	1253.15	110.65	1262.54	110.18	1285.32	110.34	1306.35	110.19
1328.25	110.29	1340.76	110.15	1372.05	110.31	1397.08	110.18	1406.47	110.35
1437.76	110.13	1450.28	110.31	1465.92	110.19	1478.44	110.81	1484.69	110.51
1509.73	110.51	1515.98	110.97	1528.5	110.54	1544.14	110.5	1581.69	111.41
1591.08	110.87	1616.11	110.63	1634.88	111.2	1650.53	110.62	1663.04	110.96
1675.56	112.07	1681.82	112.25	1691.2	111.4	1703.72	110.74	1725.62	111.72
1731.88	111.22	1738.14	109.75	1753.78	109.06	1810.1	108.94	1844.52	108.99
1857.04	109.38	1866.42	109.04	1913.48	108.96	1920.74	110.15	1929	110.6
1947.77	110.61	1994.71	110.4	2013.48	110.55	2062.35	110.34	2087.77	110.51
2151.15	110.36	2171.29	110.62	2188.7	110.4	2211.22	110.56	2248.15	110.49
2260.67	110.74	2280.22	110.51	2313.86	110.47	2326.37	110.63	2357.66	110.51
2370.18	110.71	2410.85	110.46	2516.23	110.66	2570.69	110.52	2599.74	110.76
2648.64	110.6	2667.42	110.88	2676.8	113.5	2686.19	113.95	2695.58	113.06
2701.83	113.36	2720.61	113.37	2736.25	113.77	2745.64	112.91	2758.15	112.71
2770.67	113.05	2786.31	112.78	2795.7	113.24	2836.38	112.41	2848.89	111.48
2867.67	111.23	2883.31	112.18	2892.7	112.48	2905.21	112.29	2926.53	112.36
2951.95	113.41	2974.05	113.96	2986.57	113.48	2999.08	113.81	3008.47	113.4
3024.11	113.44	3042.89	113.77	3074.18	111.83	3083.56	113.14	3089.82	113.31
3096.08	112.41	3105.46	112.57	3117.98	112.03	3133.62	109.59	3191.59	109.56
3202.48	109.3	3249.69	109.64	3271.47	108.12	3289.63	107.19	3315.05	108.44
3344.1	108.15	3373.14	108.06	3427.74	108.26	3440.26	109.17	3460.29	109.08
3490.32	108.73	3549.77	108.8	3569.22	108.64	3630.95	108.51	3645.47	107.94
3699.96	108.03	3715.6	107.9	3809.47	107.93	3856.4	107.99	3900.21	108.15
3912.72	108.48	3934.63	110.63	3947.14	111.61	3956.53	111.83	3972.17	111.65
3981.56	110.94	3994.08	111.59	4003.46	111.25	4037.88	111.52	4053.53	111.39
4097.33	111.69	4125.49	111.62	4138.01	111.4	4178.68	111.41	4203.71	111.57
4213.1	111.93	4228.75	111.57	4278.81	111.97	4285.07	111.64	4316.36	111.75
4322.62	111.57	4344.53	111.79	4357.04	111.54	4378.94	111.87	4400.85	111.47
4454.04	111.74	4466.55	112.23	4475.94	111.87	4488.46	111.85	4500.97	112.43
4516.62	112.23	4535.39	111.59	4544.78	111.81	4576.06	112.04	4585.45	111.69
4601.1	111.8	4660.55	111.62	4676.19	112.52	4691.83	112.39	4734.77	112.57
4757.54	112.46	4763.8	112.84	4776.32	112.51	4785.7	112.83	4810.73	112.59
4832.65	113.19	4842.03	112.75	4857.68	112.78	4863.94	113.14	4895.22	112.94
4917.13	112.97	4935.9	113.4	4945.29	113.19	4967.19	113.32	4982.83	113.76
4992.22	113.46	5001.61	113.63	5014.12	112.85	5020.38	113.1	5032.9	112.85
5045.41	111.7	5064.19	111.62	5076.7	112.49	5095.48	112.04	5107.99	112.79
5114.25	112.31	5123.64	112.39	5133.02	111.63	5148.67	111.27	5158.05	111.77
5164.31	111.43	5173.7	109.38	5179.96	108.9	5192.28	108.85	5210.43	108.26
5224.95	107.53	5243.11	107.41	5279.42	107.62	5312.1	107.49	5322.99	107.62
5377.46	107.43	5406.51	107.58	5428.29	107.26	5439.18	107.51	5453.71	107.24
5475.49	107.43	5500.91	107.45	5515.44	107.28	5542.92	107.41	5552.31	108
5567.95	112.56	5577.34	114.55	5580.47	114.76	5586.72	113.5	5599.24	112.65
5630.53	112.26	5646.17	112.65	5678.83	112.74	5693.36	112.44	5715.02	112.32
5744.19	112.5	5751.45	112.77	5768.21	112.52	5791.4	112.69	5808.89	112.46
5833.92	112.62	5849.56	112.46	5867.64	112.63	5914.85	112.55	5929.37	112.91
5962.2	113.1	5976.57	113.31	5990.36	113.95	6018.52	113.93	6049.19	114.4
6052.94	114.89	6065.46	115	6074.85	114.01	6090.49	114.32	6115.52	113.75
6140.55	114.06	6171.85	113.74	6200.01	114.21	6209.4	113.85	6237.56	114.04
6275.11	114.02	6281.36	114.31	6293.88	114.08	6309.52	114.39	6343.94	113.8
6353.33	114	6378.36	113.86	6428.42	114.25	6437.81	114.68	6447.2	114.21
6462.84	114.75	6503.52	114.08	6525.42	114.31	6541.06	114.16	6578.61	114.22
6597.38	114.03	6613.03	114.18	6647.45	114.17	6666.22	113.99	6700.65	114.31
6750.71	114.9	6771.76	114.95	6789.92	115.23	6813.29	114.89	6828.93	116.56
6835.19	116.6	6844.58	115.8	6857.09	113.61	6882.12	110.62	6897.77	110.45
6938.79	111.35	6972.86	111.12	6985.38	111.33	7054.22	111.34	7076.12	110.94
7098.02	111.19	7119.93	111.07	7129.31	111.35	7141.83	111.05	7160.61	111.32
7179.38	111.02	7198.16	111.22	7207.54	111.85	7226.32	112.52	7235.7	111.42
7251.35	110.53	7263.86	108.9	7292.02	108.12	7326.44	107.76	7338.96	108.24
7348.34	107.97	7370.25	108.1	7379.63	108.42	7389.03	108.22	7410.92	108.23
7426.57	108.51	7432.82	108.92	7442.21	108.62	7451.6	108.92	7464.11	110.78
7473.5	113.65	7483.74	114.5333	7501.59	114.68	7506.51	113.54	7511.44	110.04
7516.36	107.69	7524.07	107.1156	7546.34	104.53	7557.25	103.81	7585.66	102.45
7601.61	101.32	7619.07	99.47	7627.46	98.86066	7644.13	97.65	7657.05	96.15
7693.67	92.55	7710.21	91.36	7736.79	89.9	7762.61	88.87	7785.52	88.58
7801.95	89.37	7812.9	89.56	7851.24	91.28	7877.5	93.45	7884.31	95.65
7889.42	94.66	7894.53	96.57	7909.86	98.41	7916.11	104.0489	7920.76	108.2441
7922.44	109.76	7924.1	115.22	7944.93	115.25	7953.86	114.94	7983.68	115.43
7989.66	115.15	8004.62	115.2	8013.59	114.61	8055.46	114.92	8064.44	114.44
8079.39	114.35	8088.36	114.63	8100.32	114.19	8114.22	114.27	8126.36	113.6
8138.48	113.36	8184.07	113.06	8215.34	112.51	8235.56	111.75	8267.82	112.06
8280.05	111.97	8292.19	111.2	8333.62	110.58	8354.55	110.39	8393.3	110.25
8425.67	110.29	8462.23	110.05	8494.43	110.04	8551.06	110.29	8567.24	110.24
8587.85	110.49	8664.31	110.72	8688.58	110.62	8700.72	111.25	8720.95	111.24
8733.07	110.75	8761.39	110.98	8785.25	110.96	8797.21	110.77	8821.14	111.01
8848.06	110.9	8866.55	111.16	8911.05	111.26	8967.7	111.64	8983.86	112.08
9003.58	111.98	9027.52	111.54	9060.41	111.64	9084.34	112.07	9105.28	112.97
9150.15	113.79	9165.87	113.31	9177.06	114.05	9203.98	114.5	9221.93	114.43

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 9245.85  114.62 9278.75  114.28  9293.7  115.46 9305.67  118.25 9314.64  119.25
 9323.62  119.65 9329.08  118.94 9344.36  118.41 9384.76  118.41 9398.95  118.24
 9410.96  118.51 9424.06  118.19 9444.81  118.07 9498.31  118.16

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   75.62     .12  7812.9    .025 8055.46    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7501.59  7924.1          2073.72    1400 1374.03             .1       .3
Left Levee      Station=  100.29      Elevation=  134.29
Right Levee     Station=9323.616      Elevation=119.6467
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3069.42 3947.22  110.47

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 177.10*

INPUT
Description: RGV-03,
Station Elevation Data    num=     457
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  121.45    7.02  121.89   16.38  123.19    23.4  124.76   32.77  125.89
   39.79  125.45   44.47  122.72   49.15   122.6   86.59  123.37   93.61  123.74
  102.98  128.25  112.34  129.82  126.38  133.43  150.38  133.67  151.05  133.67
  151.05  123.67  161.05  123.47  252.05  112.64  255.05  113.39  279.05  112.91
  285.05  111.41  295.05  111.21  301.05  109.71  333.83  110.01  362.69  111.84
  380.56  113.82  389.12  114.49  399.49  114.89  409.86  114.73  422.25  114.98
  457.98  114.64  478.97  114.63  489.34  114.91   499.7  114.59  532.43  114.58
  544.34  114.73  568.82  114.64   586.1  114.88  596.46  114.43  663.45  114.63
  675.37  114.48  785.55   114.6  806.38  114.39  866.01  114.53   890.2  114.39
  910.94  114.61  943.36  114.31  955.54113.5656  970.16   112.9  1007.7  112.85
 1035.67  113.52 1050.56  113.62 1073.35  113.35 1114.82  113.47 1135.56  113.76
 1149.38  113.71 1170.11  114.21 1187.38  113.74 1190.85  113.24 1201.22  108.86
 1204.67  108.08 1215.04  108.22 1228.86  110.31 1259.96  109.82 1280.69  110.04
 1294.52  109.86 1339.44  109.77 1395.99   109.9 1425.77  109.72 1452.57   109.8
 1464.48  110.14 1494.26  109.98 1500.22   110.2 1527.02  109.97 1562.75  110.46
 1571.69  110.16 1595.51     110 1613.38   110.3 1628.26  110.03 1640.18   110.2
 1658.04  110.82 1678.89  110.09 1699.73  110.62 1711.64  109.62 1726.53  109.24
 1750.66  109.31 1774.85  109.15 1812.89  109.29  1824.8  109.52 1833.73  109.33
 1871.61  109.27 1878.52  108.92 1885.43  111.68 1893.29  112.13 1911.16  112.32
 1937.27  112.07 1961.78     112 1999.47  112.24  2020.2  112.01  2044.4  112.21
 2065.13  112.08 2078.95  112.18 2099.68  112.06 2123.88  112.39 2134.24  112.11
 2154.98  112.06 2161.89  112.24 2179.16  112.05 2208.94  112.35 2227.55  112.15
 2248.28  112.28 2327.76  112.18 2345.04  112.28 2372.68  112.19 2424.52  112.24
 2452.16  112.45 2459.07  112.27 2503.99  112.23 2531.65  112.47 2578.18  112.27
 2596.05   112.4 2604.99   113.7 2613.92  113.93 2622.85  113.49 2661.56  113.87
  2670.5  113.38 2682.41   113.3 2694.32  113.53 2709.21  113.47 2725.16  113.89
 2738.99  113.63 2756.26  112.75 2776.99  110.25 2786.63  110.26 2804.64  111.11
 2842.66  111.36 2863.39  112.75 2866.84  113.28 2877.21  113.75 2899.79  113.57
 2904.85  113.76 2918.68  113.29 2953.39  113.31 2967.06  112.89 2983.17  112.13
 2998.06  112.76 3004.01  112.37 3012.95  112.48 3024.86  112.23 3039.75  111.11
 3077.64  110.96 3094.91  111.06 3105.28  110.52 3150.21   111.2 3170.94  108.16
 3188.22   106.3 3212.42  108.82 3215.87  108.92 3240.06  108.24  3267.7  108.06
 3274.61  108.34 3288.43  108.17 3305.71  108.45 3316.09  108.32 3331.58  109.12
 3350.64  109.25 3357.55  108.83 3379.22  108.55 3426.67   108.5 3454.31  108.25
 3471.59  108.29 3513.06     108 3526.88  106.86 3578.74  106.91 3593.63  106.84
 3727.63  106.88 3769.32  106.97 3781.23  107.13 3813.99   108.7 3837.81  108.71
 3846.74  108.36 3858.65  108.68 3867.59  108.52 3900.34  108.65 3915.23  108.58
 3956.92  108.73 3995.63  108.59 4058.17  108.68  4067.1  108.85 4081.99  108.67
 4129.64  108.87 4135.59  108.71 4192.18  108.78 4204.09  108.66 4224.94  108.83
 4245.78  108.62  4296.4  108.76 4308.32     109 4329.16  108.81 4341.07  109.11
 4373.83  108.68 4412.54  108.91 4436.36  108.79 4494.47  108.72 4511.75  110.22
 4549.76  110.31 4563.58  110.53 4573.94  110.28 4591.21  110.52 4603.12  110.38
 4612.06   110.6 4635.88  110.62 4656.73  111.05 4665.67  110.85 4712.18   111.2
 4732.91  111.18 4750.19   111.6 4760.55  111.45 4774.37  111.85 4802.03  112.27
 4817.53  112.14 4829.45  111.76 4847.31  111.63 4859.22  110.96 4877.09  110.96
 4891.87  111.61 4906.87  111.18 4918.78  111.56 4933.67  111.31 4947.16  110.66
 4957.49  110.65 4972.38  111.04 4981.72  109.98    4999  109.64 5005.91  108.91
 5016.28  108.46  5030.1     107 5047.37  106.75 5054.28  106.96 5081.94  107.17
 5113.04  106.91  5123.4  107.18 5133.77   106.8 5140.68  106.97 5175.24   106.8
 5202.88   107.1  5216.7  106.86 5223.62  106.46 5233.98  106.95  5247.8  106.42
 5261.62  106.47 5268.53  106.78 5282.37  106.51 5292.73  106.84 5306.55  106.49
 5341.64  106.91 5356.53  109.02 5368.44  110.24  5374.4  109.69 5386.31   109.2
 5416.09  108.84 5430.98  109.11 5455.14  109.04 5462.05  109.34 5475.88  108.88
 5510.44  108.93 5524.26  109.16 5531.17   109.6 5541.54  109.32 5558.81  109.21
 5569.19   109.5 5579.55  109.17 5596.83  109.34 5624.55  109.08 5641.75  109.47
 5659.03  109.36 5686.68  109.41  5700.5  110.02 5717.78  110.17 5745.42  110.76
 5758.55  111.54 5776.53  112.23 5786.89  111.88 5800.71  112.24 5814.54  112.17
 5830.02  112.64 5838.95  112.06    5856   112.3 5877.66  111.94 5904.38  112.11
 5931.27  111.88 5958.07  112.13 5967.01  111.95 5993.81  112.08 6047.41   112.2
  6062.3  112.42 6080.63  112.06 6149.73  112.29 6184.39  112.79 6193.32  112.62
 6208.21     113 6225.76  113.06 6246.92  112.73 6267.77  112.84  6308.7  112.66
 6329.43   112.8 6363.06  112.78 6374.36  112.89 6395.09   112.6 6419.28  112.82
 6434.54  113.29 6464.21  113.88 6502.22  113.78 6519.49  114.26  6526.4  113.94
 6541.74  113.86 6556.63   114.8 6571.52  114.29 6583.43   113.1 6607.25  111.22
 6619.71  111.11 6661.18  112.85 6685.37  112.66  6761.4  112.96 6791.88   112.3
 6833.57  112.14  6842.5  112.28 6872.29   112.1 6878.89  111.92 6896.16  112.07
 6908.02  111.94 6934.82  112.46 6958.64  111.59 6970.55  110.61 6997.36  110.15
 7030.11  109.76 7042.02  109.94 7062.04  109.76 7082.77  110.35 7089.68  109.99
 7113.87  110.27 7120.78  110.02 7131.36  110.18 7144.98  109.72 7151.89  110.15
 7161.14  111.49 7170.07  113.47 7179.68114.0994 7196.81  114.19 7200.17  113.46
 7206.89  110.21 7215.15   108.6 7218.25 107.433 7227.38  104.81 7234.84  103.92
 7254.24  102.54 7272.12  100.98  7294.2   97.95 7316.8594.34486 7328.04    92.7
 7365.33   89.61 7383.97   88.71 7403.97   88.71 7427.19      90 7442.66    90.2
  7450.4   90.81 7473.62   91.22 7481.35   91.85 7489.09   91.94 7496.83   91.56
 7504.57   92.26 7527.79    92.9 7543.56   94.66 7550.78   94.63 7558.74   95.73
 7579.66   97.95 7592.16103.7533 7596.59105.8099 7597.43   106.2 7599.78   115.2
 7614.43  114.65 7653.69  114.91 7672.63   114.7 7680.75  114.35 7705.92  114.44
 7726.76  114.08  7740.3  114.08 7764.49  114.76 7771.81  115.35 7782.79  114.19
 7793.77  113.75 7815.73  114.34 7848.67  114.09 7870.64   113.5 7881.61  112.57
 7896.25  112.84  7910.9   113.6 7921.87  113.73 7932.85  112.36 7954.81  112.02
 7989.29  111.69 8024.35  111.52 8053.64   111.9 8071.94  111.91 8086.73  111.59
 8115.86  111.35 8134.16  111.36 8167.11  111.64 8181.74  111.49 8214.69  111.98
 8269.59  112.22 8291.54  111.88 8302.53  113.06  8313.5  112.79 8320.83  112.93
 8331.81  111.94 8350.11  111.82 8357.43  112.03 8372.07   111.7 8383.05  111.79
 8397.69  111.57 8412.33  111.82 8430.63  111.63 8452.59  112.11 8492.85   112.3
 8514.81  112.63 8533.12  112.67 8558.74   113.5 8609.99  112.87 8649.67  113.15
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 8712.47  114.45 8723.44  113.81 8730.76  114.74 8752.73  115.08 8767.37  114.87
 8796.64  114.81 8814.95  115.06 8822.27  114.88 8829.59  115.22 8839.11   116.4
 8849.95  118.14 8866.18  119.19 8872.74  118.86  8877.1  117.78 8883.66  117.74
  8890.2  117.17 8907.68  116.73 8927.32  116.82 9016.85  116.39 9040.87  116.93
 9067.08  116.29 9093.28  116.32 9108.56  116.04 9141.32  116.29 9158.79  116.14
 9213.38  116.12 9215.56  116.23

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154  6842.5    .066 7237.38    .015 7592.16    .066 7599.78    .084

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7196.81 7599.78          2073.72    1400 1374.03             .1       .3
Left Levee      Station=  151.05      Elevation=  133.67
Right Levee     Station=8866.184      Elevation=119.1933
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 4905.34 7154.33  111.33

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 176.8

INPUT
Description: RGV-03,  Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     456
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  118.45    9.84  118.91   22.96  120.57    32.8  122.72   45.93  124.13
   52.49  124.12   55.77  123.27   62.33  119.03   68.89  118.72  121.37  118.75
  131.21  119.09  144.34  125.63  157.46  127.87   167.3  130.77  177.14  133.11
  201.14  133.35  201.81  133.35  201.81  123.35  211.81  123.15  302.81  113.64
  305.81  114.39  329.81  113.91  335.81  112.41  345.81  112.21  351.81  110.71
  377.24  111.31  393.64  112.31  419.89  112.95  429.73  114.22  439.57  114.61
  449.41  114.54  472.37  115.04  515.02  114.86  524.86  115.24   534.7  114.73
  600.31  114.92  616.71  115.35  626.55  114.72  649.51   114.8  656.08  115.07
  662.64  114.73  682.32  114.81  711.84  114.69  784.01  114.87  810.25  114.71
  866.02  114.72  882.42  114.94  905.38  114.69  925.07  115.16  931.63  114.99
  967.71  115.08 1016.92   114.9 1030.04  115.36 1049.72  114.93 1072.68     115
 1079.24  114.79 1098.93  115.06 1118.61  114.99 1138.29  115.38 1151.41  115.12
 1171.09  115.74 1187.49  115.22 1190.78   114.5 1200.62  108.01  1203.9  106.87
 1213.74  106.95 1217.02  107.38 1226.86  110.18 1230.14  110.37 1239.98  109.62
 1256.38  109.46 1276.06  109.75 1289.19  109.51 1331.83  109.37 1384.31  109.46
  1420.4  109.29 1459.76  109.52 1489.29   109.4 1541.77  109.52 1568.01  109.36
 1627.06  109.47  1636.9  109.37 1679.54  109.55 1692.67  109.39 1722.19  109.56
 1745.15  109.36 1791.08  109.66 1827.16  109.54    1837  109.39 1843.56  108.89
 1846.84  111.76 1850.12  113.22 1863.24  114.01 1882.93  114.05 1899.33  113.72
 1948.53  113.79 1958.37  114.03 1978.05  113.68 2001.02  113.91  2020.7  113.71
 2033.82  113.87  2053.5  113.76 2066.62  114.17 2076.47  114.17 2086.31  113.75
 2105.99  113.68 2112.55  113.93 2128.95  113.66 2155.19  113.99 2174.88  113.79
 2194.56  114.04 2217.52  113.86  2253.6  113.89 2270.01  113.79 2286.41  114.03
 2312.65  113.85 2325.77     114 2361.86   113.9  2388.1  114.24 2394.66  113.97
 2417.62  113.89 2427.46  114.11  2437.3  113.94 2463.55  114.18 2509.47  113.93
    2539   113.9  2588.2  113.98 2598.04  113.81 2630.84  114.13 2647.25   114.6
 2660.37  114.38 2676.77  113.07 2696.45  109.22 2712.85  109.33 2722.69   109.9
 2758.78  110.35 2778.46  112.38 2781.74  113.16 2791.58  113.77  2804.7  113.38
 2817.82  113.83 2830.95  113.11 2844.07  113.18 2857.19  112.87 2876.87  112.84
 2903.11  112.12 2912.95  112.36 2932.64  112.44  2939.2  112.72  2955.6  112.49
 2981.84   112.4 2998.24  112.55 3008.08  111.75 3037.61  112.41 3044.17  112.23
 3050.73  112.77 3054.01  112.23 3070.41  108.21 3086.81  105.42 3109.78  109.19
 3113.06  109.35 3136.02  108.32 3162.26  108.05 3168.82  108.48 3181.94  108.22
 3198.34  108.64 3208.19  108.45 3218.03  108.98 3240.99  109.41 3247.55  108.79
 3257.39  108.43 3313.16  108.18  3339.4  107.85  3355.8  107.98 3395.17  107.49
 3408.29  105.78 4323.51  105.78 4326.79  105.79 4343.19  107.85 4379.27  108.16
 4392.39  108.49 4402.23  108.12 4428.48  108.24 4484.24  108.95 4507.21  108.94
 4533.45  109.41 4553.13  109.43 4569.53  109.86 4579.37  109.67 4592.49  110.37
  4608.9   110.5 4618.74  110.83  4625.3  110.62 4648.26  110.69 4671.22  110.22
  4690.9  110.31 4704.03  110.75 4717.15  110.32 4740.11  110.35 4756.51  109.85
 4772.91  110.16 4786.04     111 4789.32  110.62 4805.72  110.42 4812.28  109.33
 4822.12  108.65 4835.24  106.46 4851.64  106.09  4858.2  106.41 4884.45  106.72
 4913.97  106.33 4923.81  106.73 4933.65  106.17 4940.21  106.42 4973.02  106.16
 4999.26  106.61 5012.38  106.25 5018.94  105.65 5028.78  106.39  5041.9  105.59
 5055.02  105.67 5061.58  106.14 5074.71  105.73 5084.55  106.22 5097.67   105.7
 5123.91  106.11 5137.03  105.58 5150.15  105.41    5160  105.91 5202.64  105.42
 5212.48  105.59 5238.72  105.48 5245.28  105.93 5258.41  105.31 5291.21  105.51
 5304.33  105.82 5310.89  106.43 5320.73  106.04 5337.13   105.9 5346.98  106.32
 5356.82  105.85 5373.22  106.08 5399.46   105.7 5415.86   106.3 5432.26  106.17
 5458.51  106.28 5471.63  107.13 5488.03  107.34 5514.27   108.2  5543.8  110.38
 5553.64  109.78 5563.48  109.78 5566.76  110.22 5579.88  109.94    5593  110.32
 5606.12  110.03 5619.24  110.31 5645.49  110.07 5665.17  110.18 5675.01  109.94
 5701.25  110.09 5720.94  110.03 5789.82  110.23 5819.35  110.48 5832.47  110.13
 5878.39   110.6 5898.07  110.59 5917.76  111.02  5927.6  110.85 5953.84  111.26
 5970.24  111.67 5993.21  111.33 6016.17  111.37 6048.97  111.16 6068.65  111.47
  6094.9   111.4  6111.3  111.59 6130.98  111.18 6153.94  111.44 6167.06  112.22
 6196.59   113.1 6209.71  112.82 6222.83   112.9 6232.67   112.6 6249.07   113.3
 6255.63  112.86 6268.75  112.81 6281.88  113.07  6311.4  112.56 6317.96  112.59
 6331.08  111.82  6344.2  111.79 6363.88  113.15 6373.73  113.51 6383.57  114.34
 6406.53  114.17 6442.61   114.3  6478.7  114.65 6488.54  114.16 6521.34  113.32
 6554.15  113.19 6567.27  113.38 6590.23   112.7 6606.63     113 6613.19   112.7
    6646  112.38 6659.12  112.85  6678.8  112.28 6698.48  112.25 6741.13  111.65
 6764.09  111.55 6783.77  112.27 6790.33  111.76 6813.29  112.19 6819.85  111.65
 6836.26   111.3 6842.82  110.76 6849.38  111.03 6865.78  113.23 6875.62  113.79
 6892.02  113.69 6898.58  112.53 6901.86  110.42 6905.14   107.1 6908.42  105.09
 6912.42  104.04 6920.42  102.88 6932.42  101.64 6942.42   98.84 6952.42   95.64
 6962.42   92.84 6972.42   91.64 6982.42   89.84 6992.42   88.84 7022.42   88.84
 7032.42   89.64 7042.42   89.84 7052.42   90.64 7072.42   90.84 7082.42   91.64
 7102.42   91.64 7112.42   91.84 7122.42   92.64 7132.42   92.64 7142.42   91.84
 7152.42   92.64 7182.42   92.84 7192.42   93.64 7202.42   93.64 7212.42   94.64
 7222.42   94.84 7242.42   96.64 7252.42   97.84 7262.42  100.64 7272.42  102.64
 7275.45  115.19 7288.56  114.16 7298.38  114.44 7327.86  114.39 7350.79  114.05
 7370.44     114 7383.54  113.67  7403.2  113.83 7409.75  114.12 7422.85  115.36
  7429.4  116.44 7432.68  116.35 7439.23  114.77 7449.05  114.14 7468.71  115.41
 7498.18  115.38 7511.29  115.15 7517.84  114.71 7527.66  113.39 7540.76  113.89
 7553.87  115.14 7563.69  115.49 7573.52  113.53 7593.17  113.16 7606.27  113.22
 7645.58  112.73  7655.4  112.78 7681.61  113.51 7697.99  113.59 7707.81   113.2
 7737.29  112.65 7753.67   112.6 7783.15  112.98 7796.25  112.74 7825.73  113.39
 7835.55  113.28 7845.38  113.62 7874.86  113.72 7894.51  113.13 7904.34  114.86
 7914.16  114.42 7920.72  114.62 7930.54  113.12 7946.92  112.84 7953.47  113.08
 7966.57  112.51  7976.4  112.67  7989.5  112.35  8002.6  112.63 8009.15  112.28
 8018.98  112.39 8038.63  113.05 8074.66  113.33 8094.31  113.81 8110.69  113.78
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 8133.62  114.92    8150  114.55  8163.1   114.6 8179.48  114.22 8192.58  114.34
 8225.33  114.17 8248.26  114.42 8254.81   114.8 8271.19  115.14 8281.01  114.31
 8287.56  115.56 8307.22  115.75 8320.32  115.31 8346.52  115.02  8362.9  115.65
 8369.45  115.48    8376   115.9  8389.1   118.1  8402.2  117.94 8408.75  118.74
 8418.58  118.24 8425.13  116.62 8434.96  116.56 8444.78   115.7 8454.61  115.72
 8470.99  115.04 8493.91  115.37 8500.46  115.18 8536.49  114.94 8569.25  114.87
 8592.17  115.03 8598.73  114.75 8634.75  114.53 8670.78  115.34 8687.16   114.8
 8696.99  114.94 8710.09  114.38 8729.74  114.49 8742.84  114.07 8749.39  114.43
 8772.32  114.01 8791.97  114.26 8821.45  114.38 8847.66  114.16 8929.54  114.13
 8932.82  114.29

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154 6875.62    .066 6912.42    .015 7272.42    .066 7275.45    .084

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6892.02 7275.45         1153.45    2530 2395.52            .1       .3
Left Levee      Station=  201.81      Elevation=  133.35
Right Levee     Station= 8408.75      Elevation=  118.74
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 6875.62  114.44 7275.45 8932.82  115.19

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            130.76    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.68    Wt. n-Val.                 0.153      0.022     0.084
  W.S. Elev (ft)            130.08    Reach Len. (ft)          1153.45    2530.00    2395.52
  Crit W.S. (ft)            120.16    Flow Area (sq ft)       103825.00   13656.36   24471.32
  E.G. Slope (ft/ft)      0.000158    Area (sq ft)            103825.00   13656.36   24471.32
  Q Total (cfs)           235000.00     Flow (cfs)             78624.73   123803.10   32572.18
  Top Width (ft)            8731.01    Top Width (ft)          6690.21     383.43    1657.37
  Vel Total (ft/s)             1.66    Avg. Vel. (ft/s)           0.76       9.07       1.33
  Max Chl Dpth (ft)           41.24    Hydr. Depth (ft)          15.52      35.62      14.77
  Conv. Total (cfs)       18678860.0      Conv. (cfs)           6249448.0   9840428.0   2588984.0
  Length Wtd. (ft)          2078.72    Wetted Per. (ft)         6698.28     398.84    1673.11
  Min Ch El (ft)              88.84    Shear (lb/sq ft)           0.15       0.34       0.14
  Alpha                       15.96    Stream Power (lb/ft s)     0.12       3.07       0.19
  Frctn Loss (ft)              0.33    Cum Volume (acre-ft)    235144.90   81585.61   264379.30
  C & E Loss (ft)              0.13    Cum SA (acres)          25792.78    3211.47   28597.31


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 176.40*

INPUT
Description: RGV-03,
Station Elevation Data    num=     458
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.02    6.85  122.42   15.98  123.64   22.82  125.16   31.96  126.21
   38.81  125.73   43.37  122.96   47.94  122.81   84.46  123.14    91.3  123.43
  100.44  127.86  109.57  129.43  123.27  133.03  130.11  133.45  154.11  133.69
  154.78  133.69  154.78  123.69  164.78  123.49  255.78  119.46  258.78  120.21
  282.78  119.73  288.78  118.23  298.78  118.03  304.78  116.53  307.45  116.76
  338.59  116.33  367.53  115.32  376.94  115.49  384.13  115.08  444.04  114.73
  451.23  114.18  492.47  113.88  529.96  113.34  566.25  113.33  585.42  113.17
  626.16  113.21  638.14  113.37  654.91  113.22  674.09  113.45  700.45  113.54
   736.4  113.42  745.98  113.73  760.36  113.44  781.92  113.35  810.68  113.48
  825.06  113.75  834.64  113.59  849.02  114.03     861   113.7   863.4  113.22
  870.59  108.91  872.99  108.15  882.57   108.5  889.76  110.38  911.33  109.93
   925.7  110.15  935.29     110  967.29  109.96 1004.78  110.51 1042.27  111.68
 1067.25  111.99 1138.98  111.54 1251.61  111.72 1268.38   111.6 1301.93  111.95
 1335.48   111.8 1340.27  111.46 1345.06  114.35 1354.65  114.89 1381.01   114.7
 1416.95  114.77 1424.14  114.93 1438.52  114.71  1455.3  114.87 1469.67  114.74
 1493.63  114.79 1503.22  115.07  1517.6  114.77 1536.77  114.88 1548.75  114.69
 1567.92  114.93  1582.3  114.81 1596.68  114.98 1613.45  114.87  1651.8  114.85
 1663.78  115.02 1718.89  114.93 1738.06  115.16 1742.85  114.98    1774  114.95
 1793.18  115.11 1826.73  114.95 1884.24  114.98 1891.43  114.87 1915.39  115.08
 1927.38  115.39 1936.96  115.25 1948.94  114.37 1963.32  111.81  1975.3  111.88
 1982.49  112.26 2008.85  112.56 2032.81  114.84 2042.39  114.58 2051.98  114.88
 2061.57   114.4 2095.12  114.22 2114.28  113.74 2140.65  114.15  2171.8  113.94
 2183.78  114.04 2190.97  113.51 2222.12  114.19  2236.5  111.15 2248.48   109.3
 2265.26  111.81 2284.43  111.24  2303.6  111.06 2317.97  111.17 2361.11  111.97
 2373.09  111.32 2413.83  111.16    2433  110.95 2444.98  111.03 2473.74  110.71
 2483.33  109.57 2879.06  109.66 3066.47  109.93 3091.45  109.81  3154.3  109.78
 3166.28  111.15 3192.64  111.38 3202.23  111.62 3209.41  111.38 3228.59  111.48
 3269.32     112  3286.1  112.02 3319.65  112.49 3331.63  112.83 3338.82  112.68
  3348.4  113.12 3367.58  113.37 3389.14  113.26 3405.91  112.98 3429.88  113.38
 3439.47  113.11 3456.24  113.16 3468.22  112.82  3480.2  113.03 3489.79  113.58
 3504.17  113.19 3516.15  112.01 3525.73  110.55 3537.71   110.3 3561.68  110.71
 3583.25  110.45 3590.43  110.71 3626.38  110.32 3645.55  110.62 3659.93  109.95
 3667.12  110.42  3676.7  109.85 3691.08  110.22 3700.67  109.95 3707.86  110.28
 3717.44  109.93 3736.61  110.21 3755.78  109.75 3762.97  110.09 3794.12  109.71
 3820.48   109.7 3825.27  109.99 3834.86  109.57 3858.83   109.7  3873.2  110.31
 3892.37  109.96 3899.57  110.24 3906.75  109.93 3918.74  110.08  3937.9  109.83
 3949.88  110.21 3981.04  110.13 3990.62  110.67 4002.61  110.79 4021.77  111.32
 4043.35  112.75 4050.53  112.34 4060.12  112.63  4069.7  112.44 4079.29  112.69
 4098.46  112.67  4139.2   112.4 4223.07  112.54 4244.64   112.7 4254.22  112.46
 4287.77  112.69 4323.72  112.76 4354.87  113.26 4371.65  113.01 4388.42  113.01
 4412.38  112.79 4426.76  112.89 4457.91  112.73 4472.29  112.31 4489.06  112.31
 4498.65  112.74 4520.22  113.11 4546.58  112.51 4558.56  112.89 4563.35  112.57
 4582.52  112.64 4608.88  112.24 4618.47  111.72 4628.05   111.7 4656.81  113.39
 4673.58  113.26 4699.94   113.3  4726.3  113.49 4757.45  112.56 4781.42  112.43
 4791.01  112.54 4807.78  112.09 4848.52   111.9  4858.1  112.23 4872.48  111.89
 4886.86  111.91 4918.01  111.59 4934.79  111.56 4949.16  112.08 4953.95  111.75
 4970.73  112.05 4975.52   111.7 4997.09  111.31 5009.07  112.78 5016.27  113.16
 5028.24  113.11 5037.25  110.52 5046.25  106.24 5049.96105.0611 5056.24  104.06
  5083.7  102.04 5096.5799.23254 5110.97   95.55 5124.88   92.83 5152.33   90.17
 5166.06   89.36 5186.06   89.36 5195.95   89.96 5215.75   90.72 5235.55   90.91
 5245.45   91.49 5275.14   91.68 5285.04   92.22 5294.94   92.26 5304.83   91.77
 5314.73   92.35 5344.43   92.39 5354.33   92.89 5364.22   92.95 5374.12   93.66
 5391.28   94.23 5402.51   95.67 5406.8296.58137 5410.68   96.74 5433.28104.9366
 5436.51  114.02 5464.08  113.15 5471.33  112.22 5485.85  111.83 5509.06  111.66
 5522.12  113.33 5529.37  113.54 5549.69  113.41  5561.3  113.13 5588.87  113.26
 5603.38   113.1 5710.93  113.06 5750.24  113.24 5760.43  113.58 5776.44  113.38
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 5831.03  114.32 5848.56   114.9 5884.18  113.27 5901.15  112.69 5953.77  113.34
 5981.73  113.21 5987.55  112.48 6002.11  112.17  6025.4  112.25 6045.79  112.78
 6053.07  114.07 6064.71  113.96 6085.27  113.36 6111.55  112.22 6140.42  112.63
 6152.06  113.02 6159.34  114.31 6179.73  114.64 6191.37  114.42 6207.98  114.67
 6234.29  113.12  6272.9  112.96 6291.83  112.68 6323.86  112.75 6339.87  112.64
 6382.09  112.65  6421.4  112.33 6456.35  112.39 6475.27  112.75 6486.92   113.2
 6497.11  112.65 6533.51  112.85  6569.9  112.87 6594.66  112.49 6649.98  112.28
 6671.81  112.47 6683.46  112.81 6686.37  113.24 6698.02  113.29 6708.21  112.99
 6728.59  113.89 6738.79  113.74 6746.07  112.93 6757.71  112.74 6778.09  112.97
 6807.21  113.07 6823.23  112.91 6847.98  113.01 6856.71  112.86 6880.01  113.09
  6916.4  113.24 6930.96  113.09 6945.52  113.24 6961.54  113.94  6965.9   113.2
 6996.48  113.56  7002.3  113.83 7021.23  113.62 7043.07  113.73 7069.27  114.17
 7083.83  113.91 7098.39  113.91 7102.76  114.52 7118.77  115.24 7127.51  114.68
 7136.25  115.27 7144.98  114.35 7152.26  114.54 7165.36  114.23 7185.75  113.01
  7200.3  112.69 7210.49  112.76 7217.77  113.18 7229.42  112.61 7238.16  112.57
  7249.8  113.09 7261.45  112.66 7283.29  112.85 7289.09112.6108 7300.76  112.79
 7313.86  112.35 7321.14  112.74 7326.96  112.04 7337.16  113.08 7341.52  112.97
 7356.08  109.97  7372.1  110.22 7392.48   110.2  7398.3  112.29 7414.32  112.69
 7418.69  113.21 7433.25  112.05 7436.16  112.86 7453.63  112.82 7482.75  113.18
 7488.57     113 7514.77  112.98 7542.44  113.31 7561.36  113.02 7565.73  113.29
 7578.83  113.12 7587.57  113.94 7602.13   113.1 7612.32  113.24 7629.79  112.67
 7641.44  113.15  7645.8   112.9 7670.56  113.36  7705.5  113.62 7738.98  114.11
 7760.82  113.88 7807.41  113.86 7827.79  114.03 7849.63  113.66 7886.02  113.59
 7920.96  113.06 7934.07  113.16 7938.44  112.89 7950.08  113.26 7957.36  112.91
 7963.19   113.2 7974.84  112.72 7983.57  113.42 7990.85   112.4 8001.04  112.79
 8006.86  113.51 8047.63  113.38 8050.54  113.14 8066.56  113.68 8092.76  113.15
 8111.69  113.27 8127.89  112.56 8137.89  112.85 8149.54  113.61 8185.94     114
 8215.06  113.25 8248.54  113.79 8260.19  112.99 8270.38  113.09 8276.21  113.67
 8283.48  113.59 8296.58   114.4  8322.8  114.52 8347.07   114.9 8379.58  114.61
  8395.6  115.18 8411.61  116.08  8421.8  115.77 8430.54  116.11  8455.3  116.56
  8466.9  118.92 8479.53  118.15 8486.01  116.97 8495.75  116.79 8505.48  116.08
 8515.22  116.06 8531.44   115.4 8554.14  115.48 8560.63  115.33 8596.32  115.07
 8628.77  115.12 8651.48  115.27 8657.97  115.09 8693.65  114.81 8729.34  115.39
 8745.57  115.04  8755.3  115.13 8768.28  114.76 8787.74  114.97 8800.72  114.74
 8809.21  114.98 8829.92  114.57 8872.44     115 8905.71   114.8 8922.35  115.24
 8935.67  115.27 8962.29  115.05  8988.9  115.17

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .154 5028.24    .066 5096.57    .015 5410.68    .066 5436.51    .084

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5028.24 5436.51          1153.45    2530 2395.52             .1       .3
Left Levee      Station=  154.78      Elevation=  133.69
Right Levee     Station=8467.616      Elevation=  119.01
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1927.71 5014.34   112.9 5436.51  8988.9113.7933

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 176.00*

INPUT
Description: RGV-03,
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   125.6    8.99  126.71   17.99   128.3   21.85  128.18   24.42  126.88
    51.4  127.76   56.54  130.09   69.39  132.95   93.39  133.19   94.06  133.19
   94.06  123.19  104.06  122.99  195.06  118.12  198.06  118.87  222.06  118.39
  228.06  116.89  238.06  116.69  244.06  115.19  254.63   114.9  271.36  114.11
  278.27  113.52  301.93  112.95  325.59  111.94  365.01   111.6  404.45  111.76
  461.92   112.1   484.6  111.91  517.88  112.06  526.95  112.31  536.03  111.94
  542.08  109.43  548.12  109.63  552.66  110.58  601.59  110.54  625.25  111.55
  648.91  113.98  664.68  114.51  709.94  113.71  781.02  113.88  790.85  113.83
  814.51  114.26  836.98  114.04     840  115.49  846.05  115.76  862.69  115.69
  909.57  115.83  968.55  115.73  980.65  115.87 1041.14     116 1143.98  115.96
 1213.55  116.11 1221.11  115.67 1230.18  114.39 1258.92  114.77 1274.04   115.9
 1313.36   115.6 1325.46  115.36  1342.1  115.57 1369.32  115.53 1373.85  115.27
 1393.52  115.61 1410.15  113.17 1420.74  114.44 1444.94  114.07 1481.23  114.54
 1488.79  114.22 1534.16  114.09 1552.31  113.93 1558.36  113.37 1808.11  113.55
 1926.39  114.07 1942.15  113.85 1981.82  113.77 1989.38  114.44 2012.06  114.74
  2028.7  114.72 2076.22  115.28 2091.98  115.79 2116.41   115.9 2140.61  115.73
 2155.73  116.01 2179.93   115.8 2193.54  116.17 2202.62  115.97 2216.23  114.63
 2257.06  114.69 2279.75  114.48 2291.84  114.62  2311.5  114.12 2331.17  114.33
 2365.95  114.27 2411.32  113.82 2426.44  113.89 2435.51   114.2 2447.61  114.02
 2476.35  113.95 2483.91  114.12 2503.57  113.97 2529.28  114.44 2542.89  115.12
 2603.38  114.86 2669.93  114.91 2719.84  114.66 2739.49  114.85 2770.16  114.57
 2804.53  113.87 2824.18  113.19 2843.85  113.12 2860.48  112.42 2883.17  112.21
  2911.9  111.61 2930.05  112.44 2973.91  112.34 2993.57   111.8 3025.33  111.48
 3051.04  111.41 3105.48  111.58 3128.16  111.92  3144.8  111.58 3156.93112.4118
 3164.46  112.53 3167.15  112.07 3177.96  107.51  3187.5105.3757 3200.07  104.09
 3213.61  103.84 3236.95102.2132 3242.46  101.61 3257.29   97.91 3269.88   95.39
 3287.33   92.83 3296.84   91.86 3322.24   90.49 3339.69   89.87 3349.69   89.87
 3379.08    90.8 3398.67   90.97 3423.46   91.61 3437.86   91.51 3457.45   91.88
 3467.25    91.7 3479.04   92.08 3506.43   91.94 3526.03   92.26 3535.82   92.67
  3552.8   92.96 3563.92   94.82 3566.0895.80383    3572   96.01 3594.15107.1731
 3597.57  112.85 3618.81  112.62 3623.53  112.13 3642.41  111.93 3654.21  110.26
    3666  110.15 3677.81  109.36  3689.6  109.43 3701.41  108.55 3715.57  108.88
 3736.81  112.23  3748.6  112.67 3781.64  112.42 3786.36  112.59 3800.52  111.86
 3845.36  112.19 3868.96  111.95 3897.27  112.15 3963.38  112.11 4003.63  112.32
 4043.89  112.32 4065.19   112.6  4086.5  112.55 4107.82  112.73 4124.39  113.38
 4150.43  112.93 4164.64  113.17 4197.79  113.35  4219.1  113.19 4264.09   113.4
 4290.14  112.63 4306.71  112.64  4351.7  111.25 4439.31  111.27 4451.15  111.04
 4467.72  111.31  4484.3  111.01 4493.77  109.56 4512.71  109.44 4517.45  108.95
 4538.75  109.14 4543.49  109.56 4555.33  109.12 4569.54  109.38 4588.48  110.27
 4600.32  112.89 4619.26  112.74 4633.47  112.26 4650.04  112.07 4668.99  111.54
 4695.04  111.05 4742.39  111.46 4761.33  111.95 4773.17  114.27 4777.91  114.52
 4806.32   114.2 4825.26  113.57 4839.47  113.56 4846.57  113.85 4860.78  113.68
  4903.4   112.6 4915.24  112.73 4957.86  112.65 4981.54  112.43 4988.65  112.18
 5040.73  112.29 5066.78  112.15 5088.09  112.49 5102.29   112.2 5135.45  112.36
 5149.65  112.14 5170.97   112.2 5199.38  111.91 5213.58  112.07 5256.21  111.98
 5286.98  112.49 5305.93  113.28  5315.4  113.14  5322.5  112.07 5353.29  112.01
  5381.7  112.17  5440.9  112.18 5481.15  111.79 5571.13  111.75 5606.64  112.28
 5613.75  112.84 5620.85   112.7 5630.32  113.84 5649.27  113.96 5665.84  113.36
 5675.31   114.1 5687.15   114.2 5698.99  115.12 5710.83   114.6 5715.56  114.77
  5727.4  113.12 5746.35  112.69 5779.49  113.04  5793.7     113 5826.85  113.23
  5852.9  113.04 5893.15  113.13 5907.36  112.77  5919.2  112.96 5945.24  113.02
 5952.35  112.87 5973.65  113.11 6004.44  113.12 6028.12  112.87  6051.8  113.06
 6077.84  114.27 6084.94  112.78 6099.15  113.17 6110.99  113.14 6122.83  113.58
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 6134.67  113.45 6144.14     114 6151.25  113.46 6160.72  113.82 6174.92  113.55
  6198.6  113.83 6210.44  113.76 6231.75  114.56 6253.06  114.94  6257.8  114.64
 6276.73  114.58 6286.21  115.12 6300.42  114.37 6307.52  115.29 6321.73  115.82
 6333.57  115.69 6340.67  114.65 6347.77  114.64 6361.98  115.96 6369.08   115.8
 6376.18  114.27 6383.29  113.94 6388.02   114.6 6395.13  113.91 6409.34  113.94
  6438.4112.8179 6466.16  112.32 6473.26   112.7 6482.74  112.53 6494.58  113.41
 6513.52  112.36 6518.26   112.9 6527.73  112.24 6546.67  113.11 6565.61   112.4
 6582.19  112.55 6601.13  113.13  6610.6  112.69 6629.54  112.99 6646.12  112.57
 6650.86  112.05 6662.69  112.88 6672.16  111.54 6679.27  112.04 6688.74  113.71
 6695.84  113.54 6705.31  111.55 6712.42  108.96 6719.52  107.53 6738.47   107.6
 6745.57   107.9 6755.03  107.62 6771.61  107.61 6778.71  107.96 6788.19  112.27
 6792.92  112.91 6800.03  112.55 6814.23  113.04 6821.34  114.07 6840.28  112.41
 6845.02  111.63 6849.75   113.2 6878.16  112.92 6885.27  113.13 6925.52  113.29
 6934.99  112.93  6963.4  113.04 6977.61   112.8 7001.29  113.25  7008.4  113.09
  7022.6  113.39 7032.08  112.87 7039.18  113.21 7053.38  112.74 7060.48  113.27
  7081.8  112.88  7088.9  114.03    7096  114.45 7107.84  113.22 7119.68  112.63
 7136.26  112.82 7145.73  112.27 7152.83  112.35 7164.67  111.52 7183.61  112.49
 7190.72     112 7202.56  112.56 7212.03  112.41 7230.97  112.94 7247.54  112.78
 7283.06  113.11  7287.8  112.85 7299.64  113.13 7323.32  112.98 7356.46  113.49
 7377.77  113.06 7410.93  113.29 7429.87  113.14 7446.44  113.32 7453.54  113.12
 7467.75  113.57 7474.85  113.08 7486.69   113.6 7508.01  113.54 7522.21  113.04
 7571.94  112.73 7581.41  112.86 7609.82  112.25  7619.3  112.29 7638.23  111.83
 7659.54  112.07 7666.65  111.52 7685.59  112.29 7690.33  111.67 7697.43   111.6
  7706.9  112.19 7714.01  111.24 7725.85  111.25 7735.31  112.69 7740.05  112.64
 7747.15  110.81 7751.89  110.58 7768.46  111.31 7777.94  112.73 7787.41   113.1
 7794.51  112.48 7813.46   112.3 7818.19  112.62 7844.23  112.17 7848.97  111.63
 7867.91  111.83 7875.02  112.48  7898.7  111.97 7917.64  111.23 7941.31  111.39
 7948.42  111.72 7953.15  111.32 7974.78  110.82 7991.04  110.67 8002.88  110.88
 8009.99  111.64 8024.19  111.97 8047.87  111.86 8069.18   112.3 8088.12  111.81
 8107.07  111.04 8116.54  110.97 8140.21  111.48 8144.95  111.79 8161.52  111.78
    8171  112.34  8178.1  111.36 8189.94  110.78 8206.52  111.03 8215.99  112.21
 8227.82  112.08 8239.66  112.71 8249.13  113.76 8291.76  113.75 8334.39  114.17
 8384.12  113.39 8398.32   113.9 8410.16  113.61 8436.21   114.4 8445.68  114.29
 8452.79  113.47 8457.52  114.13    8467  114.19 8490.68   114.9 8507.26  115.04
 8526.12  119.24 8530.83  119.27 8537.42  118.19  8546.9  117.33 8566.18  116.47
 8583.57  116.23 8593.45   115.7 8662.67  115.17 8710.78   115.5 8735.18  115.21
 8764.84  115.14  8787.9  115.44 8834.05  115.14 8847.24  115.47 8867.01  115.56
 8890.08  115.11 8909.85  115.43 8919.75  115.24 8929.63  115.64 8942.82  115.39
 8962.59  115.45 8979.07  116.33 8992.26  116.39 9018.62  115.97 9044.99  116.05

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3164.46    .025 3398.67    .066 5826.85    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3164.46 3597.57          1153.45    2530 2395.52             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3164.46  112.53       T
 3597.57 9044.99  112.85       T
Left Levee      Station=   94.06      Elevation=  133.19
Right Levee     Station=8526.483      Elevation=  119.28
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3597.57 9044.99112.3967

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 175.6

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  129.17    6.55  131.14   16.38  133.04   40.38  133.28   41.05  133.28
   41.05  123.28   51.05  123.08  142.05  113.39  145.05  114.14  169.05  113.66
  175.05  112.16  185.05  111.96  191.05  110.46  196.58  110.46  235.89  111.13
  245.72   112.6  255.55  116.28   262.1  117.02  278.48  115.88  314.52  116.06
  324.35  116.56  376.77  116.86   386.6  116.75  416.09  116.99  527.48  116.97
  638.87  117.17  737.16  117.43   786.3  118.22  792.85  117.88  812.51  117.74
  848.55  118.23   855.1  118.81  868.21  118.33  887.87  118.78  940.29  118.62
  946.84  118.36  969.77  118.45  986.15  118.08 1015.64  118.08 1038.57  117.51
 1100.82  117.09 1113.93   116.6 1136.86  116.23 1149.97  115.14 1176.18  112.12
 1189.28  111.54 1205.66  111.48 1238.43  110.87 1251.53  110.87 1281.02  111.73
 1300.68  111.95 1303.95  111.39 1317.06  105.37 1320.33  104.85 1340.33  104.07
 1360.33   104.3 1377.33  103.45 1395.33  102.19 1413.33   97.89 1428.33    95.3
 1447.33   93.06 1461.33   91.69 1478.33    91.1 1513.33   90.39 1531.33   90.78
 1567.33   91.09 1586.33   91.59 1604.33   91.29 1641.33   91.79 1677.33   91.39
 1695.33   91.69 1714.33   91.69 1725.33   93.97 1728.33   95.88 1731.33   94.99
 1733.33   95.28 1758.63  111.68 1788.05  111.52 1794.59  110.83  1814.2  110.49
 1820.74   110.7 1827.27  109.41 1837.08  108.31 1853.42  108.11 1869.77  106.88
 1886.11  106.95 1895.92  106.55 1902.46   105.6 1922.07   106.1 1951.49  111.14
 1967.83  111.79 2013.59  111.42 2020.13  111.68 2039.74  110.59 2069.16  110.75
 2101.85  111.12 2134.54  110.81 2173.76  111.15 2265.32  111.15 2307.96  111.25
 2321.08  111.48 2376.84  111.57 2406.35  112.05 2435.87  111.97 2458.83  112.43
 2465.39  112.22 2488.35  113.18 2494.91  112.77 2501.47  113.22 2508.03  112.69
 2524.42  112.49  2544.1  112.78 2580.18  112.65 2590.02   112.8 2619.54  112.32
 2652.33  112.22 2681.85  111.95 2717.93     111 2740.89  111.47 2754.01  111.33
 2767.13  110.71  2803.2   109.8 2839.28  109.57 2855.68  109.66 2875.36  109.39
 2924.55   109.2 2940.95  108.86 2963.91  109.27 2980.31   108.6 2986.87  108.82
 2993.43  108.16 2999.99  106.64 3026.23  106.46 3032.79  105.73  3062.3  106.01
 3068.86  106.65 3085.26  105.99 3104.94  106.39 3121.34  107.48 3131.18  107.76
 3137.74  108.94 3147.58  111.71 3173.81  111.53 3193.49  110.89 3216.45  110.73
 3242.69   110.2 3278.77  109.87 3314.84   110.2 3344.36  110.29  3354.2  110.77
 3364.04  110.49  3370.6  110.89    3387  114.24 3393.56  114.55 3432.92  113.77
 3459.15  112.72 3478.83  112.64 3488.67  113.05 3508.35  112.97 3518.19  112.42
 3528.03  112.63 3567.39  112.16 3583.78  112.38 3616.58  112.31 3623.14  112.11
 3642.82  112.35 3675.62  112.06 3685.46  111.69  3695.3   111.9 3714.97  111.75
 3757.61  111.83 3793.69  111.66 3823.21  112.19 3842.88  111.78  3888.8  112.07
 3908.48  111.76    3938  111.88 3977.35  111.49 3997.03  111.73 4056.07  111.56
  4098.7  112.23 4111.82     113 4124.94  113.35 4138.06  113.11  4147.9  111.49
 4190.54   111.3  4229.9  111.49 4279.09  111.42 4311.89   111.5 4367.65  111.09
 4426.68  111.12 4446.36  111.27 4492.28  111.22 4541.47  112.09 4551.31  112.94
 4561.15  112.73 4567.71  113.16 4574.27  114.44 4600.51  114.63 4623.47  113.74
 4636.58  114.85 4652.98  114.99 4669.38  116.35 4685.78  115.56 4692.34   115.8
 4708.74  113.31 4734.98  112.63 4751.38  112.64 4780.89  113.11 4800.57  113.03
 4846.49   113.4 4882.57  113.16 4895.69  113.34 4938.32  113.25    4958  112.67
  4974.4  112.93 5010.48  112.96 5020.32  112.71 5049.83  113.02 5072.79   112.8
 5092.47     113 5125.27  112.66 5144.95  112.97 5158.07  112.89 5194.14   114.6
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 5203.98  112.36 5223.66  112.93 5240.06  112.89 5256.46  113.54 5272.86  113.34
 5285.98  114.16 5295.82  113.35 5308.94  113.89 5328.61  113.48 5361.41  113.89
 5377.81   113.8 5394.21  114.31 5407.33  115.06 5436.85  115.71 5443.41  115.28
 5469.64  115.25 5482.76   116.1 5502.44  114.83 5512.28  116.06 5531.96  116.57
 5548.36  116.13  5558.2  114.58 5568.04  114.59 5577.88   115.9 5587.72  116.65
 5597.55  116.45 5607.39  114.19 5617.23  113.68 5623.79  114.65 5633.63  113.59
 5653.31  113.65 5699.23  112.31 5718.91  112.39 5732.02  111.96 5741.86  112.54
 5754.98   112.3 5761.54  113.34 5771.38  113.65 5791.06  112.78 5797.62   112.1
 5804.18  112.92  5817.3  111.91 5843.54  113.14 5859.93  112.74 5869.77  112.15
 5892.73  112.45 5902.57  113.07 5909.13  112.84 5918.97  113.42 5932.09  112.77
 5945.21   113.2 5958.33  113.18 5981.29  112.52 5987.85  111.74 6004.24  113.03
 6017.36  111.04  6027.2  111.81 6040.32  114.34 6050.16  114.11 6063.28  111.15
 6073.12  107.25 6082.96  105.09  6109.2  105.15 6119.04  105.57 6132.15  105.14
 6155.11  105.16 6164.95  105.72 6171.51  109.54 6178.07  112.24 6184.63  113.22
 6194.47  112.67 6214.15  113.39 6223.99  114.93 6233.83  113.75 6250.23  112.39
 6256.79  111.21 6263.35  113.55  6269.9  113.66  6302.7  113.01 6312.54   113.3
 6348.62  113.27  6368.3  113.41 6381.42  112.86 6420.77     113 6440.45  112.62
 6450.29     113 6460.13  112.82 6473.25  113.27 6483.09  113.03 6502.77  113.47
 6515.89  112.68 6525.73  113.19  6545.4  112.47 6555.24  113.26 6584.76  112.64
  6594.6  114.35 6604.44  114.95 6620.84  113.08 6630.68  112.95 6637.24  112.16
  6660.2   112.4 6673.31  111.55 6683.15  111.65 6699.55  110.38 6706.11  111.02
 6715.95  111.13 6725.79  111.84 6735.63   111.1 6752.03  111.95 6765.15  111.72
 6791.39  112.52 6814.34   112.2 6843.86  112.41  6853.7  112.14 6863.54  112.49
  6870.1  112.07  6886.5  112.43 6896.34   112.1  6919.3  112.06 6945.54  112.58
 6955.37   112.4 6965.21  112.84 6994.73  112.25 7014.41  112.56 7040.65  112.66
 7066.89  112.43 7089.84  112.68 7099.68  112.38 7106.24  112.94 7119.36  113.07
  7129.2  112.35  7145.6  113.17 7175.12  113.13  7194.8  112.42 7214.47  112.43
 7263.67  111.94 7276.79  112.13 7316.15  111.21 7329.27  111.28  7355.5  110.61
 7385.02  110.97 7394.86  110.16 7407.98  110.74 7414.54  110.55  7421.1  111.32
 7427.66   110.4  7437.5   110.3 7450.62  111.19 7460.46  109.76 7476.86  109.79
 7489.97  111.95 7496.53  111.87 7506.37  109.11 7512.93  108.76 7535.89  109.84
 7549.01  111.96 7562.13  112.49 7571.97  111.56 7598.21  111.26 7604.77  111.74
 7640.84  110.97  7647.4  110.12 7673.64  110.33 7683.48  111.29 7716.28  110.47
 7726.12  109.71 7742.52  109.31 7775.31   109.6 7785.15  110.17 7791.71  109.62
 7827.79  108.96 7844.19   108.5 7860.59  108.55 7870.43  109.68  7890.1  110.15
  7922.9  109.96 7936.02  110.45 7952.42  110.59 7978.66  109.84  8004.9  108.75
 8018.02  108.69 8050.81  109.55 8057.37  110.02 8080.33  110.03 8093.45  110.89
 8103.29  109.42 8119.69  108.57 8136.09  108.59 8142.65  108.96 8155.77  110.75
 8172.16  110.57 8188.56  111.53 8201.68  113.12 8221.36  113.25 8224.64  113.89
  8231.2   113.2 8260.73  112.97 8319.77  113.44 8349.29  113.08 8388.65  112.16
 8408.33  112.71 8424.73  112.04 8460.81  112.73 8473.93  112.38 8483.77  111.16
 8490.33  112.16 8503.46  112.26 8536.26  113.37 8559.22  113.52 8585.35  119.55
 8591.87  119.54  8598.4  118.09 8627.78  116.81  8644.1  116.65 8653.89  116.02
 8666.95  115.75 8722.44  115.29 8738.76  115.58 8781.19   115.8 8794.25   115.5
 8823.62   115.3    8853  115.54 8892.17   115.5 8905.23  115.98 8924.81  116.14
 8947.66  115.64 8967.24  116.01 8977.04  115.71 8986.83  116.28 8999.89  115.93
 9019.47  116.09 9035.79  117.42 9048.85  117.51 9074.96  116.88 9101.07  116.93

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 1377.33    .025 1725.33    .066 5587.72    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1300.68 1758.63          1212.33 1503.33 1122.85             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1300.68  111.95       T
 1758.63 9101.07  111.68       T
Left Levee      Station=   41.05      Elevation=  133.28
Right Levee     Station= 8585.35      Elevation=  119.55

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            129.80    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                 0.066      0.037      0.074
  W.S. Elev (ft)            129.72    Reach Len. (ft)         1212.33    1503.33    1122.85
  Crit W.S. (ft)            116.78    Flow Area (sq ft)       16747.50   15665.06   124925.70
  E.G. Slope (ft/ft)      0.000087    Area (sq ft)            16880.38   15665.06   129446.10
  Q Total (cfs)           235000.00     Flow (cfs)             19615.69   60450.72   154933.60
  Top Width (ft)            9060.02    Top Width (ft)          1259.63     457.95    7342.44
  Vel Total (ft/s)             1.49    Avg. Vel. (ft/s)           1.17       3.86       1.24
  Max Chl Dpth (ft)           39.33    Hydr. Depth (ft)          13.30      34.21      17.01
  Conv. Total (cfs)       25236150.0     Conv. (cfs)            2106487.0   6491675.0   16637990.0
  Length Wtd. (ft)          1243.19    Wetted Per. (ft)        1268.28     466.19    7368.27
  Min Ch El (ft)              90.39    Shear (lb/sq ft)           0.07       0.18       0.09
  Alpha                        2.22    Stream Power (lb/ft s)     0.08       0.70       0.11
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)    230129.60   79028.18   252028.10
  C & E Loss (ft)             0.00    Cum SA (acres)          25477.18    3138.16   27854.92


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 175.27*

INPUT
Description: RGV-03,
Station Elevation Data    num=     461
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  123.94    18.5  125.36      37  131.82   46.96  132.81   70.96  133.05
   71.63  133.05   71.63  123.05   81.63  122.85  172.63  116.64  175.63  117.39
  199.63  116.91  205.63  115.41  215.63  115.21  221.63  113.71  239.62  113.23
  264.73   111.9  292.48  111.35   311.7  110.37  353.12  109.93  432.26  110.24
  464.07  110.16  515.85  110.21  608.15  110.63  633.28  111.69  651.94  112.94
  717.03  111.72  724.43  112.36  731.82  111.74  809.17  111.84   834.3  112.18
  968.31  112.38  993.44   112.3 1068.84  112.46  1154.9  112.46 1165.26  113.25
 1172.66  114.48 1191.89   114.5 1211.12  114.25    1291  114.46 1304.31  114.79
 1316.15   116.4 1323.54   115.8  1326.5  116.67 1339.82  116.05 1353.13   117.5
 1363.49  116.14 1381.24   117.1 1388.63  117.05 1394.55  115.73 1400.47  116.71
  1412.3  115.82 1430.05  116.99 1444.84  115.04  1455.2  115.71 1459.64  115.25
 1475.91  115.74 1496.62  115.28 1530.65  115.17    1541  115.29 1622.36  115.42
 1666.74  115.22  1748.1  115.26 1813.19  115.63 1885.68   115.6 1924.14  115.95
 1944.85  115.92 1952.25  115.04 1959.65  114.91 1968.52  115.76 1990.71  115.74
 2002.55  116.06  2020.3  115.93 2036.57  115.28  2082.3  114.92 2174.44  115.14
 2191.18  115.59 2217.05  115.09 2225.93  115.45 2230.37  114.45 2237.76  116.02
 2277.71  116.29 2408.98  116.17 2438.96  115.97  2478.9  116.07 2515.88  115.82
 2601.61   115.8 2660.23  115.43 2711.16  115.32 2795.48  115.24 2819.38   115.4
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  2852.9  115.07 2911.52  114.84 2945.03  114.09 3012.04  112.13 3048.36  111.73
 3063.12  110.76 3167.94  110.25 3173.84  110.02 3185.65  110.85 3212.23  111.19
 3222.56  111.81 3228.47  111.59 3247.66  111.86 3253.56   111.1 3271.28  110.55
 3293.42  112.42 3303.76  112.62 3311.14   112.1 3330.33  112.15 3340.71  109.99
 3349.17  106.41  3356.3  104.87  3370.6103.8059 3398.92  102.13 3406.05101.2678
 3432.08   98.12 3439.17   97.68 3459.87    94.6 3477.11   92.84 3515.06   90.37
 3574.86    89.4 3620.62   89.96 3651.97    90.7 3683.33   92.25 3699.86   92.75
  3711.3   95.89  3721.5   96.92 3735.8797.44773 3745.19   97.79 3749.8498.76688
 3757.06  101.14  3761.3  100.77 3782.74  111.84 3807.75  111.76  3813.3  111.34
 3835.53   111.4 3849.42  109.83 3863.31  109.74 3877.21  109.02  3891.1  109.05
    3905  108.09 3921.67  108.43 3946.68  111.81 3960.57  112.25 3999.46  112.19
 4005.02  112.39 4021.69  111.73  4046.7  111.63 4074.49  111.74 4105.71  111.62
 4125.89  111.19 4141.03  111.22 4161.21  111.58 4181.39   111.4 4226.82  111.63
 4260.84  112.13 4282.32  111.86 4317.64   111.9 4332.78   112.7 4347.93  112.39
 4403.03  113.58 4454.06  112.77 4469.27  113.21 4489.45  113.17 4542.42  112.55
 4570.59  111.75 4598.18  111.22  4617.7  111.57 4670.67   110.6 4715.28  110.74
 4752.95   110.4 4793.48  110.18 4808.68  110.76 4832.37   109.6 4837.95  108.59
 4854.26  108.98 4865.83  108.35 4884.66  108.06 4896.49  108.65 4910.43  108.35
 4927.16  108.49 4949.46  109.39  4963.4  111.91  4985.7  111.64 5002.43  111.16
 5036.64  111.29 5046.76  111.53 5067.03  110.66 5082.22  110.53 5107.56   110.9
 5130.68  110.87 5152.98  111.21 5166.92  113.47  5172.5  113.69 5205.96  113.23
 5228.25  112.72 5254.46  113.09 5278.44  112.44  5286.8   112.6 5320.26  112.26
 5362.08   113.1 5384.38  112.83 5401.38  112.34 5420.63  112.22 5428.99  112.44
 5477.37  112.49 5497.62  111.88 5512.63  111.83 5537.72  112.36 5554.44  112.03
 5593.47  112.27  5610.2   112.1  5635.3  112.42  5664.8  112.08 5685.47  112.29
 5720.51  112.16 5750.92  112.61 5766.11  112.48 5783.05  113.14 5805.36  113.04
 5813.72     112 5883.42  112.07 5913.03  111.89 5953.12  111.88 6004.21  111.23
  6034.6   111.3 6064.99  111.05 6148.27  111.71 6156.64  112.23 6170.58  112.44
 6176.15  113.32 6198.46  113.45 6217.98  112.88 6229.12  113.73 6243.06  113.97
    6257  114.94 6270.94  114.45 6276.52  114.62 6290.46  112.95 6312.76  112.48
 6351.79  112.63 6368.52  112.52 6407.55  112.76 6449.37  112.78 6485.61  112.58
 6502.34  112.01 6520.92  111.92 6546.25  111.33 6555.32  111.42 6576.64  113.09
 6586.78  113.41 6607.04  112.31  6642.5  112.88 6672.41  113.02 6683.03  113.28
 6703.07  114.23 6711.43  112.79 6728.16  113.19  6742.1  113.19 6756.04  113.64
 6769.99  113.51 6781.14  113.88  6789.5  113.31 6800.66  113.71 6817.38  113.49
  6859.2  113.68 6884.29  114.53 6909.38  114.91 6914.96  114.63 6937.26  114.67
 6948.41  115.34 6965.14  114.49  6973.5  115.29 6990.23  115.59 7004.17  115.27
 7012.54  114.21  7020.9   114.2 7037.63  115.54 7045.99  115.39 7054.35  113.86
 7062.72   113.5 7068.29  114.14 7074.37113.6097 7093.38  113.47 7132.42  112.71
 7149.15  112.86 7160.29  112.53 7168.66  112.89 7179.81  112.69 7193.75  113.54
 7209.87  113.13 7216.05   112.6 7221.63  113.11 7232.78  112.35 7255.09  113.15
 7277.39  112.55 7310.84  112.83 7319.21  113.24 7330.36  112.83 7352.67  113.17
 7372.18  112.59 7377.76  112.07 7391.69  112.92 7402.84  111.59 7411.21   112.1
 7422.36  113.76 7430.72  113.58 7441.88  111.57 7450.24  108.94 7458.61  107.47
 7480.91  107.38 7489.28  107.66 7500.42  107.39 7519.94  107.39  7528.3  107.73
 7539.45  112.08 7545.03  112.74 7553.39  112.38 7570.12  112.87 7578.49  113.84
 7600.79  112.05 7606.37  111.25 7611.95  112.81  7645.4   112.4 7653.76  112.59
 7701.16  112.61 7712.31  112.24 7745.76  112.28 7762.49  111.99 7790.37  112.35
 7798.73  112.17 7815.46  112.42 7826.62  111.86 7834.98  112.18  7851.7  111.77
 7860.06  112.34 7885.16  111.93 7893.52  113.02 7901.89  113.38 7915.83  112.06
 7929.77  111.37 7949.29  111.48 7960.43  110.98 7968.79  111.09 7982.73  110.24
 8005.04  111.19  8013.4  110.69 8027.34  111.24  8038.5  111.14  8060.8  111.91
 8080.31  111.64 8122.13  112.03 8141.65  111.73 8152.11  111.13 8169.53  110.99
 8208.56  111.34 8233.65  110.93 8268.63  111.21 8294.99  110.95  8314.5  111.11
 8322.86  110.91 8339.59  111.59 8347.96  111.36  8361.9  112.01 8386.99  112.06
 8403.72  111.56 8425.67  111.64 8462.26  111.13 8473.41  111.15 8506.87  110.49
 8518.02  110.56 8540.32  110.12 8565.41  110.25 8573.78  109.68 8590.51  109.91
 8596.08  110.44 8610.02  109.78 8621.18  110.39 8629.54  109.45 8643.48   109.5
 8654.63  110.98  8660.2  110.97 8668.57  109.18 8674.14  108.98 8693.66  109.82
 8704.81  111.28 8715.96  111.65 8724.33  111.05 8746.63  110.84 8752.21  111.14
 8782.87  110.64 8788.45  110.08 8810.75  110.25 8819.12   110.9    8847  110.42
 8855.36  109.95  8869.3  109.75 8896.79  110.06 8905.54  110.62 8911.12  110.37
 8932.25  110.32 8955.73  109.89 8969.67   110.1 8978.03  111.06 8994.75  111.55
 9018.38  111.37 9033.57  110.74  9043.7  110.66 9063.96   111.4  9074.1  111.44
 9103.49  110.74 9131.36  111.02 9136.94  111.29 9156.46  111.14 9167.61  111.66
 9175.97  110.65 9189.92  110.04 9209.43  110.24 9220.58  111.39 9234.52  111.23
 9248.46  111.82 9259.61  112.85 9337.51  112.91 9359.99  113.07 9393.25   112.7
 9418.54   111.7 9435.27  112.59 9449.21  112.26 9479.88  112.97 9491.03  112.71
  9499.4  111.82 9504.98  112.43 9516.14  112.59 9563.54  115.06 9570.54  116.67
 9585.75  119.47 9592.18  119.04 9598.62  117.64 9605.96  116.94 9627.61   116.2
 9643.71  116.01 9653.37  115.55 9690.21  115.17 9710.42  115.44 9721.01   115.3
 9778.97  115.66 9820.83  115.39 9849.82  115.58 9888.47  115.55 9901.35  115.87
 9920.67  115.97 9943.22  115.63 9962.54  115.87  9972.2  115.66 9981.86  116.05
 9994.75  115.8910014.07  116.2110030.17  117.3310043.05  117.4810068.82  116.99
10094.58  116.96

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3330.33    .025 3782.74    .066 7037.63    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3330.33 3782.74          1212.33 1503.33 1122.85            .1       .3
Left Levee      Station=   71.63      Elevation=  133.05
Right Levee     Station= 9583.56      Elevation=  119.53

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 174.93*

INPUT
Description: RGV-03,
Station Elevation Data    num=     462
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  118.72   11.75  118.62   30.54  119.61   35.25  120.88      47  125.88
    61.1  131.28   68.15  132.27   77.54  132.58  101.54  132.82  102.21  132.82
  102.21  122.82  112.21  122.62  203.21   117.3  206.21  118.05  230.21  117.57
  236.21  116.07  246.21  115.87  252.21  114.37  272.62  113.75  333.58  112.03
   387.5  111.53  427.89   110.9  472.54  110.83  503.47  110.01  570.11  109.76
  582.01  109.84  660.55   109.9  674.83  110.04  748.61  109.86  758.13  110.08
  786.69  109.85  841.43  110.06  893.79   110.1  908.07  109.94  936.63  110.12
  988.99  110.17 1005.65  110.62 1038.96  110.84 1050.87  110.55 1055.63  109.84
  1069.9  109.01 1077.04  107.95 1160.35  107.57 1167.48  108.82 1174.62  107.65
 1179.38  107.58 1303.82  107.63 1344.25  107.79 1559.86  107.89 1600.29  107.86
 1721.58  107.94 1860.05  107.93 1876.72  109.51 1888.61  111.98 1919.55  112.01
 1924.31  111.33 1933.83  111.75 1950.49  111.52 2052.83  111.88 2062.35  112.09
 2079.01  111.94 2083.77  112.58 2100.43   112.6 2107.57  114.28 2119.47  115.83
 2126.61  115.81 2131.37  114.62 2136.13  116.37 2140.89  115.29 2145.65  116.24
 2157.55  115.14 2169.45  117.43 2178.97  118.02 2195.63  115.31 2202.77  115.56
 2224.19  117.21 2236.09   117.1  2245.6  114.45 2255.13  116.42 2274.17  114.62
 2286.06  115.27 2290.83  116.45 2302.73  116.95 2307.49  115.06 2312.25  115.22
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 2326.52  113.04 2343.19  114.38 2350.32  113.46 2362.22  114.26 2376.51  114.43
 2409.83  113.48 2464.56  113.24 2481.23  113.49  2495.5   113.4 2526.44  113.59
  2566.9  113.57 2583.56  113.35 2612.12  113.67 2645.44   113.4 2683.52  113.25
 2716.84  113.31 2731.12  113.14 2766.82  113.28 2814.42  113.24 2838.22  113.74
 2852.49  113.48 2919.14   113.9 3035.75  113.78  3078.6  113.87 3097.63  114.25
 3111.92  113.95 3130.96  114.07 3142.86  112.26 3154.76  111.95 3159.52  113.16
 3169.04  113.59 3204.74  113.42 3223.78  113.98 3252.34  113.74 3278.52   112.7
 3335.64   112.3 3352.09   112.1 3416.56     112 3461.79  112.13 3490.35     112
 3526.05  112.37 3559.37  112.18 3568.89  111.73 3583.17  112.57 3590.31  110.53
 3602.21  113.59 3618.87  113.72 3649.81  113.66 3666.47  113.81 3687.89   113.7
 3728.35  113.84 3792.61  113.81 3833.08  113.68 3864.02  113.78 3897.34   113.6
 3913.99   113.7  3961.6  113.58 4037.76  113.64 4049.66  113.47 4075.84  113.59
 4187.58  113.52 4232.92  113.38 4363.82  113.27 4387.62  113.33 4466.17  113.26
 4504.25  113.16 4530.43  113.72 4591.86  113.54 4686.17  113.46 4799.37  112.62
  4847.9  112.14 4906.34  111.92 4915.83  111.52 4930.09     110 4941.96  109.83
 4987.09  109.84 5072.59  109.62 5098.71  109.61 5108.22  109.16 5112.97  109.83
 5127.22  110.82  5148.6  111.08 5160.47  111.94 5169.97  111.42  5186.6  112.54
  5196.1  112.03 5207.97  112.46 5226.97  112.35 5236.47  110.77 5248.35  110.48
 5264.97  109.47 5267.35  110.11 5276.85  110.55  5300.6  113.04 5317.23  113.41
  5329.1  112.33 5350.48  111.99 5359.98  112.36 5371.72  111.24 5381.27  107.46
 5389.33  105.01 5399.75104.1636 5434.77100.2237 5439.13   99.75 5466.03   94.84
    5475   93.61  5506.4   91.32  5525.9   90.38 5568.79   89.04 5600.52   88.86
 5636.38    88.4 5687.63   89.07 5699.62   90.11 5738.88   93.93 5748.26  100.36
 5756.63   102.3 5760.55102.6228 5774.35103.7592 5785.79   106.4 5789.26  106.27
 5806.84  111.99 5832.02  111.85 5850.33  112.11 5861.77  111.36 5896.09  111.15
 5907.54  110.58 5921.27  110.77 5941.86  112.48 5989.92  113.11 6035.42  112.36
 6072.84   112.4 6089.46  111.34 6101.93   111.3 6118.55  112.01 6135.17  111.66
 6164.26  112.16 6172.58  112.07 6197.51  112.87 6218.29   112.2 6247.39  112.05
 6259.86  113.37 6272.33  112.77 6297.04  113.64 6317.71  113.97 6343.06  113.68
 6359.74  112.78 6372.26  113.73    6382  113.52 6409.81  113.45 6439.01  112.69
 6455.71  111.64 6478.44  111.44  6503.7  111.64 6526.63  111.24 6555.83  111.77
 6585.04  111.79  6605.9   111.5 6639.28  111.38  6651.8  112.31 6662.13  111.31
 6681.01  110.55 6689.34  111.44 6714.37  110.19 6724.12  110.66  6739.4  110.84
 6751.93  110.57 6767.75  111.02 6779.23  112.12 6814.51   111.4 6839.54  112.21
 6847.88  112.89 6864.58  111.37 6877.09  111.11 6897.96   111.6 6935.36  111.53
 6951.44  112.82 6985.57  112.58 7018.94  113.13 7031.46  112.56 7056.49  112.27
 7077.35  112.42 7094.05  112.99 7110.73  114.05 7139.94  112.51 7173.32  113.21
 7202.52  113.17 7219.21  112.01 7240.06  112.07 7248.41  112.54 7273.44  112.25
 7315.17  112.46 7327.68  112.98 7356.89  112.63 7386.09  112.95 7402.78  112.71
 7427.82  113.37 7440.33  112.83 7452.85  113.27 7472.65  112.97 7479.54   112.5
 7523.77  112.77 7561.33  112.34 7582.19  112.42 7619.74  111.81 7636.42  111.38
 7661.45  111.48 7686.49  110.85 7719.87  111.54 7755.07  111.32 7768.85  111.52
 7778.04   112.2  7790.8  112.38 7812.48  112.02 7821.66  112.61 7844.62  113.53
  7860.7  113.44 7872.18  112.59 7890.55  112.32 7936.47  112.01 7982.72  112.06
 7991.05  112.28  8032.9  111.91 8061.99   110.9 8082.85  109.69 8087.02  109.75
 8099.53  111.32 8107.88   113.2 8116.23  113.86 8132.91  111.74 8141.26  111.72
 8162.11  113.08 8174.64  112.87 8195.49  113.09    8212  113.86 8218.89  113.23
 8255.63  113.73  8276.3  113.61 8283.19  113.27 8292.37  113.53 8316.49  113.65
    8329  113.45 8361.25     114 8404.88   114.1 8414.06  114.57 8427.84  114.14
  8448.5  114.61 8473.76  113.81 8487.54  114.42 8501.31  113.53 8512.79  113.62
 8519.68  113.23 8561.02113.1643 8579.39  113.34 8604.64  113.08 8609.23  113.38
 8639.08  113.29 8648.27  112.78 8666.64  113.16    8685  112.95 8719.45  113.05
 8728.63  112.89 8750.39  113.13 8767.67   112.4 8779.14  112.82 8788.33  112.14
  8804.4  113.17 8811.29  113.04 8820.47  111.99 8834.25  109.86 8852.62  109.61
 8891.65  109.74 8900.84  111.93  8926.1  112.34 8932.99  112.76 8955.95   111.3
 8960.54  112.06 8988.09   111.8 9021.58  111.99  9043.2  111.61 9070.75  111.57
 9084.53  111.35 9128.16  111.37 9137.34  111.05    9158  111.07 9164.89  111.43
 9185.56  111.22 9199.33  111.81  9222.3  110.58 9254.44  110.53 9265.92   110.1
 9284.29  110.54 9291.18  110.28 9309.46  110.46 9321.97  111.24 9359.53  111.04
 9380.73  111.57 9392.91  111.34 9405.42  110.17 9419.76  109.91 9472.57  109.62
 9501.38  109.79 9513.89  109.52 9555.62  109.65 9563.97  110.41    9589  111.04
 9626.54  110.66 9630.71  110.91  9693.3  109.79 9706.78  109.85 9745.81  109.54
  9752.7   109.2 9771.07  109.55 9782.55  109.26 9791.73   109.6 9798.62  109.15
  9810.1  109.21 9823.87  110.06 9835.36   109.2 9851.43  109.81 9860.61  110.61
 9899.65  110.55  9924.9  110.31  9929.5  110.04 9947.87  110.17 9954.76  110.51
 9996.09  110.1910018.72  110.5310025.93  111.0710047.93  111.4810072.96  111.31
10089.66  112.7210110.52  113.0710118.86  112.7410131.37  111.0310139.72  110.78
 10156.4  112.7510164.75  113.2310202.31  112.5610232.58  112.2410241.77  112.42
10260.14  111.5110276.21  111.51 10285.4  112.0410296.87  111.8910317.54  112.58
10331.32  112.5110360.84  112.84 10381.7   112.610400.21   112.7 10427.6  112.55
10448.44  111.25 10456.8  112.28 10473.7  112.4710498.95  113.2110515.03  112.48
10523.56  112.6310548.59  114.2710567.85  116.6110573.62  117.9110586.14  119.39
10606.09  116.1210652.85  115.0710689.19   114.810709.13   115.5 10732.4  115.19
10776.75  115.5210818.05  115.4810846.64  115.6110884.76   115.610916.53  115.79
10938.77  115.6110967.37  115.6210998.33  115.9911024.55  117.2511037.26  117.46
11062.67  117.1111088.08  116.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .198 5359.98    .066 5399.75    .015 5687.63    .066 5806.84    .069

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5359.98 5806.84          1212.33 1503.33 1122.85             .1       .3
Left Levee      Station=  102.21      Elevation=  132.82
Right Levee     Station=10581.77      Elevation=  119.51

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 174.6

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  113.49   16.38  112.97   29.49  113.72   42.59  113.86   49.15  115.66
   65.53  122.92   75.36  126.49   85.19  130.73   95.02  132.07  108.12  132.35
  132.12  132.59  132.79  132.59  132.79  122.59  142.79  122.39  233.79  112.77
  236.79  113.52  260.79  113.04  266.79  111.54  276.79  111.34  282.79  109.84
   331.1  109.88  350.78  110.03  377.03  109.87  475.44  109.95  564.02  109.79
  636.19  110.07   652.6  110.31  678.84  110.07  695.24  109.66  708.37  109.75
   787.1  109.59   803.5  109.73  911.76  109.68  931.45  109.86 1033.15  109.55
 1046.27  109.89 1085.64  109.54 1128.29  109.73 1147.97  109.59 1161.09  109.81
 1207.02   109.7 1233.27  109.77 1252.95  109.49 1292.32   109.7 1308.72  109.56
 1334.97  109.74 1364.49  109.54 1387.46  109.91 1410.42  109.85 1433.38  109.13
 1439.95  108.23 1449.79  108.16 1456.35  106.88 1476.03  105.25 1485.87  103.57
 1492.44  103.41  1600.7  103.41 1610.54  105.28 1620.38  103.52 1626.94  103.41
  2565.2  103.41 2588.17  105.77 2604.57  109.48 2611.13  110.03 2620.97  109.57
 2647.22  109.53 2653.78   108.5  2666.9  109.13 2689.87  108.79 2781.72  109.15
 2791.56  109.04 2830.93  109.33 2844.05  109.64 2867.02  109.42 2873.58  110.39
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 2883.42  110.16 2889.98  110.88 2896.54  110.42 2906.39  112.93 2922.79  115.26
 2932.63  115.23 2939.19  113.45 2945.75  116.07 2952.32  114.45 2958.88  115.88
 2968.72  115.32 2975.28  114.22 2991.68  117.66 3004.81  118.55 3027.77  114.47
 3037.61  114.85 3044.17     116 3050.73  115.95 3067.14  117.32 3083.54  117.16
 3096.66  113.18 3103.22  115.34 3109.79  116.13 3122.91  114.48 3136.03  113.43
 3152.43   114.4    3159  116.17  3175.4  116.91 3181.96  114.07 3188.52  114.31
  3208.2  111.05 3231.17  113.05 3241.01  111.67 3257.41  112.87  3277.1  113.11
 3323.03  111.69 3342.71  111.46 3362.39  111.59 3398.48  111.31 3421.45  111.68
 3441.13  111.55 3483.78  111.82 3516.58  111.63 3539.55  111.78 3562.51  111.45
 3601.88  111.93 3637.97  111.76 3647.81  111.51  3700.3  111.27 3746.23  111.35
 3765.91   111.1 3815.12  111.29 3857.77   111.1 3880.73  111.22 3913.54  111.96
 3933.22  111.56 3949.63  111.92 3969.31  111.86 4025.08  112.18 4071.01  112.13
 4090.69  111.87  4107.1  112.06 4185.83  111.96  4225.2  112.14 4244.89  112.02
 4271.13  112.55 4290.82  112.07 4297.38  112.39 4317.06  112.22 4333.47  109.48
 4349.87  108.99 4356.43   110.8 4369.56  111.42  4395.8  111.24 4402.36  110.92
 4418.77  111.09 4425.33  111.58 4445.01   111.9 4484.38  111.55 4520.47  110.11
 4546.72  109.85 4599.21  109.57 4618.89  109.29 4704.19  109.11 4710.75  109.02
 4773.09  109.15 4812.46   108.9 4861.67  109.16  4907.6  109.01 4920.72  108.38
 4940.41  109.68 4946.97  106.92 4950.25   106.6 4966.65  111.16 4983.06     111
 4989.62  111.31 5032.27  111.14 5055.23  111.32 5084.76  111.17 5140.53  111.39
 5229.11  111.38 5284.89  111.19 5327.54  111.35 5373.47  111.18 5396.43  111.36
 5412.84  111.14 5429.24   111.3 5462.05  111.16 5501.42  111.34 5514.54  111.18
 5567.03  111.34 5583.43  111.12 5619.52  111.35  5708.1  111.32 5836.05  111.17
 5895.11  111.28 6016.49  111.22  6049.3  111.32 6157.57  111.29 6180.53   111.2
  6203.5   111.4 6210.06  111.16 6229.74  111.85  6236.3  111.44 6246.15  112.03
  6374.1     112 6485.64  112.09 6534.85     112 6616.87  112.19 6629.99   112.1
 6731.57  112.19 6764.31  112.11  6777.4  111.52 6797.05  109.24 6813.42  108.99
 6875.62  109.06 6993.48  108.93 7029.49  108.97 7042.59  108.31 7049.14  109.31
 7068.78   110.8 7098.25  111.19 7114.62  112.46 7127.71  111.65 7137.53  112.68
 7150.63  113.27 7163.73  112.48  7180.1  113.08 7206.29  112.85 7219.38  110.44
 7235.75  109.97 7258.67  108.39 7261.94  109.34 7275.04  109.97 7294.68  112.01
 7307.78  113.67  7330.7   114.2 7347.07  112.56 7376.53  112.03 7389.63  112.56
  7392.9  112.31 7402.72  112.48 7422.37  105.14 7428.91  104.79 7477.91   97.51
 7507.91   90.71 7517.91   89.11 7537.91   88.11 7617.91   87.71 7657.91   87.81
 7697.91   87.41 7737.91   87.81 7777.91   95.11 7785.23  104.83 7791.76  107.68
 7801.56  108.82 7814.62  111.69 7830.95  112.15 7844.02  112.14 7866.88  112.87
 7879.94  112.89 7896.27  113.43 7906.07  113.05 7948.52  113.19 7984.45  114.05
 8010.57  113.07  8026.9  112.92 8039.97  113.18 8053.03  111.48 8062.83  111.37
 8075.89  112.44 8088.95  111.91 8111.81  112.66 8118.35  112.51 8131.41  113.56
 8137.94   113.6 8154.27  112.54 8177.13   112.2 8186.93  114.03 8196.73  113.16
 8219.59  114.43 8252.31  114.28 8265.42  112.79 8275.26  114.24 8285.09  113.88
 8304.76  114.02 8327.71  112.97 8340.83  111.53 8376.89   111.8 8396.56  111.76
 8419.51  112.84 8442.46  112.95 8458.85   112.6 8478.52  112.81 8485.08  112.58
 8494.92  113.86 8504.75  112.42 8517.87  112.53 8524.42  113.91 8530.98  113.69
 8544.09  112.31 8563.76  113.21  8573.6  112.54 8583.43  112.74 8606.38  111.92
 8622.78  111.67 8642.45  113.12    8649  114.25 8662.12  112.08 8671.95  111.69
 8688.35  112.29 8714.57  111.83  8757.2  112.18 8773.59  113.13 8783.42  113.17
 8793.26  112.35 8803.09  112.59 8812.93  112.19 8829.32  112.51 8842.44  113.31
 8855.55  114.99  8878.5  112.68 8904.73  113.93 8927.68  113.84 8940.79  112.15
 8957.18  112.17 8963.74  112.76 8983.41  112.45  9016.2   112.8 9026.03  113.55
 9048.98  113.17 9071.93  113.58 9085.04  113.26 9104.72  114.14 9114.55  113.18
 9124.39  113.46  9137.5  112.84 9157.17  113.27 9180.12  113.46 9209.63  112.79
 9226.02   112.9 9255.53   112.1 9268.64  111.52 9288.31  111.67 9307.98  110.65
 9334.21   111.7    9367   110.8 9389.95  111.29 9399.78  110.82 9426.01  112.05
 9445.68  112.27 9471.91  112.15 9501.41  111.51 9540.76  111.46 9547.31  111.83
 9583.38  111.18 9603.05  109.89 9619.44  108.06 9622.72  108.21 9632.55  110.55
 9639.11  113.32 9645.67  114.32 9658.78  111.17 9665.34  111.09 9681.73  113.28
 9691.57  112.85  9701.4   113.3 9707.96  112.89 9724.35  113.65 9763.69  113.88
 9773.53  113.18 9803.04  113.64 9812.87  113.23 9829.26  113.62 9848.93   113.3
 9868.61  113.37 9881.72  113.89 9963.68  113.04 9989.91  113.2610009.58  113.81
10042.37  113.2410048.92  113.7610068.59  113.04 10098.1  113.4210114.49   112.8
   10144  113.1710153.83  112.7410180.06  112.6810209.57  112.2510225.96  111.79
10245.63  111.9910252.19  111.74 10281.7  111.8310298.09  111.3810343.99  111.12
 10357.1  111.3510366.94     11110386.61  110.9610455.46  110.1410471.85  110.57
10484.96  110.53 10524.3  109.55 10540.7  109.9910583.32   109.810593.15  110.78
10622.66  110.3910642.33  111.2410648.89  110.8510658.72  109.2110681.67  108.46
10701.34  108.2710734.13  108.3610743.96     10810776.75  107.9710783.31  109.29
10802.98  109.9810832.48  109.7710835.76  110.1810852.15  109.8810865.27  109.19
10884.94  109.0110904.61  109.24 10937.4   108.610980.02  108.94 11012.8   109.9
11035.75  110.0811052.14  109.8911101.32  110.1811140.66  110.9911153.78  112.22
11163.61  112.6311183.28   112.7 11196.4  114.1711212.79  114.5711219.35  114.12
11229.18  111.3311235.74  110.8911248.85  114.1111255.41  115.0311268.52  115.18
11284.92  114.2411311.14  113.2611386.55  112.14 11409.5  112.7711425.89  112.28
11461.96   112.411478.35  110.79 11484.9  112.1811520.97  113.5611537.36  112.85
11557.03   114.8 11576.7  119.1611586.54  119.3111606.21  115.2911655.39  114.55
11688.17  114.4211707.84  115.5611730.79  115.0311786.53  115.4811855.38  115.68
11970.12  115.5611993.07  115.9812025.86  117.4812081.59  117.01

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .198 7389.63    .066 7428.91    .015 7785.23    .066 7830.95    .069

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7389.63 7830.95           3662.8    2000 1560.98            .1       .3
Left Levee      Station=  132.79      Elevation=  132.59
Right Levee     Station=11579.98      Elevation=  119.49
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   64.26 7341.37  114.18 7983.9411911.65  114.01

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            129.45    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.61    Wt. n-Val.                 0.198      0.016     0.069
  W.S. Elev (ft)            128.85    Reach Len. (ft)          3662.80    2000.00   1560.98
  Crit W.S. (ft)            118.76    Flow Area (sq ft)       105708.30   15150.49   62183.81
  E.G. Slope (ft/ft)      0.000071    Area (sq ft)            105708.30   15150.49   62183.81
  Q Total (cfs)           235000.00    Flow (cfs)              39810.00   127872.60   67317.38
  Top Width (ft)          11948.80    Top Width (ft)           7256.84     441.32    4250.64
  Vel Total (ft/s)            1.28    Avg. Vel. (ft/s)            0.38       8.44       1.08
  Max Chl Dpth (ft)          41.43    Hydr. Depth (ft)           14.57      34.33      14.63
  Conv. Total (cfs)       27902070.0    Conv. (cfs)             4726729.0   15182600.0   7992741.0
  Length Wtd. (ft)          2650.07    Wetted Per. (ft)         7268.20     450.61    4264.51
  Min Ch El (ft)              87.41    Shear (lb/sq ft)            0.06       0.15       0.06
  Alpha                       23.74    Stream Power (lb/ft s)      0.02       1.26       0.07
  Frctn Loss (ft)             0.15    Cum Volume (acre-ft)    224453.80   77440.01   244396.70
  C & E Loss (ft)             0.18    Cum SA (acres)           25121.64    3091.61   27406.66


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 174.2

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	115.49	32.52	115.73	52.03	117.4	55.29	118.25	71.55	125.17
84.55	131.09	91.06	132.04	115.06	132.28	115.73	132.28	115.73	122.28
125.73	122.08	216.73	116.73	219.73	117.48	243.73	117	249.73	115.5
259.73	115.3	265.73	113.8	291.04	113.79	310.72	114.03	350.09	113.9
402.59	114.04	448.52	114.03	471.48	113.58	478.04	111.85	487.88	106.68
494.45	105.49	501.01	108.85	504.29	109.51	517.41	109.03	563.34	108.73
609.27	108.84	645.36	108.71	684.73	108.82	724.1	108.77	733.94	108.28
743.78	108.81	750.34	108.67	763.47	109.76	770.03	111.14	786.43	111.85
792.99	111.03	809.4	104.01	812.68	103.41	1235.89	103.41	1245.73	104.08
1255.58	107.25	1265.42	108.82	1278.54	109.62	1291.66	109.42	1301.51	109.81
1324.47	109.81	1331.03	110.22	1344.16	109.68	1396.65	109.78	1419.61	109.64
1488.51	109.79	1547.56	109.45	1557.4	109.61	1609.89	109.5	1701.76	109.56
1734.56	109.81	1760.81	109.53	1800.18	109.72	1829.7	109.66	1892.04	109.75
1898.6	109.89	1957.65	109.68	1980.62	109.75	1997.02	109.56	2019.99	109.67
2069.2	109.57	2085.6	109.74	2118.41	109.6	2161.06	109.83	2197.15	109.6
2233.23	109.59	2282.44	109.71	2298.85	109.49	2321.81	109.66	2341.5	109.49
2423.52	109.69	2439.92	109.52	2476.01	109.69	2508.81	109.65	2515.38	109.49
2544.9	109.64	2558.03	109.51	2571.15	109.76	2594.11	109.52	2630.2	109.64
2659.73	109.51	2682.69	109.9	2685.97	109.65	2712.22	109.39	2725.34	109.54
2777.83	109.43	2800.8	109.53	2850.01	109.48	2872.97	109.34	2895.94	109.53
2909.06	109.32	2922.19	109.54	2971.4	109.28	2984.52	109.47	3000.92	110.18
3023.89	110.58	3027.17	110.29	3037.01	106.94	3040.29	106.33	3046.85	107.16
3056.69	110.66	3066.54	111.57	3082.94	111.44	3092.78	110.9	3105.91	111.39
3115.75	111.19	3148.55	111.42	3197.77	111.31	3207.61	111.49	3233.85	111.07
3283.06	112.32	3299.47	111.92	3319.15	112.14	3335.56	112.07	3391.33	112.2
3443.82	112.02	3460.22	112.16	3473.35	111.95	3493.03	112.2	3561.93	112.08
3591.45	112.2	3624.26	112.01	3653.79	112.14	3683.31	111.86	3758.77	111.98
3768.61	111.72	3781.73	112.01	3801.42	112.02	3827.66	110.65	3850.63	110.36
3870.31	110.6	3890	110.43	3909.68	110.83	3935.93	110.51	3952.33	110.85
3975.3	110.48	4004.82	110.76	4040.91	110.75	4057.31	110.54	4086.84	110.79
4106.52	110.54	4126.21	110.76	4149.17	110.63	4178.7	110.81	4234.47	110.67
4241.03	110.82	4277.12	110.61	4313.21	110.82	4319.77	110.62	4346.02	110.53
4365.7	111.34	4395.23	111.48	4418.19	110.32	4451	109.83	4480.52	110.14
4523.17	110.13	4533.02	109.74	4562.54	109.28	4588.79	109.09	4634.72	108.97
4664.24	109.04	4674.09	108.87	4716.74	109.15	4739.7	108.99	4779.07	109.14
4811.88	108.96	4834.84	109.45	4847.96	108.11	4870.93	108.16	4887.33	108.82
4903.74	108.68	4939.82	108.92	4975.91	108.79	4995.6	108.96	5018.56	108.71
5028.4	108.98	5044.81	108.86	5077.61	109.08	5172.75	108.95	5192.44	109.13
5228.52	108.93	5244.93	109.13	5258.05	108.95	5290.86	109.15	5300.7	108.99
5320.39	109.16	5340.07	109	5353.19	109.19	5369.6	108.94	5399.12	108.99
5405.68	109.17	5445.05	108.98	5468.02	109.18	5494.26	109.04	5504.1	109.21
5527.07	108.96	5602.52	109.2	5628.77	108.88	5651.74	109.15	5658.3	108.9
5677.98	109.39	5694.38	109.3	5717.35	109.9	5730.47	108.9	5740.31	110.56
5750.16	110.97	5792.81	110.46	5799.37	111.01	5848.58	111.12	5907.63	111
5976.52	111.05	6029.02	111	6068.39	111.09	6137.28	111.05	6153.68	110.93
6163.52	111.49	6176.65	111.54	6186.49	111.22	6189.77	111.69	6268.51	111.57
6307.88	111.7	6327.56	111.48	6370.21	111.63	6458.79	111.68	6488.31	111.59
6537.52	111.68	6580.17	111.61	6649.07	111.79	6665.47	111.64	6724.53	111.71
6836.07	111.64	6904.96	111.67	6924.65	111.76	6967.3	111.71	6973.86	111.49
6990.26	111.66	7009.95	111.48	7029.63	111.64	7075.56	111.63	7082.12	111.48
7137.89	111.73	7160.86	111.54	7180.54	111.68	7193.67	111.53	7223.19	111.59
7262.56	111.97	7275.68	111.76	7301.93	111.71	7354.42	111.79	7433.16	111.72
7479.09	111.85	7515.17	111.51	7541.42	111.83	7613.6	111.76	7630	111.91
7649.68	111.54	7672.65	111.72	7702.18	110.22	7712.02	109.03	7771.07	109.29
7826.84	109.15	7853.09	109.29	7899.02	109.23	7918.7	109.03	7928.54	109.2
7954.79	109.01	7990.87	109.27	8023.68	109.02	8046.65	109.21	8056.49	109.08
8092.58	109.25	8108.98	108.65	8115.54	109.49	8125.38	109.42	8145.07	110.09
8161.47	108.64	8174.59	108.76	8194.28	108.22	8207.4	109.21	8217.24	109.4
8236.93	107.64	8246.77	107.07	8259.89	107.02	8269.73	109.11	8276.29	109.67
8289.42	107.64	8309.1	107.46	8328.79	107.77	8351.75	108.69	8361.59	108.23
8377.99	108.21	8394.4	107.84	8407.52	108.94	8427.2	111.7	8443.61	112.64
8450.17	111.8	8463.29	111.84	8473.13	111.13	8499.38	107.92	8515.78	106.98
8532.18	106.83	8551.86	107.74	8558.42	107.72	8584.67	106.69	8594.51	105.15
8601.07	104.79	8641.07	105.07	8661.07	103.49	8699.07	101.93	8718.07	101.7
8720.07	100.74	8729.07	99.4	8742.07	94.5	8758.07	91.7	8774.07	90.6
8807.07	89.1	8823.07	88.2	8840.07	87.9	8856.07	87.1	8891.07	86.71
8896.3	104.79	8902.86	105.35	8909.42	110.07	8915.97	110.99	8955.31	110.28
8974.97	110.26	9014.31	109.84	9024.14	110.82	9033.97	110.82	9053.64	109.08
9060.2	109.57	9092.98	109.25	9115.92	108.83	9129.03	109.18	9148.7	109
9155.26	108.63	9191.31	108.52	9197.87	108.72	9207.7	108.26	9230.65	108.14
9237.2	108.79	9266.7	108.01	9292.93	107.95	9312.59	107.55	9348.65	108.04
9378.15	107.63	9397.82	107.71	9433.87	107.34	9489.6	107.61	9512.54	106.9
9555.15	107.17	9564.99	107.07	9617.43	107.51	9633.82	107.03	9656.77	106.91
9673.16	106.57	9686.27	107.55	9715.77	107.89	9745.27	108.52	9771.49	108.06
9781.33	108.5	9797.72	108.65	9810.83	108.17	9817.38	108.46	9827.22	108.12
9843.61	108.34	9859.99	107.04	9873.11	106.99	9882.94	108.72	9905.88	110.15
9912.44	107.94	9928.83	106.95	9941.94	107.17	9958.33	106.72	9991.11	106.52
10000.94	106.6610040.28		106.6910056.67		107.5910063.22		107.510076.33		108.1
10092.72	107.110105.83		107.2110115.67		107.6510132.06		107.8510138.61		107.01
10191.06	106.6810200.89		106.9610230.39		106.610240.23		106.6910256.62		107.41
10279.56	107.3510302.51		106.8110322.17		106.8910328.73		107.6710335.28		110.9
10341.84	112.3710368.06		112.5110381.17		113.1610404.12		113.210420.51		113.93
10427.06	113.3910446.73		114.0310456.56		113.6610469.68		113.8510482.79		114.51
10509.01	114.8810522.12		114.5810531.96		116.3110548.34		117.610558.18		116.54
10571.29	115.8 10584.4		115.5610600.79		114.7810620.46		114.6510630.29		115.09
10653.24	114.8910669.63		114.3110728.63		113.8110745.02		114.1610797.46		113.1
10810.57	111.4810817.13		112.9710840.07		112.5410846.63		112.8610856.46		111.46
10872.85	111.0810889.24		111.21 10895.8		112.1210905.63		115.6510918.74		119.17
10928.58	118.7910938.41		116.2910951.52		112.0810958.08		111.3610971.19		110.98
11020.36	113.9511030.19		113.5111046.58		114.6111079.36		114.8111099.02		114.67
11194.08	115.1211220.31		11511272.75		115.3811282.58		115.6811305.53		115.22
11315.36	115.8411328.47		117.1911348.14		117.4111371.09		117.19		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	8718.07	.025	8891.07	.06610918.74		.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
8584.67	8915.97	472.5	1764.5	2016	.1	.3

```
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 8915.9711371.09  110.99       T
Left Levee      Station=  115.73      Elevation=  132.28
Right Levee     Station=10918.74      Elevation=  119.17
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1278.54  109.62

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            129.12    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                0.066      0.048      0.068
  W.S. Elev (ft)            129.10    Reach Len. (ft)          472.50    1764.50    2016.00
  Crit W.S. (ft)            113.94    Flow Area (sq ft)       157902.00   10666.42   40973.22
  E.G. Slope (ft/ft)      0.000048    Area (sq ft)            157902.00   10666.42   45314.92
  Q Total (cfs)           235000.00    Flow (cfs)             172336.60   22415.46   40247.96
  Top Width (ft)          11255.36    Top Width (ft)           8468.94     331.30    2455.12
  Vel Total (ft/s)            1.12    Avg. Vel. (ft/s)            1.09       2.10       0.98
  Max Chl Dpth (ft)          42.39    Hydr. Depth (ft)           18.64      32.20      16.69
  Conv. Total (cfs)       34052650.0    Conv. (cfs)            24972420.0   3248110.0   5832126.0
  Length Wtd. (ft)          844.58    Wetted Per. (ft)         8481.17     348.30    2472.38
  Min Ch El (ft)             86.71    Shear (lb/sq ft)            0.06       0.09       0.05
  Alpha                       1.16    Stream Power (lb/ft s)      0.06       0.19       0.05
  Frctn Loss (ft)             0.04    Cum Volume (acre-ft)    213370.80   76847.34   242470.50
  C & E Loss (ft)             0.00    Cum SA (acres)           24460.48    3073.87   27286.51


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 174.10*

INPUT
Description: RGV-03,
Station Elevation Data    num=     462
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  123.76   17.22   123.9   29.28  125.16   44.78   131.6   58.58  132.08
   82.58  132.32   83.25  132.32   83.25  122.32   93.25  122.12  184.25  117.78
  187.25  118.53  211.25  118.05  217.25  116.55  227.25  116.35  233.25  114.85
  257.78  114.78  278.91  115.03  284.95  114.54  294.01  111.39  300.05  109.99
  306.08  109.87  312.11   111.6  324.19  111.29  351.36  111.16  405.68  111.31
  453.65     111  460.83  110.15   471.6  107.57  478.79  106.94  489.56  108.99
   541.5  108.64  562.63  107.83  571.69  106.57  601.87  106.37  613.94  106.06
     644  106.01   687.1  106.07   730.2  106.04  740.97   105.8  758.92  105.99
   773.3  106.54  780.48  107.23  798.43  107.58  805.61  107.18  823.58  103.67
  827.17  103.37  991.24  103.37 1000.28  103.77  1018.4  103.44 1033.49  104.21
 1042.55  103.76 1054.61  103.93 1063.67  105.29 1081.78  106.07 1096.87   108.1
 1105.93  108.89 1111.96  108.88 1121.02  107.51 1130.07  106.71 1178.36  106.54
 1205.53  106.66 1244.77  106.62  1265.9  106.71 1290.47  106.62 1301.24  106.98
 1312.02   108.6  1322.8  109.41 1337.16  109.83 1351.52  109.65 1394.62  110.08
 1408.99  109.83 1440.96  109.91 1491.59  109.78 1525.47  109.88 1537.54  109.63
 1552.64   109.7  1579.8  109.42 1628.09   109.3 1658.28  109.44 1667.33  109.36
 1718.64  109.43 1772.97  109.37 1794.09  109.49 1824.28  109.44 1836.38  109.56
 1865.11  109.44 1908.21  109.53 1972.17  109.47 2038.58  109.63 2077.81  109.47
 2153.27  109.42 2201.56  109.57 2216.66  109.79  2240.8  109.54 2303.28  109.71
 2370.59  109.55  2388.7   109.7 2409.82  109.63 2418.88  109.02 2430.95  107.02
 2436.99  106.75 2443.03   107.3 2452.08  109.45 2458.11  109.66  2503.4  109.24
 2539.61  109.24 2593.94  109.38 2633.17  109.26 2669.39  109.36 2691.16  109.25
 2752.22  109.37 2777.35   109.3 2816.86  109.37 2849.19  109.28 2874.32   109.5
 2906.65  109.24 2928.97  109.37 3004.42  109.26 3034.61  109.33 3082.63  109.16
 3107.77  109.27 3122.14  109.16 3155.33  109.31 3176.46  109.18 3212.68   109.7
 3218.72  109.31 3227.77   107.7 3236.83  107.59  3248.9  109.48 3251.92  109.53
  3265.8  107.65 3272.98  108.07 3283.75  109.84 3294.53  110.24 3323.26  109.83
 3337.63  110.06 3348.41  109.97 3375.67   110.2 3448.97   110.2 3477.69  110.03
  3496.4  110.29 3517.53  110.31 3549.53  110.57 3565.82   111.1 3599.02   111.3
 3629.21  111.23 3644.29  111.39 3671.46  111.42 3683.53  111.24 3725.79   111.4
 3739.88  111.23 3761.43  111.39 3836.85  111.32 3869.17  111.39 3928.01  111.26
 3949.14  111.33  3991.4  111.15 4048.74   111.3 4063.11  111.15 4077.47  111.36
 4100.05  111.07 4112.13  111.13 4127.75  110.71 4145.33  110.54 4187.59  110.71
    4196  110.54 4217.54  110.79 4246.28  110.57 4264.23  110.86 4289.38   110.7
  4321.7  110.82 4379.16  110.73 4411.49  110.86 4433.03  110.71 4454.59  110.87
 4479.72  110.77 4512.05  110.89 4549.79   110.8 4580.28  110.86 4619.79  110.68
  4659.3  110.79 4679.58   110.6 4695.22  110.66 4716.76     111 4742.95  111.13
 4774.22  110.47 4810.14  110.25  4866.7  110.53 4889.15  110.52 4918.01  110.04
 4954.24  109.92 5035.73  109.87 5054.37  109.72 5074.96  109.88 5126.19  109.89
  5147.4  110.07 5159.48  109.84 5171.55  110.03 5192.69  110.05 5201.73  109.84
 5207.77  108.34 5213.81  107.75 5222.86  109.12 5230.34  109.65 5244.71  108.99
 5269.85   108.9 5287.81  109.19 5305.77  109.13 5345.27  109.27 5406.33   109.3
 5431.47  109.18 5442.24  109.32  5476.4  109.27 5518.66  109.46 5560.91  109.36
 5576.01  109.46 5661.32  109.42 5693.64  109.35  5797.8   109.5 5815.76  109.37
 5855.26  109.48 5898.96  109.39  5923.5  109.58  5953.3  109.49    5963  109.62
 5988.15  109.49 6070.75  109.59 6131.81  109.43 6171.31  109.58 6196.45  109.92
 6210.82  109.45 6221.59  110.25 6232.37  110.42 6279.06   110.2 6286.24  110.49
 6324.54  110.72 6339.64  111.23 6366.81  111.38 6393.97  111.09 6406.04  111.28
 6460.38   111.3 6481.51  111.15 6490.58  111.31 6529.83  111.34  6572.1   110.5
 6602.29  110.68 6644.56  110.51 6674.12  110.65 6684.89  110.95 6710.04  110.75
 6713.62  110.99 6810.64  110.98 6864.47  110.87  6898.2  110.94 6937.46  110.87
 6952.55  111.02 6982.75   110.9 6994.82     111 7028.04  110.83  7115.6  110.95
 7127.69  110.87 7182.03  111.03 7234.39  110.94 7339.05  110.96 7384.34  111.03
 7396.41  110.94 7438.69  111.02 7499.08  110.96 7532.29  111.06 7547.39  111.83
 7556.44  111.35 7589.94   111.4  7611.5  111.26 7625.89   111.4 7707.43  111.34
 7722.52  111.52 7776.88  111.34 7782.92  111.46 7812.62  111.33 7855.39  111.32
 7888.04  111.48 7900.68  111.36  7988.6  111.47 8045.62  111.46 8075.81  111.38
 8125.08  111.48 8164.58   111.2 8211.69  111.44 8220.75   111.3 8272.33  111.31
 8290.29  111.39 8311.83  111.17 8336.98  111.27  8369.3  110.57 8380.08  109.95
 8420.04  110.12 8474.39   110.1 8489.49  110.02  8522.7  110.11 8571.02  110.09
 8606.34  109.95 8617.11  110.05 8652.55  109.95 8685.34  110.11 8721.26  109.96
 8796.69  110.05 8814.64  109.77 8821.82   110.2 8854.86  110.41  8872.1  109.82
 8886.47  109.86 8908.02  109.56 8922.38  110.06 8933.16  110.18 8954.71  109.26
 8965.48  109.01 8979.85  109.02 8990.62  110.01  8997.8  110.26 9012.17  109.18
 9033.01  109.18 9045.09  109.48 9057.16  110.33 9069.25  110.46 9084.34  108.91
  9093.4  108.75 9099.45   109.1 9105.48  110.12 9120.58  110.24  9127.1  109.96
 9153.79  109.95 9168.89  111.26 9180.97  112.85 9186.44  112.37 9197.37  112.26
 9205.57  110.86 9226.08  106.73 9228.17106.5647 9241.12  105.54 9254.78  105.06
 9271.19  105.03 9298.53  104.21 9306.73  102.78 9315.17  102.11 9331.41   99.73
 9345.53    98.8  9362.2    97.3 9393.87   95.86 9409.71   95.45 9416.3794.47572
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 9429.71   91.42 9443.04   89.88  9473.9   88.37 9497.21   87.56 9511.38   87.36
 9524.72   86.79 9553.88   86.35 9554.03   95.93 9560.65  105.53 9564.75  106.91
 9572.75     111 9577.63  112.26 9586.11  112.86 9606.14  112.54 9626.16  110.52
 9651.31  109.94 9664.34  110.38 9677.38   109.7 9692.88  110.12 9718.68  109.53
 9740.41  109.51 9744.76  109.32 9794.74  109.13 9799.08  109.47 9818.64  109.14
 9849.07  109.07 9886.38  109.58 9899.72  110.68 9906.39   110.9 9939.76  110.24
 9966.45  110.63 9981.63  110.1210009.88 110.3410051.18 110.4910062.04   110.2
10088.12 109.8510096.82   110.310135.93  110.910153.32 110.6310170.71 110.89
 10179.4 110.6510201.13 110.7510211.99 110.1110220.69 110.0910227.21 110.95
10242.42  111.510246.77 110.3510257.63 110.0310266.71 110.2810286.72 109.86
10313.43 110.1110331.52 110.1110355.42 110.7910366.29 110.2810392.37 110.57
10396.72 110.1610431.49 110.0810438.01 110.2310457.57 110.0910474.96 110.43
10505.38 110.0410518.42 110.1210522.77 110.5210527.11 112.1510531.46 112.89
10548.84    11310557.53  113.310572.75 113.3410583.62  113.810587.96 113.57
   10601    11410607.52 113.8810624.91 114.2410650.98  114.210657.51 114.79
10683.58 114.2610693.74 114.3510703.14 114.02 10722.7 114.1710760.47 113.22
 10787.9 113.0710798.76 113.2510810.66113.076610833.53 113.5910842.22 113.51
10847.21 114.6710860.58 114.9110866.13 115.5210872.65 115.3710894.38  116.8
10898.73 117.4510905.25 119.5110913.94 121.6510921.46 121.2810928.98 119.85
10939.01 117.4610951.48115.295910966.07 113.7910980.28 113.9510989.77 112.87
10999.24 113.64 11011.7 114.1111036.77 113.9111060.85 113.5311075.06 113.53
11089.27 113.8911122.45 116.4711131.92 116.7811192.18 117.0211209.73 116.19
11227.27 116.9611259.87 116.88

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 9331.41    .025 9586.11    .06610928.98    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9226.08 9586.11           472.5  1764.5    2016             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9586.1111259.87  112.86       T
Left Levee      Station=   83.25      Elevation=  132.32
Right Levee     Station=10913.94      Elevation= 121.655
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  440.62 1356.28  109.46

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 174

INPUT
Description: RGV-03,  Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     461
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  132.12      24  132.36   24.67  132.36   24.67  122.36   34.67  122.16
  125.67  118.93  128.67  119.68  152.67   119.2  158.67   117.7  168.67   117.5
  174.67     116  196.77  115.82     223  115.76  245.96  116.04  252.52  115.07
  262.36   108.8  268.92  106.01  275.48   105.8  282.03  109.28  295.15  108.67
  304.99  108.75  324.67  108.35  337.79   108.5  370.58  108.43   383.7  108.58
  409.93  108.32  452.57  108.48  465.68  108.38   495.2  108.66  514.88  108.52
  521.44  108.15  531.27  108.47  547.67  107.73  554.23  106.92  564.07  104.38
  580.47  103.93  596.86   103.9  609.98  103.32 1019.92  103.32 1029.75  104.13
 1049.43  103.47 1055.99  103.84 1065.83  105.02 1075.67  104.11 1088.78  104.46
 1098.62  107.17 1111.74   107.9  1118.3  108.73  1134.7  112.79 1144.54  114.36
 1151.09  114.35 1160.93  111.62 1170.77     110 1223.24  109.68 1252.76  109.91
 1295.39  109.82 1318.35  110.01 1344.58  109.83 1393.78  110.07 1413.45  109.85
 1436.41  110.11 1452.81  109.92 1508.56  110.08 1570.87   109.9 1600.38  110.05
  1613.5  109.53  1629.9  109.64 1659.41  109.11 1685.65  109.27 1711.88  109.13
 1744.68   109.3 1754.52  109.15 1810.27  109.34 1816.83  109.17 1843.06  109.34
  1869.3   109.2 1892.25  109.42 1925.05  109.15 1938.17  109.31  1997.2  109.38
 2085.74  109.24 2118.54  109.44 2141.49  109.25 2157.89  109.45 2200.52  109.25
 2210.36  109.34 2239.88  109.18 2256.27  109.33 2282.51  109.18 2334.98  109.57
 2351.38  109.87 2377.61  109.41 2397.29  109.53  2459.6  109.61 2485.84  109.52
 2492.39  109.68 2518.63  109.51 2538.31   109.8 2561.26  109.61  2571.1  108.37
 2577.66  105.91 2584.22  104.34 2590.78   103.8 2597.34  104.97 2607.17  109.39
 2613.73  109.81 2623.57  109.36 2639.97  109.32 2662.93  108.99 2695.72  109.06
 2702.28   108.9 2735.07  108.92 2761.31   109.1 2803.94   108.9 2843.29  109.06
 2859.69  108.88 2872.81   109.1 2925.28  108.96 2974.47  109.14  3049.9  109.03
 3072.86  109.14 3115.49  109.05 3125.33  109.21 3158.12  109.07 3167.96  109.27
 3207.31     109 3240.11  109.16 3246.67  109.01 3269.62  109.11 3282.74  108.98
 3354.89  109.02 3371.28  109.18 3394.24  109.02  3417.2  109.63 3433.59  109.61
 3440.15  108.59 3449.99  105.14 3459.83  104.78 3466.39  106.31 3472.95  108.47
 3476.23  108.92  3512.3  109.02 3531.98  108.79 3577.89  108.71 3610.68  109.04
 3627.08  108.84 3643.48  109.08 3695.95  108.88 3741.86  109.07 3764.82  108.63
 3784.49  108.73 3807.45  109.46 3817.29  110.12 3853.36  110.51 3869.76  110.54
 3886.16  110.31 3902.55   110.6 3932.07   110.7 3945.19  110.39 3961.58  110.58
  3991.1  110.65  4007.5  110.49 4043.57  110.65 4053.41  110.47 4069.81  110.63
 4132.11  110.53 4164.91  110.65 4210.82  110.41 4233.78  110.63 4279.69  110.41
    4342  110.63 4355.12  110.53 4368.24  110.75 4387.91   110.6 4397.75  110.17
 4410.87  110.87 4446.94  110.64  4469.9  110.86 4479.74  110.71 4492.86  110.93
 4499.42  110.65 4532.21  110.77 4542.05  110.59 4565.01  110.66 4578.12   110.9
 4620.76  110.95 4650.27  110.83 4728.98  110.98 4751.94  110.85 4788.01  110.99
 4807.69   110.9 4856.88  110.98  4886.4  110.88 4899.51  111.05 4932.31   110.8
 4991.34  110.71  5014.3  110.79 5027.42  110.63 5047.09  110.81 5066.77  110.66
 5096.28   110.8 5102.84  110.58 5217.62  110.74 5230.74  110.92 5273.37  110.91
 5286.49   110.6 5319.29  110.85 5325.85   110.7 5361.92  110.84 5414.39  110.71
 5427.51   110.5 5457.02  110.77 5463.58  110.59 5522.61  110.83 5535.73  111.08
 5548.85  110.57 5561.97  110.93 5584.93  111.07 5594.76  110.71 5601.32  107.68
 5607.88  106.38 5617.72  108.93 5624.28  109.84 5634.12  109.94 5680.03  109.55
 5788.25  109.67 5811.21  109.63 5880.08  109.69  5893.2  109.58 5925.99  109.68
 5939.11  109.86 5955.51  109.71 5985.02  109.72 6001.42  109.93 6027.66  109.98
 6044.05  109.78 6086.69  109.94  6132.6  109.73  6244.1  109.81 6352.32  109.79
 6368.72     110 6411.36  109.93 6427.75  110.07 6496.62  109.94 6509.74  110.04
 6552.37  109.95 6565.49  110.12 6578.61  109.95 6601.57     110 6621.24  109.79
 6693.39     110 6722.91  109.81 6752.42     110 6768.82  109.92 6814.73  110.36
 6831.13  111.34 6860.65  111.68 6890.16  111.15 6903.28  111.56 6929.51  111.45
 6942.63  111.57 6959.04  111.33 6962.32  111.56 6985.28  111.25 6995.13  111.57
 7037.78  111.68 7047.62  111.45 7057.46  110.77 7083.71  109.93 7096.83  110.22
 7116.51  110.29 7162.44  109.96 7175.57  110.29 7205.09  110.42 7218.22  110.28
 7313.36  110.34 7333.04  110.17 7342.89  110.35 7378.98  110.22 7438.03   110.3
 7451.15  110.08 7467.56  110.23 7480.68   110.1 7497.08  110.39 7529.89  110.14
 7543.01  110.32 7572.54  110.23  7579.1  110.04 7595.51  110.25 7602.07  110.08
 7641.44  110.08 7674.24  110.26 7687.37  110.12 7746.42  110.35 7769.39  110.27
 7867.81  110.17 7917.02  110.24 7966.23   110.4 7979.35  110.22 8025.29   110.4
 8044.97  110.24 8071.22  110.27 8081.06  110.49  8090.9  110.24 8126.99  110.37
 8133.55  111.46 8143.39  111.93 8153.23  110.99 8186.04  111.16 8218.85  111.02
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 8228.69  111.22 8264.78  111.04 8277.91  111.16 8317.28  111.13 8333.68  111.43
 8356.65  111.16 8392.74  111.14  8399.3  111.34 8418.98  111.07 8445.23   111.2
 8478.04  110.96 8504.28  111.04 8527.25  110.94 8566.62  111.15 8579.74  111.03
 8602.71  111.13 8684.73  111.18 8717.54  111.04 8786.44  111.14 8796.28  110.91
 8825.81  110.89 8865.18  111.06 8875.02   110.8  8947.2  110.87 8989.85  110.76
 9029.22  110.94 9065.31  110.81 9091.55  111.04 9121.08  110.86 9150.61  110.98
 9167.01  110.86  9203.1  110.99 9226.07  110.79  9255.6  110.94 9265.44  110.83
 9317.93  110.92 9334.34  111.05 9344.18  110.84 9360.58  110.98  9426.2   110.9
 9478.69  110.93  9495.1  110.84 9557.43  110.96    9564  110.79  9580.4     111
 9626.33  110.88 9662.42     111 9668.98  110.86 9698.51  111.03  9734.6  110.71
 9757.57  110.89 9770.69  111.34 9783.81  112.83 9796.94  112.63 9813.34  109.29
 9823.18  109.28 9829.75  109.98 9836.31  112.02 9852.71  112.51  9872.4  111.33
  9888.8  109.38 9892.08  109.35  9905.2  110.52 9918.33  113.06 9931.45  112.68
    9945  108.35 9954.42  105.34  9957.7  104.76  9995.7  101.93 10014.7   101.7
 10016.7  100.74 10025.7    99.4 10032.7   96.42 10038.7    94.5 10054.7    91.7
 10070.7    90.6 10103.7    89.1 10119.7    88.2 10136.7    87.9 10152.7    87.1
 10184.7    86.8 10200.7    86.2 10216.7      8610216.88  104.7610223.45   105.5
10230.01  108.7410236.57  113.8510239.85  114.6510246.41  114.4310256.25  114.74
 10266.1  114.6310275.94  110.7910285.78  110.0710295.62  109.9310308.75  110.84
10325.15  110.0410341.56  109.97 10367.8  110.2110400.61  110.9210403.89  111.41
10410.45  113.6910413.73   114.110430.14  113.0610443.26  113.6510449.82  113.32
10476.07  113.6410508.88  113.0310525.28  113.2910544.97  113.1210571.21  113.19
10581.06  112.76 10590.9  113.4110600.74  113.0810613.87  113.5610643.39  113.45
10649.96  113.2710689.33  113.6310699.17  113.17 10728.7   113.510738.54  113.38
 10761.5   114.210771.35   113.810781.19  113.8310787.75  111.8510800.87  113.24
   10814   113.310833.68  112.2810859.93  112.3610869.77  114.1110876.33  116.38
 10882.9  117.2410896.02  121.7510909.14  124.1410925.55  122.9910928.83  122.49
10941.95  116.3710945.23  115.6610955.07  114.8510961.64  111.93 10968.2  113.76
10981.32  113.5311010.85  112.3411020.69  112.2511030.53  112.87 11053.5  117.84
11060.06  118.4811079.75  118.7611099.43  118.6211112.55  117.2211125.68  116.73
11148.64  116.56

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066  9957.7    .02510256.25    .06610909.14    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          994510256.25          1056.67 1804.67    1796             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10256.2511148.64  114.84       T
Left Levee      Station=   24.67      Elevation=  132.36
Right Levee     Station=10909.14      Elevation=  124.14
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0  1118.3  108.73

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            129.05    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.066      0.027      0.069
  W.S. Elev (ft)            129.01    Reach Len. (ft)          1056.67    1804.67    1796.00
  Crit W.S. (ft)            114.93    Flow Area (sq ft)       186145.70   10414.12   11920.44
  E.G. Slope (ft/ft)      0.000041    Area (sq ft)            186145.70   10414.12   13406.66
  Q Total (cfs)           235000.00    Flow (cfs)              189645.80   36212.58    9141.62
  Top Width (ft)          11123.97    Top Width (ft)           9920.33     311.25     892.39
  Vel Total (ft/s)            1.13    Avg. Vel. (ft/s)            1.02       3.48       0.77
  Max Chl Dpth (ft)          43.01    Hydr. Depth (ft)           18.76      33.46      13.36
  Conv. Total (cfs)       36628240.0    Conv. (cfs)             29559120.0   5644268.0   1424857.0
  Length Wtd. (ft)          1242.31    Wetted Per. (ft)         9937.40     334.72     911.31
  Min Ch El (ft)              86.00    Shear (lb/sq ft)            0.05       0.08       0.03
  Alpha                        2.14    Stream Power (lb/ft s)      0.05       0.28       0.03
  Frctn Loss (ft)              0.05    Cum Volume (acre-ft)    209651.60   75951.10   239812.20
  C & E Loss (ft)              0.00    Cum SA (acres)          24261.57    3046.28   27131.58


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 173.33*

INPUT
Description: RGV-03,
Station Elevation Data    num=     462
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  131.92      24  132.16   24.67  132.16   24.67  122.16   34.67  121.96
  125.67  118.86  128.67  119.61  152.67  119.13  158.67  117.63  168.67  117.43
  174.67  115.93   183.9  115.91   202.5  116.09   207.9  115.45  216.01  111.27
  221.41   109.4  226.81  109.26   232.2  111.58     243  111.17  267.31  110.96
  305.11  111.01  315.91  111.12   337.5  110.96  372.61  111.04   383.4  110.96
  407.71  111.16   437.4  111.04  450.91  110.59  456.31  110.08  464.41  108.38
  477.91  108.03  491.41  107.96  517.22  107.17  540.22  104.94  557.46  103.89
  563.21  104.06  580.44  105.63  632.16  105.21  787.33  105.05  827.57   105.1
  839.72  105.25  847.81  105.79  864.01  105.19  877.52  106.24  885.62  105.64
  896.41  105.91  904.51  107.75  920.72  108.86  934.22  111.83  942.32  112.74
  947.71  112.54  955.81  110.18  963.92  108.63  976.99  107.94 1007.12  107.56
 1031.42  107.71 1066.52  107.65 1085.42  107.78 1107.02  107.66 1147.52  107.82
 1163.72  107.67 1182.62  107.85 1196.12  107.72 1242.02  107.83 1293.33  107.71
 1317.62  107.81 1328.42  107.46 1341.93  107.53 1366.22  107.18 1387.83  107.29
 1409.42  107.19 1436.43  107.31 1444.53  107.21 1490.43  107.33 1539.03  107.24
 1557.92  107.39 1584.93  107.21 1595.73  107.31 1644.33  107.36 1695.35  107.29
 1744.23  107.58 1763.13  107.39 1776.63  107.55 1819.83   107.5 1833.27   107.4
 1850.51  107.66 1879.23  107.49  1896.5  107.64 1907.99   108.5 1925.23  109.31
 1935.93  110.23 1948.22  110.93 2011.43  111.19 2045.92  109.58 2089.84  109.59
 2108.73  109.46 2116.83  108.63 2127.63  105.94 2133.04  105.57 2138.44  106.35
 2146.53   109.3 2151.93  109.58 2160.03  109.27 2192.44  109.02 2224.83  108.97
 2273.44  109.11 2308.53  108.99 2365.24  109.13 2408.43  109.05 2448.93  109.17
 2482.69  109.09 2534.41  109.19 2565.04  109.09 2600.14  109.13 2608.24  109.27
 2640.64  109.08 2667.64  109.18 2762.14   109.1 2794.54  109.11 2813.44  109.52
 2826.94  109.52 2832.34  108.84 2840.44  106.55 2848.54  106.31 2862.04  109.04
 2891.74   109.1 2907.94  108.96 2945.74  108.92 2972.74  109.13 2986.24  108.99
 2999.74  109.14 3042.94  109.04 3080.74  109.16 3099.64  108.84 3115.84  108.91
 3134.74  109.42 3142.84  109.87 3172.54  110.14 3199.54     110 3213.04  110.18
 3237.34  110.24 3248.14  110.03 3285.94  110.21 3299.45   110.1 3329.14  110.22
 3402.04  110.13 3429.04   110.2 3466.84  110.03 3485.75  110.17 3523.54  110.01
 3596.45  110.25 3612.64  110.15 3620.75  109.87 3631.55  110.34 3661.24  110.16
 3699.05  110.36 3704.45  110.18 3731.45  110.23 3747.01  110.07 3769.25  110.39
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 3787.25  110.43    3793  110.24 3810.24  108.63 3827.48  108.45 3833.22  108.63
 3856.21  110.37 3912.36  110.16  3976.9  110.24 4023.06  110.12 4033.85  110.23
 4060.86  110.06 4139.16     110 4155.36  110.13 4171.56  110.03 4195.86  110.11
 4201.26  109.96 4295.76  110.06 4333.22   110.2 4352.46  109.94 4379.47  110.16
 4457.76  110.07 4468.56  109.94 4492.86  110.12 4498.26  109.99 4546.86  110.14
 4557.66  110.31 4568.47  109.97 4598.17  110.29 4606.26  110.06 4611.67  108.05
 4617.07  107.19 4625.17  108.91 4630.57  109.52 4638.67   109.6 4676.47   109.4
 4841.17  109.46 4851.98  109.37 4889.77  109.59 4927.57  109.49 4962.68  109.65
 4976.17  109.51 5011.28  109.62 5049.08  109.49 5120.55  109.56 5195.27  109.52
 5229.98  109.57 5243.48  109.73 5275.73   109.6 5292.08  109.78 5348.78  109.64
 5435.19  109.65 5476.87  109.53 5510.79  109.71 5535.09  109.62 5572.89  109.68
 5610.69  110.04 5626.29  110.65 5660.77  109.36 5672.26   109.3 5695.26  110.74
 5715.99     111  5751.1  110.75 5759.21  110.98 5794.33  111.17 5832.14     110
 5859.15  110.23 5896.96  110.03 5907.77  110.25 6045.53  110.34 6075.24  110.23
 6123.86  110.26 6134.66  110.13 6158.98  110.17 6172.48  110.36 6199.49  110.16
 6210.29  110.27 6240.01  110.07 6291.33  110.15 6318.34  110.29 6333.17  110.23
 6377.76   110.3 6477.71   110.2 6558.74  110.44 6569.54  110.34 6607.36  110.47
 6661.38  110.32 6691.09  110.39  6696.5  111.12  6704.6  111.44  6712.7  110.81
 6739.71  110.93 6766.72  110.85 6774.83  110.98 6804.54  110.87 6847.76  110.91
 6861.27  111.09 6880.18  110.91  6931.5  110.86 6953.11  110.96 6980.12  110.83
 7020.64  110.82 7053.05  110.94 7063.85  110.85 7143.47  110.98 7183.67  110.83
 7234.03  110.93 7252.61  110.75 7298.86  110.89 7306.96  110.71 7366.39  110.76
  7401.5  110.71 7433.92  110.81 7463.63   110.7 7485.23  110.87 7547.36  110.74
 7577.07  110.84 7595.99  110.67 7706.73  110.81 7817.48  110.68 7861.49  110.73
 7907.44  110.55 7936.17   110.8 7960.64  110.71 7984.95   110.8 8014.67  110.59
 8033.58  110.72 8044.38  111.02 8055.18  112.02 8065.99  111.89  8079.5  109.67
  8087.6  109.66 8093.01  110.13 8098.41  111.49 8111.91  111.82 8128.12  111.04
 8141.62  109.77 8155.13  110.55 8165.94  112.26 8176.28  111.96 8195.78106.7035
 8209.88105.0564 8226.94   103.2 8241.92  102.75  8250.6  100.79 8260.85   96.48
 8273.47   93.23 8293.34   90.22 8324.72   86.48 8350.74   84.6 8375.97      84
 8388.59   83.29 8404.54   82.77 8405.17   95.33 8412.77   96.44 8416.89   96.53
 8428.19   97.81 8451.18  102.81 8458.05  104.51 8474.17  109.19 8485.66  110.66
 8505.14111.0707 8524.24   111.3 8532.34  113.75 8543.13  114.45 8548.37   114.3
 8556.23  113.25 8560.16  113.32 8568.01   112.2 8582.85  112.21 8600.75  110.18
 8620.39  108.99 8642.65  109.24 8660.99  109.21 8687.17  109.95 8735.63  109.61
 8740.86  109.79 8767.05  109.77 8784.07  109.51 8837.76  109.84 8862.64  110.17
 8883.59  110.09 8929.42   109.5 8945.14  109.63 8962.16   109.7  8981.8  109.52
 8998.83  109.12 9031.56   109.1 9049.89  109.38 9086.56  109.62 9120.61   109.7
 9138.39  109.87 9164.84  111.24 9184.77  111.71 9192.62  113.06 9200.48  113.79
  9203.1  113.45 9214.88   113.9 9222.74  113.85 9248.93  113.04 9268.57  113.42
 9276.43  113.11 9293.46   113.7 9303.94  113.85 9310.49  113.39 9323.58  113.05
 9372.04  112.72 9421.81  112.81 9445.39  112.65 9462.42  112.25 9475.52  112.26
 9480.76  112.55 9488.62  113.72  9500.4   112.4 9504.33  112.98 9514.81   112.8
 9529.22  113.47 9572.44  113.35 9575.06  113.55 9594.71  113.33 9602.56  112.96
  9647.1   113.1 9656.27  113.76  9660.2  113.05 9670.67  113.64 9677.22  112.82
  9700.8  112.68 9746.64  112.78 9763.67  112.67 9791.17  112.79 9830.46   112.7
  9848.8  112.48 9892.39  112.85 9910.35  112.91 9935.24  112.69 9965.36  112.99
10029.53  112.9310062.27  112.8110096.32  112.82 10130.5  112.6210205.02  112.47
10222.05  113.32   10243  112.8810254.79  113.2210289.24  113.18 10324.2  112.89
 10392.3   113.110401.47  113.0110428.97  113.27 10432.9   113.1 10486.6  113.05
10548.15  113.4210563.87  113.6710617.01113.4746 10659.6  113.5110686.05  112.17
10711.86  112.4810734.12  113.0110755.08  113.0610768.17  113.38 10772.1  112.91
10778.65  114.1710787.82  114.1210790.44  113.5310802.22  113.2410804.84  113.75
10821.87  114.5510850.68  114.88 10880.8  115.0810888.66  114.9810904.38  115.47
10927.95  115.4210947.59  115.0610952.83   115.310963.31    11510969.86  114.33
10977.07  114.2611016.74  115.0711037.44116.243911043.19  116.5711060.22  116.86
11069.68  116.7911128.33  120.5511149.28  121.2911157.14  122.5111162.38  124.71
11168.92  124.4611175.47  125.22 11192.1  123.7911203.19  119.7911214.27  118.85
11219.82  116.9311225.36  118.1311253.28   117.1 11269.7  116.8311278.01  117.28
11297.41  120.4811302.95  120.8911319.58  121.12 11336.2  120.9611347.29  119.93
11358.38  119.5411377.77  119.62

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 8241.92    .025 8458.05    .06611162.38    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8195.78 8543.13          1056.67 1804.67    1796             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 8543.1311377.77  114.45       T
Left Levee      Station=   24.67      Elevation=  132.16
Right Levee     Station=11173.29      Elevation=125.2567
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1925.23  109.31


CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 172.67*

INPUT
Description: RGV-03,
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  131.79      24  132.03   24.67  132.03   24.67  122.03   34.67  121.83
  125.67  115.72  128.67  116.47  152.67  115.99  158.67  114.49  168.67  114.29
  174.67  112.79  178.14  112.73  182.37  113.89  209.94  113.57  248.11  113.66
  302.42  113.54  343.54  113.62  358.38  113.23  364.75  112.38   397.2  111.71
  406.22  111.02  424.29  106.55  437.83  104.47  442.34  104.81  455.88  107.93
   496.5   107.1  618.37  106.77  649.97  106.87  665.87  107.46   678.6  106.92
   689.2  107.45  704.04  107.37  710.41  108.33  718.89  108.67   726.7  109.48
  735.72  111.16  744.75  110.64  757.06  107.26  767.33  105.97   789.9  105.44
  810.08  105.52  913.99   105.5  975.49  105.57 1034.86  105.56 1073.03  105.25
 1134.53  105.26  1223.6  105.35 1331.53  105.31 1363.13  105.75 1384.76  105.54
 1417.29  105.74 1439.86  105.55  1453.4  106.07 1466.94  105.75 1489.52  105.94
 1498.54  107.56 1512.08  108.99 1530.13  112.26 1539.16  112.56 1579.78  112.78
 1606.87  109.63 1624.92  109.67 1638.46  109.36  1656.2   109.3 1662.56  108.88
 1671.05  107.53 1679.53  107.74 1685.89   109.2 1747.39  109.04 1785.56  109.13
 1813.13  109.08 1913.79   109.2 1949.91  109.11 1990.53  109.26 2014.59  109.14
 2048.52  109.26 2073.96  109.16 2139.48  109.26 2194.84  109.19 2220.28  109.43
 2230.89  107.95 2237.25  107.84 2247.85  109.16 2313.59  109.12 2334.79  109.21
 2389.93  109.19 2419.62  109.25 2447.19   109.1 2468.39  109.61 2502.32  109.77
 2542.62  109.78  2551.1  109.67 2580.79  109.77 2693.18  109.75  2771.4   109.6
 2824.66  109.75 2843.74  109.57 2852.22  109.81 2875.55  109.68 2920.35  109.78
 2942.91  109.51 2947.42  109.75 2974.52  109.93 2979.03  109.54 2992.57  106.33
 3006.11  106.07 3010.62  106.43 3028.67  109.84 3046.73  109.56 3109.92  109.38
 3123.46  109.55 3159.72  109.35 3195.69   109.3 3250.91  109.36 3263.63  109.45
 3299.68  109.34 3349.15  109.32 3403.32   109.5 3418.43  109.28 3439.64  109.46
 3509.62  109.38 3571.11  109.46 3588.08  109.36 3617.77  109.41 3626.25     108
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 3636.86   109.2 3643.22  109.27 3732.82   109.2 3782.47  109.29 3818.58  109.15
 3840.44  109.32 3870.13  109.25 3965.56  109.25 4021.69  109.32 4080.37  109.24
 4120.99  109.47 4143.57  109.26 4156.41  109.49 4200.94  109.33 4268.81  109.31
 4301.55  109.19 4328.18  109.41 4391.82  109.49  4418.9  109.92 4436.95  107.82
 4445.98   107.3 4455.01  107.43 4473.07  109.98 4486.61  110.44 4516.93  110.26
 4557.24  110.67 4580.58  110.07 4601.79  110.18 4631.49   110.1 4639.98  110.21
 4748.17  110.32 4818.18  110.18 4847.88  110.34 4900.91   110.1 4962.44  110.32
 5001.16  110.22 5104.98  110.24 5151.25  110.49 5189.44  110.54 5231.86  110.39
  5255.2  110.41  5265.8  110.94 5272.17  110.63 5320.96  110.75 5388.85  110.76
 5444.01  110.64 5499.17  110.76  5574.4  110.65 5610.49  110.78 5642.07  110.62
  5651.1  110.75 5732.54  110.72 5759.37  110.58 5838.61  110.68 5858.62  110.58
 5903.74  110.73 5917.11   110.6 5944.34  110.74  5965.9  110.56 6052.88  110.65
 6139.87  110.51 6174.43  110.51 6210.52  110.17 6233.09  110.68 6294.74  110.47
 6318.07   110.7 6326.56  111.21 6335.05  111.15 6345.65  110.04 6356.26  110.28
 6360.51  110.96 6371.11  111.13 6383.84  110.76 6394.45  110.15 6405.05  110.58
 6413.54  111.46 6421.11  111.23 6436.26  108.16  6446.5106.4612 6462.07104.1118
 6469.15  103.79  6475.5  102.18    6483   98.47 6492.23   94.77 6506.78   90.27
 6522.56   86.17 6538.35   83.25 6554.13   81.61 6569.92   81.08 6585.71   79.54
 6592.37   79.54 6593.45    85.9 6599.43    86.5 6606.49   87.87 6613.55   87.92
 6627.66   89.34  6655.9      94 6662.96   95.53 6684.13   98.76 6711.77  104.53
 6719.42  105.86 6739.18  107.06 6750.48  107.39 6788.07107.9003 6797.62  108.03
 6799.93  108.49  6811.5  112.85 6830.02  114.17  6839.2  113.88 6852.96   111.8
 6859.84  111.95 6873.61  109.72 6880.49   109.6 6889.66  110.23 6912.61  108.99
 6930.96  107.47  6953.9  106.95  6992.9  107.53 7004.37  108.05 7036.49  108.34
 7052.55  108.98 7082.37  109.91 7121.37   109.6 7167.26  108.72 7176.43  108.99
 7192.49  108.76 7222.32  108.85  7229.2  108.59 7252.14  108.54 7263.61   108.8
 7302.61  109.27 7332.43  109.82 7346.19  109.67 7389.79  110.35 7403.55   110.1
 7426.49  110.21 7506.79  108.94 7527.43  109.55 7534.32  109.15 7564.14  109.25
  7580.2  108.84 7598.55  108.86 7628.38  107.99 7642.14  108.09 7651.32  107.77
 7685.73  107.78 7690.32  108.04 7706.38  107.98 7717.85  108.25 7738.49  108.35
 7756.85  108.25 7782.08  108.52 7862.38  108.48 7880.73  108.29 7885.32  108.53
 7912.85  108.79 7926.61   108.7 7940.38   108.9 7954.14  109.42 7967.91  112.25
 7981.67  113.83 7986.26   113.2 8006.91  114.27  8011.5  113.97 8020.67  114.31
 8066.56  112.98 8078.02  113.26  8087.2   113.1 8100.97  113.52 8114.74  112.79
 8144.56   113.8 8156.04  113.44 8162.92  114.14  8174.4  113.29 8190.46   112.9
    8218  112.48 8254.71  112.13 8270.77   112.2 8282.25  111.97 8337.32  112.08
 8369.44  112.01 8401.57  111.56 8410.75  111.73 8440.58  111.01 8463.53   111.1
 8472.71  111.69 8486.48  114.07 8493.36  113.65 8507.13  111.48 8514.01  112.66
 8532.37  112.36 8541.55  112.65 8557.61  113.76 8633.33  113.64 8637.92  114.01
  8649.4   113.7 8672.35  113.49 8686.11  112.72 8702.18  112.88 8713.65   112.7
 8754.95  112.79 8764.13  112.96  8780.2  114.28 8787.08  112.89 8796.26   113.2
 8800.85  114.11 8805.44  114.07 8816.91  112.45 8832.98  112.27 8858.22  112.23
 8869.69  112.46 8890.34  112.33 8938.53  112.41 8968.37  112.19 9002.78  112.22
 9016.54  112.41 9041.79  112.26 9085.38  112.41  9117.5  112.15 9140.45  112.13
 9156.51  112.39  9163.4  112.18 9197.81  112.29 9225.34  112.56 9252.88  112.55
 9268.94  112.26 9294.18  112.55 9305.66   112.4 9321.71   112.6 9337.78  112.34
 9427.26  112.29 9434.15  112.35 9491.51  112.12 9551.16  112.19 9567.23  112.05
 9654.41   111.9 9675.06  111.66 9707.18  111.53 9727.84  111.81  9741.6  111.51
 9755.37  112.56 9771.43  113.17 9780.61  112.84 9798.96  112.68 9808.14  112.24
 9828.79  112.88 9872.39  112.62 9895.33  112.75 9932.04   112.7  9950.4  112.55
 9958.65   112.710046.77  112.8310051.36  112.6710069.71  112.8610085.78  112.64
10133.96  113.0910140.84  112.7410161.49  112.7810177.55  112.5810214.27  112.61
10250.98  112.9110299.16  112.7710324.88113.042510342.76  112.93 10363.4  113.03
10370.29  113.2910379.47  112.8910386.35  113.16 10409.3  112.9310425.35  113.09
10473.54  113.1510494.19     11310505.66  113.2210538.02  113.18 10574.5  112.52
10590.56  112.5810629.56  112.4410668.57   112.910705.28  112.8510728.23  113.48
10735.11  112.5310746.58  115.0510762.64  114.9510767.23  113.7510774.12  113.32
10787.88  113.3210792.47  114.3710810.82  115.33 10822.3  116.1910842.95  116.71
10872.78  117.2110891.13  117.31 10904.9  117.7310925.55  117.8810939.31  117.66
10966.85  118.6311008.15  118.5211033.39117.984711042.57  117.7911051.75  118.27
 11070.1  117.6611081.57   116.311122.88  116.0911136.64  116.1911163.71  116.03
11187.12  116.1711221.54  116.9411228.42  116.6711239.89  116.7811249.07  116.37
11265.13  116.3911297.25  117.4211329.38  118.0611372.97  119.3911395.91  119.63
11409.68   121.711416.57   125.311418.86  125.8711430.33  125.0711437.22  126.33
11441.81   126.311455.38   125.111464.42   123.211473.47  122.84   11478  121.94
11482.52   122.511505.31  121.47 11518.7  121.4211525.48  121.6811541.32  123.12
11564.57  123.5111572.98   123.311591.07  122.34 11606.9  122.67

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 6462.07    .025 6711.77    .06610966.85    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6436.26 6830.02          1056.67 1804.67    1796             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 6830.02 11606.9  114.17       T
Left Levee      Station=   24.67      Elevation=  132.03
Right Levee     Station=11437.43      Elevation=126.3733
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1530.13  112.26

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 172

INPUT
Description: RGV-03, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     462
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   131.9      24  132.14   24.67  132.14   24.67  122.14   34.67  121.94
  125.67  119.11  128.67  119.86  152.67  119.38  158.67  117.88  168.67  117.68
  174.67  116.18  196.82  116.26  219.79  116.11  252.59   116.2  262.43  116.44
  288.67   115.9  295.23  114.87  308.36  108.17   318.2  105.04  321.48  105.55
  331.32  110.24  360.84  108.99  449.41   108.5  472.38  108.65  482.22   109.3
  488.78  108.63  505.18  108.68  528.14  109.17   534.7   110.1  541.26  108.87
  547.82  106.49  557.67  104.01  574.07  103.32  967.71  103.32  990.68  103.93
 1007.08  103.67 1030.04  103.96 1046.44   103.7 1056.28  104.48 1066.12     104
 1082.53  104.24 1089.09  106.62 1098.93  108.67 1112.05  113.58 1118.61  114.13
 1148.13  114.38 1167.82  109.68 1180.94  109.73 1190.78  109.17 1243.27  109.08
 1390.88  109.25 1417.13  109.12 1446.65  109.32 1472.89  109.11 1486.01  109.26
 1535.22  109.22  1554.9  109.39 1581.15  109.23 1627.07  109.38 1636.91  109.24
 1676.28  109.34 1718.92  109.25 1748.45  109.41 1771.41  109.25 1804.21  109.41
 1853.42  109.31 1925.59  109.37 2014.16  109.19 2073.21  109.28 2102.73  109.14
 2122.41  109.32 2138.81  108.96 2142.09   109.3 2161.78  109.43 2165.06  108.85
  2174.9  104.04 2184.74  103.69 2188.02  104.22 2201.14  109.31 2214.26  108.87
 2260.19  108.62 2270.03  108.86 2289.71   108.6 2322.52  108.56    2375  108.78
 2434.05  108.63 2473.42  108.79 2479.98  108.57 2502.94   108.8 2519.34  108.67
```

```
 2552.15  108.82  2627.6  108.74 2666.96  109.11 2712.89  108.98 2748.97   109.1
 2775.22  108.91 2788.34  109.05 2857.23  108.96 2922.83  109.09 2965.48  108.96
    2995  109.21 3011.41  108.92 3017.97  109.21 3070.45  108.94 3116.38  108.97
 3126.22  108.84 3155.74  109.26 3191.83  109.16 3208.23  109.53 3211.51   109.2
 3224.63   105.9 3231.19  105.25 3237.75  105.57 3250.88  109.22 3260.72  109.89
  3280.4  109.74 3300.08   109.9  3313.2  110.32 3332.89   110.1  3447.7  110.32
 3490.35  110.16 3519.87  110.33 3555.95   110.1    3615   110.4 3634.68  110.18
 3710.13  110.26  3749.5  110.58  3782.3  110.63 3808.55  110.42 3897.12  110.56
 3913.52  110.42 3959.45  110.43 3995.53  110.63 4051.29  110.41 4077.52  110.59
 4100.47   110.4 4107.03  110.59 4139.82  110.45 4146.37  110.64 4185.72  110.46
 4231.62  110.63 4257.85  110.46 4290.64  110.64 4300.48   110.4 4320.15  110.64
 4329.99  110.44 4402.12  110.48 4487.37  110.29  4513.6  109.79    4530  110.56
 4552.95  110.32  4638.2  110.46 4661.15  110.66 4674.26  110.24 4690.66  105.36
 4697.21  104.76 4697.21  104.67 4701.21  103.29 4710.21   96.81 4720.21   90.31
 4730.21   84.81 4740.21   80.91 4750.21   78.91 4760.21   78.31 4770.21   76.31
 4780.21   76.31 4790.21   77.31 4800.21   79.31 4810.21   79.31 4830.21   81.31
 4870.21   87.31 4880.21   89.31 4910.21   93.01 4930.21   96.31 4940.21   98.31
 4960.21  101.71 4988.21  103.29 5004.21  103.81    5071  104.76 5074.28  105.45
 5087.39  111.12 5090.67  111.95  5116.9  113.88 5130.02  113.45 5143.13  111.01
 5149.69  110.35 5159.53  110.58  5179.2  107.25 5189.04  107.07 5202.15  108.02
 5234.94  106.53 5251.33  105.16 5261.17  104.75 5293.96  104.61 5310.35  104.99
 5320.19  105.56  5349.7  106.03 5366.09  106.86    5412  107.46 5434.95  108.45
 5461.18  109.17 5477.57  109.88 5533.31  109.37 5589.05  108.14 5598.89  107.82
    5612  108.18 5634.95  107.76 5677.58  107.93 5687.42  107.56  5720.2  107.56
  5736.6     108 5792.34  108.83 5815.29  109.46 5834.96  109.71 5854.63  109.49
 5867.75  110.05 5877.59  109.92 5916.93  110.52  5936.6  110.16 5949.72  110.48
 5969.39  110.33  6061.2   108.7 6074.31  108.79 6084.15  108.38 6113.66  109.28
  6123.5  108.68 6166.12  108.81 6189.07  108.18  6215.3   108.2 6257.93  106.87
  6277.6  106.99 6290.72   106.5 6320.23  106.59  6339.9  106.46 6346.46  106.85
 6369.41  106.73  6385.8  107.11 6415.31  107.23 6441.54  107.06  6448.1  107.34
 6477.61  107.42 6500.56  107.22  6510.4  107.38 6562.86  107.32 6575.97  107.03
 6592.37  107.13  6618.6  106.53 6625.15  106.78 6648.11  106.45  6664.5  106.49
 6684.17  106.14 6703.85  106.32 6723.52  107.14 6736.63  109.66 6743.19  111.44
 6753.03  112.97 6762.86  113.87 6769.42  112.95 6798.93  114.65 6805.49  114.22
  6818.6  114.76 6851.39  113.74 6867.79  113.41 6874.34   113.7 6884.18  112.91
 6900.57  113.29 6913.69  113.03 6933.36  113.61  6943.2  112.74 6953.04  112.48
 6995.67  113.89 7012.07  113.35 7021.91  114.43 7038.31   113.2 7061.26  112.67
 7100.62  112.04 7153.09  111.49 7176.05  111.57 7192.45  111.22 7228.52  111.18
 7271.16  111.34 7317.07  111.21 7362.99  110.54 7376.11  110.81 7418.74  109.77
 7451.54  109.94 7464.66  110.84 7477.78  113.59 7484.34  114.42 7494.17   113.8
 7504.01  111.87 7513.85  110.57 7523.69  112.35 7540.09  112.34 7549.93  111.92
 7563.05  112.37    7586  114.05 7628.64  114.07 7654.88  113.95 7677.83  114.09
 7694.23  113.92 7700.79  114.48 7717.19     114 7749.99  113.66 7769.66  112.49
 7792.62   112.7 7809.02  112.42 7868.05  112.56 7881.17  112.81 7904.13  114.81
 7913.97  112.72 7927.08  113.19 7933.64  114.56  7940.2  114.51  7956.6  112.08
 7979.56  111.82 7995.96  112.03 8015.64  111.78 8032.03  112.13 8061.55  111.93
 8130.42  112.04 8136.98  111.85 8173.06   111.7 8222.25  111.74 8241.92  112.02
    8278  111.79 8317.35  112.09  8340.3  112.11 8386.21  111.83 8402.61  111.98
 8419.01  111.74 8441.96  112.05  8451.8   111.7 8500.99  111.74 8540.34  112.21
 8553.46  112.08 8579.69  112.26 8602.65  111.84 8638.72   112.2 8655.12  111.95
 8678.07  112.21 8701.03  111.78 8828.92  111.67 8838.76  111.76 8920.74  111.44
 8937.13  111.62 8953.53  111.46    9006  111.56 9028.96  111.36 9078.14  111.35
 9153.57  111.18 9183.08  110.81 9199.48  110.89 9228.99   110.6 9258.51     111
 9271.62   110.4 9278.18  110.54 9297.86  112.11 9320.81  113.01 9333.93  112.51
 9360.16  112.27 9373.28   111.6 9402.79  112.55  9465.1  112.12 9497.89  112.33
 9550.36  112.37  9576.6  112.21 9586.44  112.47 9629.07  112.45 9714.33  112.59
 9720.89  112.35 9747.12  112.62 9770.08  112.28 9786.47  112.62 9802.87  112.59
 9838.94  112.91 9848.78  112.38 9878.29  112.43 9901.25  112.13 9953.72  112.21
 9973.39  112.54 9983.23 112.3810006.19 112.6410075.05 112.3110107.84  112.68
10137.36 112.4310166.87 112.5410176.71  112.910189.83 112.2810199.66  112.67
10232.46 112.3210255.41 112.6110301.32 112.7510311.16 112.5210324.28  112.83
10353.79  112.610370.19 112.9210435.77 112.8310468.57 112.6410491.52   112.9
10547.27 112.3910557.11 112.8510563.67  112.510603.02 112.7910622.69  112.59
10655.49 112.6510688.28 113.5910698.12 112.1610714.51 115.9310737.47  115.78
10744.03 113.9810753.87 113.3410773.54 113.39 10780.1 114.9910806.33   116.5
10822.73 117.8310852.24 118.6810894.88 119.5410921.11 119.7610940.79  120.44
 10970.3 120.6710989.97 120.3411012.93 121.3611029.33 121.7911088.35  121.62
11137.54 120.5111150.66 121.2311176.89 120.3111186.73 118.7311193.29  118.28
11252.32 117.5911271.99 117.5711331.02 116.6911344.14 116.6311393.33  117.12
11403.17 116.6411419.56  116.711432.68 116.0111455.63 115.7611478.59  115.97
11501.54 116.5211527.78 116.7911547.46 116.6911576.97 117.0811590.09  117.62
11609.76  117.911642.55 117.9611655.67 119.5411662.23  120.911672.07  126.21
11675.35 127.0311691.74 125.6811701.58 127.4911708.14 127.38 11714.7  126.28
11737.65 126.9911757.33 125.8411777.01 126.1511786.84 125.6811803.24  125.91
11822.92 125.1111836.03 125.73

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4697.21    .025    5071    .06611029.33    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4697.21  5116.9             2737    1911  1305.5             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  5116.911836.03  113.88       T
Left Levee      Station=   24.67      Elevation=  132.14
Right Levee     Station=11701.58      Elevation=  127.49
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1098.93  108.67

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            128.87    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                 0.066      0.026      0.067
  W.S. Elev (ft)            128.79    Reach Len. (ft)          2737.00    1911.00    1305.50
  Crit W.S. (ft)            115.90    Flow Area (sq ft)       87957.52   14581.79   93838.70
  E.G. Slope (ft/ft)      0.000044    Area (sq ft)            87957.52   14581.79   109899.00
  Q Total (cfs)           235000.00    Flow (cfs)              93277.88   60269.18   81452.95
  Top Width (ft)          11811.36    Top Width (ft)           4672.54     419.69    6719.13
  Vel Total (ft/s)            1.20    Avg. Vel. (ft/s)            1.06       4.13       0.87
  Max Chl Dpth (ft)          52.48    Hydr. Depth (ft)           18.82      34.74      13.97
  Conv. Total (cfs)       35229360.0    Conv. (cfs)             13983490.0   9035085.0   12210790.0
  Length Wtd. (ft)          1932.59    Wetted Per. (ft)         4687.45     430.04    6729.70
  Min Ch El (ft)              76.31    Shear (lb/sq ft)            0.05       0.09       0.04
  Alpha                        3.55    Stream Power (lb/ft s)      0.06       0.39       0.03
  Frctn Loss (ft)              0.12    Cum Volume (acre-ft)    199751.80   74467.09   232275.80
  C & E Loss (ft)              0.01    Cum SA (acres)          23730.83    3000.43   26660.84


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
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CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 171.90*

INPUT
Description: RGV-03,
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	126.32	10.79	126.47	26.98	128.22	44.96	130.95	53.95	131.54
77.95	131.78	78.62	131.78	78.62	121.78	88.62	121.58	179.62	121.03
182.62	121.78	206.62	121.3	212.62	119.8	222.62	119.6	228.62	118.1
232.32	114.32	238.2	112.75	246.04	115.4	263.68	114.74	314.3	114.04
340.13	114.25	363.65	114.68	367.57	115.07	371.49	114.37	381.29	111.71
391.09	111.14	404.43	110.84	434.48	110.78	504.57	110.93	626.3	110.81
640.03	111.07	673.35	110.7	679.23	111.05	685.11	110.77	694.91	110.97
704.71	113.26	712.55	115.63	716.47	115.87	734.11	115.8	745.88	113.33
759.6	112.92	774.94	112.74	814.98	111.51	845.03	110.98	912.48	110.85
925.35	110.69	939.65	110.8753	977.17	110.92	992.85	110.79	1020.29	110.87
1106.54	110.65	1126.14	110.72	1186.41	110.66	1236.62	110.27	1316.27	110.13
1326.07	109.94	1339.8	110.16	1347.63	107.46	1355.47	107.55	1363.31	110.08
1371.15	109.86	1398.6	109.72	1435.84	109.71	1467.2	109.83	1502.48	109.77
1526.01	109.94	1573.05	110.13	1598.13	110.08	1618.14	110.2	1648.34	110.57
1688.49	110.17	1738.7	110.42	1755.35	110.24	1837.67	109.62	1847.47	109.28
1899.38	108.55	1916.08	108.17	1955.28	108.1	1965.08	108.3	1974.88	106.49
1982.72	106.33	1990.56	108.13	1996.44	108.44	2008.2	108.33	2027.8	108.56
2050	108.4	2151.29	108.5	2172.85	108.38	2208.14	108.52	2219.9	108.39
2260.85	108.35	2308.1	108.55	2323.79	108.44	2413.95	108.51	2435.51	108.64
2468.83	108.59	2502.14	108.69	2542.01	108.54	2562.1	108.64	2617.73	108.3
2672.57	108.54	2702.68	109.02	2745.07	109.1	2754.87	109.63	2772.98	109.8
2819.53	109.83	2833.24	109.92	2843.94	109.42	2854.31	105.8776	2858.99	104.57
2870.29	99.6	2874.36	96.80185	2887.86	88.24	2897.11	83.64	2906.36	80.46
2915.6	78.82	2924.85	78.16	2934.1	76.31	2944.1	76.31	2952.6	77.16
2961.1	78.71	2980.53	79.95	3004.82	82.88	3020.6	85.28	3029.1	86.81
3054.6	90.26	3065.53	92.22	3097.1	97.11	3138.39	101.09	3162.68	102.97
3202.41	104.23	3207.99	105.4	3227.5	104.38	3247.01	104.69	3256.57	104.6443
3272.1	104.57	3288.83	104.88	3297.21	105.66	3300.6	106.455	3308.34	108.27
3330.64	111.94	3344.58	112.38	3352.94	112.97	3366.72	112.63	3380.49	111.26
3387.38	110.84	3397.71	110.83	3418.36	109.31	3428.69	109.03	3442.46	109.69
3462.5	108.91	3468.77	108.91	3504.43	107.56	3538.86	107.48	3556.41	107.56
3566.41	107.98	3578.32	107.91	3590.85	108.41	3600.24	108.23	3614.6	108.53
3644.06	108.78	3653.45	108.67	3669.11	109.25	3678.49	109.26	3725.45	110.21
3775.54	110.16	3794.32	110.34	3816.23	110.18	3838.14	110.24	3850.67	109.7
3872.57	110.05	3896.92	109.72	3916.4	109.82	3957.1	109.43	3997.79	109.15
4025.96	109.3	4047.87	108.99	4072.92	109.1	4094.83	108.98	4107.35	108.64
4127.59	108.56	4148.05	109.14	4157.44	108.87	4173.08	109.36	4204.39	109.74
4213.78	109.72	4226.31	110.17	4267	110.42	4279.52	110.61	4344.5	110.42
4358.26	110.58	4373.43	110.41	4392.21	110.89	4409.91	110.61	4429.77	110.79
4470.47	110.47	4478.76	110.23	4506.31	110.31	4536.21	109.67	4551.07	109.55
4571.72	109.68	4585.5	109.43	4616.49	109.64	4637.14	109.64	4648.9	109.85
4664.54	109.41	4677.07	107.13	4695.85	109.32	4708.37	109.01	4720.9	107.07
4727.15	107.59	4752.2	107.28	4777.24	108.38	4792.89	108.36	4802.28	109.45
4824.2	109.82	4855.49	109.92	4874.28	109.57	4902.24	109.61	4927.49	109.23
4936.66	109.36	4958.8	109.27	4971.31	109.47	4986.97	109.17	5019.3	109.09
5039.96	109.39	5053.72	110.59	5060.61	111.52	5070.94	112.34	5081.26	112.76
5088.15	112.25	5119.14	113.07	5126.03	112.92	5137.23	113.43	5146.62	113.18
5191.45	112.59	5208.66	112.53	5225.87	112.69	5243.66	112.33	5260.3	112.76
5280.96	112.14	5296.87	112.69	5325.72	113.11	5342.94	112.69	5353.28	113.52
5368.87	113.4	5384.52	112.95	5406.43	113.01	5425.21	112.54	5437.74	112.72
5462.77	112.24	5478.43	112.24	5494.08	111.45	5509.74	109.76	5522.25	109.45
5534.77	109.5	5556.69	109.29	5584.86	109.64	5628.69	110.62	5663.12	111.15
5694.43	111.19	5711.42	111.04	5747.64	111.39	5769.96	111.28	5791.46	111.49
5803.99	112.1	5818.18	112.17	5838.85	113.42	5849.17	113.16	5869.83	111.65
5880.17	112.59	5897.39	112.59	5907.72	112.37	5921.49	112.58	5945.59	113.45
5969.89	113.56	6013.71	113.17	6026.23	113.27	6059.24	112.95	6066.13	113.19
6113.88	112.63	6138.44	111.85	6148.32	111.77	6179.77	111.98	6210.92	112.46
6223.44	112.77	6232.83	112.32	6239.09	112.63	6255.53	112.2	6279.64	113.08
6289.97	112.01	6303.74	112.2	6310.63	112.86	6317.52	112.82	6334.74	111.55
6358.85	111.28	6376.07	111.35	6396.73	111.19	6413.94	111.33	6444.94	111.08
6483.26	111.07	6511.42	111.2	6524.14	111.01	6562.03	110.93	6580.29	111.04
6595.95	111.62	6602.21	111.42	6630.38	111.86	6639.77	112.19	6658.55	111.7
6672.22	111.66	6737.64	111.81	6820.28	111.6	6844.38	111.71	6862.02	111.47
6906.37	111.51	6930.88	111.66	6989.01	111.61	7013.11	111.38	7043.58	111.61
7068.21	111.47	7092.31	111.57	7116.42	111.31	7212.61	111.07	7250.71	111.09
7275.22	111.45	7290.86	111.5	7309.65	111.23	7364.33	111.37	7412.94	111.27
7425.47	111.37	7497.47	111.26	7535.03	111.13	7591.6	111.14	7622.59	110.89
7639.81	110.95	7670.79	110.83	7701.79	111.04	7722.45	110.87	7743.11	111.72
7767.21	112.17	7780.98	111.89	7808.53	111.83	7822.3	111.49	7853.29	111.94
7879.36	111.74	7901.27	111.82	7918.72	111.69	7970.13	111.85	8035.8	111.76
8046.13	111.89	8076.57	111.8	8132.91	111.83	8154.82	111.75	8180.42	111.83
8187.31	111.71	8214.85	111.78	8238.96	111.61	8256.17	111.86	8276.9	111.82
8311.27	111.93	8321.6	111.66	8336.38	111.78	8398.99	111.49	8452.44	111.64
8462.78	111.55	8492.89	111.75	8511.67	112.04	8524.2	111.98	8533.58	112.33
8558.63	112.59	8593.62	112.55	8611.84	112.29	8646.27	112.2	8665.94	112.61
8679.71	112.26	8690.03	112.42	8724.48	112.35	8733.92	112.58	8765.22	112.67
8807.11	112.55	8840.35	112.63	8851.88	112.53	8896.7	112.68	8912.35	112.58
8956.17	112.74	8971.83	112.6	8996.5	112.71	9043.82	112.32	9065.37	112.57
9075.12	112.27	9100.16	112.59	9140.86	112.5	9156.51	112.14	9169.03	113.44
9178.42	114.06	9197.21	114.19	9213.44	112.74	9230.65	114.64	9254.75	115.43
9271.98	114.22	9292.63	114.3	9299.52	115.19	9322.42	116.71	9344.28	118.62
9419.46	120.9	9447.58	121.24	9475.8	121.97	9525.88	122.43	9561.22	122.97
9591.62	123.31	9621.96	123.1679	9641.71	122.75	9657.36	122.74	9674.84	122.35
9688.62	122.48	9716.16	121.66	9726.5	120.54	9735.61	120	9795.37	119.11
9829.52	118.95	9851.42	118.58	9892.11	118.12	9926.55	118.43	9943.43	118.44
9953.77	118.17	9970.97	118.23	9986.02	11810011.06		118.410045.49		119.44
10073.66	118.9710079.92		119.2110098.71		119.1110123.75		119.3710130.01		120.18
10139.4	120.4610151.92		119.4110176.96		119.1210186.35		119.4310205.12		119.53
10218.9	120.8710225.79		122.1910236.12		126.0110239.56		126.6410256.77		126.18
10267.73	127.6710273.99		127.6510281.17		126.8210290.73		126.76 10302.7		127.06
10320.91	127.14 10352.2		126.2710374.46		126.4810393.59		125.8210412.73		124.49
10419.9	124.410427.08		124.9310441.43		123.4910462.96		123.4310477.31		123.84

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.081	77.95	.066	2874.36	.015	3097.1	.066	3352.94	.067

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2833.24 3352.94 2737 1911 1305.5 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent

```
       0 2833.24  109.92       T
Left Levee      Station=   77.95      Elevation=  131.78
Right Levee     Station=10270.71      Elevation=   127.7
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3359.72 9404.47  113.15

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 171.8

INPUT
Description: RGV-03, 8-foot wall applied, End Wall, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  120.98   19.61  121.23   26.15  121.71   39.23  123.71   49.03  124.66
   68.65  128.06   81.72  130.04   98.06  131.22  122.06  131.46  122.73  131.46
  122.73  123.46  132.73  123.26  223.73   121.3  226.73  122.05  250.73  121.57
  256.73  120.07  266.73  119.87  272.73  118.37  287.66  118.28     304  117.54
  310.54  117.85  333.42  116.35  346.49   113.9   356.3  112.77  372.68  112.59
  382.52  112.23  389.07  112.65  405.46  112.34  418.57  112.36  438.24  112.06
  467.74  111.97  484.13   111.3   503.8  110.97   533.3  110.82  572.64  110.92
   592.3  111.45  602.14  111.38  618.53  112.07  631.64  111.25  648.03  111.85
   667.7  110.69  677.53  110.39  687.36  109.16  700.48  108.15  710.31  106.98
   726.7   107.1  749.65  106.67  798.81  106.67  818.48  106.45  857.82  106.48
  893.88  106.84  910.26  106.56  916.82  106.73  933.21  106.15  952.88  106.61
  962.71  107.65  972.55  108.04  985.66  109.26 1005.33  109.18 1015.16  108.56
 1021.72  105.16 1028.99  103.29 1037.99   96.81 1047.99   90.31 1057.99   84.81
 1067.99   80.91 1077.99   78.91 1087.99   78.31 1097.99   76.31 1107.99   76.31
 1117.99   77.31 1127.99   79.31 1137.99   79.31 1157.99   81.31 1187.99   85.71
 1197.99   87.31 1207.99   89.31 1217.99   90.71 1237.99   93.01 1257.99   96.31
 1267.99   98.31 1287.99  101.71 1315.99  103.29 1331.99  103.81 1405.33  104.76
 1411.89  105.02 1418.45   107.2 1428.29  106.47 1441.41  104.82 1447.97  104.61
 1464.36  105.21 1480.76  105.05 1493.88  104.68 1503.72  105.26 1513.56  105.09
 1520.12  105.77 1529.95  108.13 1536.51  108.54 1543.07  108.21 1552.91     109
 1562.75  111.35 1579.15  111.39 1588.99  112.07 1598.82  111.69 1605.38  111.85
  1634.9  111.06 1654.58  111.47 1670.97  110.89 1680.81  111.42 1703.77  110.67
 1710.33  110.94 1720.17  110.61 1739.84  110.73  1746.4  110.37 1769.36  110.52
 1802.15  110.12 1811.99  110.42 1825.11  110.07 1838.23  110.88 1848.07  110.29
 1877.58   110.1 1893.98  110.34 1903.82     110 1920.22  110.79 1930.05  110.42
 1979.25   110.8 1992.36  110.45 2031.72  110.83  2051.4  111.39 2074.35  111.53
 2084.19  112.06 2097.31  112.11 2110.43  111.32 2133.38  111.92 2166.18  111.61
  2179.3   111.8 2208.81  111.17 2221.93   111.3 2248.17  110.94 2264.56  110.44
 2294.08  110.29 2317.03  109.35 2343.27  109.08 2359.67  108.32 2366.23   108.4
 2379.35  107.58 2405.58  107.65 2421.98  108.32 2431.82  107.73 2448.21  108.49
 2474.45  108.63 2481.01  109.16 2490.85  109.28 2503.97  109.88  2513.8  109.92
  2546.6  110.82 2559.72  111.43 2599.07  111.94 2631.87  112.16 2648.26   112.5
  2658.1  112.29 2677.78  112.71 2687.62  112.42 2717.13  112.84 2743.37  112.24
 2759.77  112.55 2766.32  112.27 2792.56  112.48 2828.64  112.02 2854.87  112.37
 2881.11  112.35 2920.46  112.77  2946.7  112.87 2963.09  112.07 2976.21  107.34
 2995.89  111.48 3002.45  111.61 3009.01  110.82 3022.13  106.93 3028.68  108.02
 3054.92  107.22 3081.16  109.36 3090.99  108.96 3097.55  109.39 3107.39  111.66
 3120.51  111.81 3130.35  112.26 3163.14   112.5 3182.82  111.89 3205.78  112.15
 3238.57  111.89 3271.37  112.07 3284.48  112.46 3300.88  112.01    3314  112.07
 3369.75  111.51 3392.71  111.75 3415.66  111.42 3435.34  111.41 3448.46  111.66
  3458.3   112.2 3468.14   111.8 3494.37  111.99 3504.21  111.77 3523.89  111.76
 3537.01  112.32  3553.4  112.06  3569.8  111.51 3592.76  112.05 3605.87  111.69
 3625.55   112.4 3661.63  112.32 3671.46  111.91 3700.98  113.49 3717.38     113
 3740.33  113.54 3760.01  112.88 3773.13  113.42 3799.36   112.7 3815.76  112.86
 3832.16   111.4 3848.56  107.96 3861.67  107.47 3874.79  107.79 3881.35  107.49
 3897.75  107.39 3914.15  107.96 3927.26  108.05  3937.1  108.64  3953.5  108.96
 3973.18  109.93 4009.25  111.08 4042.05  111.61 4068.28  111.52  4081.4  111.72
  4097.8   112.5 4110.92   112.8 4133.87  112.79 4143.71   113.1 4156.83  114.27
  4192.9  112.41 4238.81  112.86 4294.56  112.76 4330.64  113.05 4376.55  112.37
 4389.67  112.55 4429.02  111.89 4451.98     112 4481.49  111.57 4488.05  111.21
 4504.45  111.27 4517.57  110.97 4530.69  111.02 4583.16  112.42 4596.27  113.02
 4606.11   112.1 4612.67  112.71 4622.51  111.76 4635.63  111.46 4714.33  111.02
 4740.57  110.72 4806.16   110.5 4822.56  110.25 4868.47  110.15 4897.98  110.37
 4907.82  110.17 4963.57  110.17 4970.13  110.37 4986.53  111.52 4993.09   111.1
  5006.2   111.6  5022.6  111.76 5032.44   112.4    5039  111.89 5052.12  111.53
 5193.13   111.5 5235.77  111.44 5265.28  111.24 5337.43   111.3 5347.27  111.17
 5393.18  110.97 5429.25  110.91 5455.49  111.09 5465.33  110.88    5485  111.02
 5540.75  110.81 5566.99  110.61 5580.11  110.71 5622.74  110.58 5632.58  110.43
 5655.53  110.62 5671.93  110.51 5691.61  110.85 5698.17   111.2 5714.56  111.36
 5730.96  110.69 5734.24  110.89 5776.87  111.14 5842.46  111.03 5855.58  111.21
 5871.98  111.04 5904.77  111.19 5921.17  110.94 5931.01  111.17 5970.36  110.96
 5990.04  111.21  5996.6  111.03 6042.51  111.14 6062.19  110.96 6104.82  111.08
 6131.05     111 6199.92  111.39 6232.72  111.26 6265.51  111.44 6285.19  111.21
 6308.14  111.37  6331.1  111.11 6354.06  111.41 6373.73  111.25 6386.85  111.38
  6426.2  111.36 6449.16  111.17 6455.72   111.3 6531.15  111.31 6537.71  111.15
 6596.74  111.15 6619.69  110.96 6649.21  111.09  6698.4  110.87 6731.19  111.14
 6747.59  111.02 6767.27  111.15 6777.11  110.94 6803.34  110.94  6809.9  111.15
 6829.58  110.92 6859.09  111.07 6875.49  110.81 6901.72  110.98 6908.28   110.8
 6950.92  110.69 6957.47  110.93 6973.87  110.89 6993.55  111.55 7006.67   111.5
  7016.5  112.24 7029.62  112.33 7042.74  112.87 7088.65   112.3 7098.49  112.04
 7134.56   111.9 7150.96  112.35 7190.32  112.11 7196.87  112.36 7216.55  112.39
 7226.39  112.73 7252.62  112.45 7259.18  112.68 7278.86  112.46 7298.54  112.64
 7324.77  112.31 7337.89  112.57 7367.41   112.3 7396.92  112.48 7413.32  112.29
 7459.23  112.75 7475.63  112.56  7528.1  112.47 7551.05  112.16 7567.45  112.44
 7583.85  112.02 7610.08  112.49 7633.04  112.23 7652.72  112.39 7669.11  111.66
 7682.23  114.22 7692.07   115.2 7711.75  114.95 7721.59  113.52  7734.7  113.16
  7751.1  113.41 7760.94  114.58  7767.5  114.66 7780.62  115.86 7790.45  115.08
 7803.57  114.99 7823.25   115.5 7842.93  117.18 7849.48  118.18  7862.6  119.29
 7924.91  121.43 7944.59  122.27 7987.22  122.92 8003.62  123.44 8026.57  123.67
 8042.97  124.15 8056.09  124.27 8072.49  124.05 8095.44  124.16 8124.96  124.92
 8151.19  124.92 8164.31  124.36 8177.43  124.28 8193.83   124.6 8216.78  124.09
 8239.74  123.26 8256.13     123 8275.81  121.74 8318.44   120.9 8347.95  120.49
 8374.19  120.53 8397.14  120.09 8439.77  119.61 8475.85   119.9 8502.08  119.69
 8521.76  119.74 8538.15  120.01 8547.99  120.59 8564.39  121.02 8570.95  121.61
 8580.78  121.73 8600.46  122.62 8613.58   121.8 8629.97  121.25 8636.53  121.67
 8656.21   121.5 8682.44  121.82    8689  123.36 8698.84  123.72 8708.68  122.14
 8711.96  121.18 8738.19  120.32 8748.03  120.94 8754.59  120.73  8767.7   121.1
  8784.1  122.35  8800.5  125.89 8807.05  126.62 8816.89  126.85 8826.73   126.5
 8833.29  127.86 8839.85  127.91 8849.69  127.01 8856.24  127.46  8862.8  127.11
  8879.2  127.49 8898.88  127.37 8938.23  126.71 8964.46   126.7 8977.58  126.89
 9003.81  125.79 9030.05  123.18 9039.88  122.94 9049.72     124 9062.84  122.56
  9069.4  121.49 9089.07  122.07 9098.91  121.56 9118.59  121.94

Manning's n Values        num=       5
```

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .081  122.06    .066 1028.99    .015 1480.76    .066 1588.99    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1005.33 1588.99          1869.27    1625  951.28             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 1005.33  109.18       T
Left Levee      Station=  122.73      Elevation=  131.46
Right Levee     Station= 8839.85      Elevation=  127.91
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1588.99 9118.59  112.07

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            128.58    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.13    Wt. n-Val.                 0.066      0.030      0.067
  W.S. Elev (ft)            128.45    Reach Len. (ft)          1869.27    1625.00     951.28
  Crit W.S. (ft)            116.04    Flow Area (sq ft)       13683.76   18161.41   108471.90
  E.G. Slope (ft/ft)      0.000089    Area (sq ft)            14364.88   18161.41   108471.90
  Q Total (cfs)           235000.00    Flow (cfs)             18004.85   82595.03   134400.10
  Top Width (ft)           8995.86    Top Width (ft)           882.60     583.66    7529.60
  Vel Total (ft/s)            1.67    Avg. Vel. (ft/s)           1.32       4.55       1.24
  Max Chl Dpth (ft)          52.14    Hydr. Depth (ft)          15.50      31.12      14.41
  Conv. Total (cfs)       24882610.0    Conv. (cfs)            1906415.0   8745445.0   14230750.0
  Length Wtd. (ft)         1247.94    Wetted Per. (ft)          888.92     594.55    7539.32
  Min Ch El (ft)             76.31    Shear (lb/sq ft)            0.09       0.17       0.08
  Alpha                       2.95    Stream Power (lb/ft s)      0.11       0.77       0.10
  Frctn Loss (ft)             0.10    Cum Volume (acre-ft)    193424.60   73007.35   225977.20
  C & E Loss (ft)             0.00    Cum SA (acres)           23383.23    2955.62   26233.81


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 171.48*

INPUT
Description: RGV-04, 8-foot wall applied, Begin Wall
Station Elevation Data    num=     461
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  121.53   20.46  122.12   30.69  121.82   46.53  122.57   64.79  124.25
   68.21  124.84   75.02  127.02   85.25  129.43  109.25  129.67  109.92  129.67
  109.92  121.67  119.92  121.47  210.92  120.06  213.92  120.81  237.92  120.33
  243.92  118.83  253.92  118.63  259.92  117.13  285.11  117.02  301.71  116.59
  308.36  116.72  331.62  115.92  336.48115.4662  354.87   114.1  371.52  113.99
  381.52  113.67  392.43  113.68  431.11  112.08  453.67  111.48  468.14  111.34
   484.8  110.87  504.79  110.63  534.24  110.51  574.76  110.58  594.74  110.78
  604.74  110.71   621.4  111.09  634.73  110.74  651.39  111.04  681.37  110.31
  691.36  109.72   704.7  109.25  714.69  108.66  731.35   108.7  769.53  108.44
  782.42  108.57  824.63  108.59  843.66  108.77   875.9   108.7  895.25  108.27
  917.92  108.24  927.49   108.4  941.25  108.17  961.24   108.4  981.23   109.1
  994.56  109.77 1014.55     110  1022.8  107.59  1026.7   106.9 1034.62104.3512
 1043.79  102.81 1058.8697.51893 1070.29   92.64 1091.99    82.2 1100.52   78.73
 1109.76   76.53 1116.71   76.14 1129.07   75.01 1134.07   75.01 1141.88   75.72
 1149.69   76.93 1157.49   77.36 1173.11    79.1 1204.34   83.35 1212.15   84.63
 1235.57   87.39 1260.59   91.39 1274.61   94.27 1291.18   96.46 1308.96   97.92
 1337.07    99.6 1352.36  100.37 1371.35  101.61 1376.47   102.9  1387.7102.5931
  1394.4  102.41 1412.32   103.2 1417.82103.2358 1450.73  103.45 1455.85  103.75
 1463.53  105.06 1477.49  105.52  1477.7  106.69 1481.45  107.04 1491.38  109.17
 1501.94  109.45 1509.62  109.97 1541.37  109.89 1552.54  109.58 1576.65  109.55
  1583.7  109.12 1590.76  108.06 1616.91  107.51 1622.51  107.62 1633.08  108.73
 1650.62  108.96 1664.83  108.71 1675.41   108.2 1682.47  107.51 1707.15  107.44
 1718.06  107.79 1730.32  107.71 1742.58  108.05 1751.78  107.75 1794.69   107.7
 1803.89  107.61 1819.21  108.14 1837.66  108.07 1869.41  108.68 1886.64  108.61
 1897.63  108.84 1911.74  109.46 1941.82  110.22 1963.28  110.22 1972.47  110.54
 1985.81  110.63    1997  109.95 2018.45  109.69 2049.11  109.12 2061.37  109.08
 2088.95  108.63 2141.06  108.61 2179.81  109.32 2186.86  109.04 2214.63  108.86
 2229.17  108.43 2248.35  108.25 2272.87  108.53 2288.19  108.91 2297.39  108.64
 2312.71   108.9 2337.24  108.89 2343.37  109.16 2364.83  109.56 2404.67  109.58
 2416.94   109.8 2454.83  109.86 2483.05  110.31 2493.61  110.63 2504.19  110.45
 2511.25  110.63 2521.83  110.47 2528.88  110.88 2539.46   110.1 2564.06  110.11
 2588.59  109.79 2603.92  110.02 2610.04  109.86 2634.56  109.92 2668.29   109.7
 2705.17  110.05 2726.33  109.86 2743.96  109.97 2778.63  109.85 2793.95  109.41
 2806.21  107.02 2824.61  109.15 2830.74  109.42 2836.87  109.17 2849.13  107.18
 2855.26  107.39 2863.84  106.44 2904.31  108.13 2919.63  108.03 2928.82  109.02
 2941.09  109.01 2980.93  109.45 2999.33  109.08 3026.04   109.1 3043.66  109.24
 3057.77  108.96 3082.09  109.04 3094.34  109.24 3131.81  109.01 3152.97     109
 3181.17  108.78 3195.28  109.43 3209.39  108.89 3235.35  108.95 3256.81  109.63
 3269.33  109.49 3279.91  110.03 3290.52  110.96 3308.11  111.18 3322.21  110.97
 3330.38  111.33    3361  111.02 3382.48  111.23 3394.74  111.04 3413.13  111.36
 3446.85  111.43 3456.04  111.24 3483.63  111.94 3498.96  111.61 3520.41  111.82
 3540.82  111.49 3551.07  112.01 3561.98  111.99 3576.08  111.43 3590.92  111.72
 3606.24  110.96 3621.57  109.22 3667.55  108.92 3678.34  109.24 3695.13  109.18
 3717.12  109.62  3727.7  109.49 3738.27  110.17 3752.38  110.52 3777.07  110.73
 3794.69  110.53 3805.27  110.76 3826.94  110.56  3839.2  110.69 3854.53  111.11
 3879.31  111.34 3897.44  111.28  3909.7  111.86 3918.09  111.75 3943.42     111
 3986.33  111.12  4013.3  110.97 4020.35  111.08 4048.56  110.91 4069.71  111.04
 4083.82   110.8 4115.07  110.52 4129.65  110.71 4164.11  110.29 4200.17  110.27
 4228.38  109.94 4267.16  109.79 4320.43  110.65 4329.63  110.22 4335.76  110.54
 4344.96  110.09 4471.67   109.3 4492.83  109.39 4524.57  109.06 4552.77  109.17
  4570.4  109.09 4584.51  109.37 4595.08  109.16 4609.19  109.19 4619.76  108.86
 4637.39  109.21 4663.74  108.97 4669.87  109.03  4685.2  109.75 4691.33  109.52
 4703.58  109.73 4718.91  109.67 4728.11  109.98  4746.7  109.68 4778.43   109.7
 4796.06  109.48 4848.95  109.42 4859.53  109.54 4912.42  109.38 4972.36  109.31
 4979.41  109.18 4997.04  109.38 5022.37  109.33 5053.45   109.4 5081.67  109.27
 5102.83   109.5 5141.61   109.5 5152.19  109.69 5162.77  109.58 5205.07  109.69
 5227.73  109.55 5254.44  109.73  5289.7  109.51 5310.49  109.84 5325.82  109.61
 5342.58  109.57 5360.22  110.24 5380.99  109.76 5448.37  110.04 5462.47  109.93
 5476.57  110.06  5512.8  109.74 5550.62  109.98 5558.77  109.86 5578.83  109.97
 5631.71  109.81 5663.45  110.02 5684.61  109.84 5712.81  109.83 5726.92  109.97
 5744.55  109.86 5755.13     110 5779.81   109.6 5797.44  109.64 5804.49  109.88
 5839.75  110.39 5864.43   110.2 5885.59  110.55 5892.64  110.39 5906.74  110.57
 5934.95   110.3 5952.58   109.5 5963.16  110.34 5981.77  110.17  6023.1   110.2
 6037.21  109.99 6072.46  110.09 6086.57  109.83 6100.67  109.97 6118.31  109.86
 6195.87  109.84 6220.55  109.53 6234.66  109.66 6248.77  109.45 6266.39  110.48
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 6276.97  109.67 6305.18  109.75 6322.81  109.59 6333.39  109.95 6343.96   110.6
 6368.65   111.2 6383.31   111.3 6396.86  111.82 6407.43  113.33 6421.53  112.92
 6435.64  113.25 6439.16  112.46 6446.22  111.87 6460.32   111.9 6474.43  112.17
 6501.09111.8525 6520.26  111.78 6561.09  112.84 6573.36  112.74 6582.54  112.94
 6594.81  112.76 6607.07  112.87 6622.51  112.64 6640.14  112.64 6657.77  112.94
 6675.41  112.84 6703.61  113.02 6721.24  113.36 6731.82  113.74 6760.03  113.56
 6767.08  113.28 6791.76  113.53 6809.37  114.04 6834.07  113.99 6855.23  114.13
 6865.81  113.98 6876.39  114.36 6897.54  114.32 6908.11  113.93 6929.27   113.7
 6943.38  113.34 6953.44  113.36 6999.79  113.99 7024.48  113.91 7042.11  114.11
 7080.89  113.98  7097.5  114.28 7112.83  114.23 7137.34  114.54  7158.8  114.45
  7177.2  114.66 7192.52   114.4 7204.78  115.84 7213.98  116.51 7232.37  116.64
 7253.67  115.89 7269.15  116.04 7278.35  116.65 7296.74  117.12 7305.93   116.5
 7320.66  116.13 7327.71  116.25 7338.28   115.6 7348.86   116.1 7359.44  117.31
 7373.37  117.67 7398.23  117.89 7415.85  118.39 7426.43  119.04 7433.49  118.72
 7447.59  119.58 7458.17  118.94 7468.75  119.74 7479.33  119.97 7500.48  119.41
 7514.58  119.39 7528.69  119.13 7539.27  119.69 7567.47  119.57 7578.05  119.76
 7595.68  119.65 7620.37   120.5  7643.1  120.13 7655.62  119.61 7682.96  119.83
 7697.93  119.75 7708.51  119.43 7725.87  119.22 7741.19  119.38 7759.58  118.96
 7768.45  119.08 7786.08  118.85 7803.71  118.88 7824.87  118.74 7851.53  118.98
 7870.71  118.83 7877.76  118.98 7888.34  118.74 7902.45  119.16  7909.5  119.72
 7923.59  119.63 7946.55  119.96 7972.96     120 7994.11  121.43 8015.27  121.85
 8035.44  123.09 8044.63  123.24 8063.02  123.92 8075.28  123.77  8090.6  123.88
 8096.73  124.24 8115.13  124.72 8139.64  125.72 8145.78  126.67 8154.97   127.1
 8167.24  126.16 8191.75  126.39 8200.95  126.98 8234.66  128.04 8256.11  130.48
 8265.31  130.96 8274.51  130.99 8280.64   131.8 8286.77  131.96 8291.98  131.51
  8307.6  131.76 8338.85  131.37 8359.69  131.46 8373.57   130.9 8387.46  129.54
 8392.67   129.4 8397.88   129.9  8408.3   128.6 8418.71  128.84 8423.92  128.56
 8434.34   128.7

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .081  354.87    .066 1091.99    .015 1481.45    .066 1633.08    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1034.62 1412.32          1869.27    1625  951.28             .1       .3
Left Levee      Station=  109.92      Elevation=  129.67
Right Levee     Station= 8286.77      Elevation= 131.965
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1508.89 6362.59  110.06

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 171.15

INPUT
Description: RGV-04, 8-foot wall applied, Bathymetric elevations translated
             from IBWC 2008 Cross-sections
Station Elevation Data    num=     461
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.07    6.45  122.55   19.36  122.87   29.04  120.99    35.5  120.47
   61.31  120.51   64.54  121.14   70.99  124.41   80.67  128.47  104.67  128.71
  105.34  128.71  105.34  120.71  115.34  120.51  206.34  118.68  209.34  119.43
  233.34  118.95  239.34  117.45  249.34  117.25  255.34  115.75  260.61  115.72
  276.98  115.79  316.28  115.52  371.96  115.38  391.61  114.78  430.91     112
  453.84  110.95  493.14  110.32  535.71  110.19  581.56  110.24  611.04  110.01
  637.24  110.22  683.09  110.23  712.57  110.36  742.04  110.28  764.97  110.41
  774.79  110.21  787.89  110.48  814.09  110.45  850.12  111.07  882.88   110.8
  902.54  109.75  928.75  109.94   935.3  110.18  968.07  110.21   977.9  110.05
 1017.21  110.39 1023.77  110.82 1033.59  106.43 1040.15  104.76 1053.15  102.52
 1060.15  102.28 1079.15   99.92 1090.15   96.32 1092.15   95.08 1101.15   91.62
 1126.15   77.92 1137.15   74.42 1148.15   73.82 1160.15   73.72 1171.15   74.52
 1182.15   76.19 1203.15   78.63 1229.15   81.24 1251.15   84.12 1273.15   90.02
 1290.15    92.7 1306.15   94.92 1317.15   96.22 1330.15   98.13 1351.15  100.42
 1363.15  101.42 1376.15  102.12 1391.15  101.72 1407.15  102.45  1407.3  104.76
 1413.86  105.52 1417.14  106.98 1430.26  107.88 1459.79  108.41 1486.04  107.64
  1492.6  107.85 1499.16  107.26 1505.72  104.98    1509  104.46 1535.25  104.33
 1545.09  106.84 1568.06  107.33 1574.62  106.99 1584.46   105.9 1591.02  104.55
 1613.98  104.73 1630.39  105.41 1650.07  105.18  1679.6  105.31    1696  105.05
 1715.69  105.46 1735.37  105.65  1764.9   106.6 1778.02  106.67 1791.14  107.12
 1804.27  108.21 1817.39  108.89 1827.23  109.08 1853.48   108.9 1873.16  109.21
 1899.41  107.62 1915.81  107.02  1951.9  106.15 1981.43  106.05 2007.67  106.41
 2033.92  107.41  2053.6  108.83 2060.16  108.59    2070   108.8 2099.51   108.5
 2109.35  108.64 2129.03  109.35  2165.1  109.56  2181.5  109.21 2201.18  109.14
 2227.41  109.25 2260.21  108.39 2279.89  108.07  2309.4  107.78 2335.64  108.46
 2345.47   108.9 2355.31  108.51 2361.87  108.92 2371.71  108.35 2378.27   109.1
 2388.11  107.73 2404.51  107.34  2420.9  107.46 2427.46  107.26 2447.14   107.5
 2470.09  107.35 2525.85   107.4 2542.24  107.74 2561.92  107.26 2578.32  107.29
 2597.99  106.88 2650.47  106.63 2663.58  107.54  2676.7  107.42 2683.26  106.58
 2689.82  105.15 2706.22  107.03 2735.73  106.85 2752.13  106.33 2778.37  106.02
 2794.76  106.42 2840.68  106.09 2857.07  106.52 2870.19  105.99 2912.82  106.03
 2922.66  106.29 2939.06  106.06 2958.74  106.27 2984.97  105.98 2998.09  107.11
 3011.21  106.24 3037.45  106.52  3060.4  107.21 3066.96  107.16  3076.8  108.15
 3086.64  109.92 3103.03   110.6 3116.15  109.99 3122.71  110.33 3152.23  110.52
 3158.79  110.76  3171.9  110.42 3207.98   110.3 3237.49  110.59 3270.29  110.37
 3273.57  110.17 3289.96  110.29  3299.8  110.08 3312.92  110.28 3319.48  110.01
 3326.04  110.52 3339.16  110.89 3352.27  110.15 3362.11   110.6 3398.19  110.46
 3404.75  110.78 3417.86  110.31 3430.98   110.3 3447.38  110.68 3463.78   110.3
 3483.45  110.34 3493.29   109.6 3503.13  110.41 3516.25  110.63 3532.65  110.21
 3539.21  110.28  3555.6  109.58 3565.44  109.93    3572  109.66 3591.68  109.57
 3604.79  109.81 3624.47  109.56 3634.31  109.88 3644.15  109.51 3660.55  109.39
 3670.38   109.7  3683.5  109.48 3703.18  109.67 3709.74  109.43 3739.25  109.37
 3758.93  109.13 3765.49  109.37 3791.73  108.97  3811.4  109.05 3824.52  108.73
 3857.31  108.67 3867.15  108.91 3916.35  108.58 3932.74  108.76  3939.3  108.59
 3952.42  108.88 3958.98  108.64 3981.94  108.69 3995.05  108.33 4027.85  108.54
 4044.25  108.28 4073.76  108.46 4093.44  108.45 4132.79  108.21 4139.35  107.98
 4149.19  108.19 4165.59  108.18 4185.26  107.94 4204.94   108.2 4221.34  108.08
 4234.46  107.74 4241.02  108.03 4260.69  108.13 4277.09  108.01 4290.21  108.52
 4300.05  108.01 4313.17  108.16    4323  107.55  4339.4  108.26 4368.92  107.68
 4382.03     108 4401.71  107.85 4421.39  107.45 4434.51  108.07 4441.07  107.84
 4470.58  107.88 4486.98  107.44  4500.1  107.56 4506.66  107.31 4536.17  107.33
 4546.01  107.58 4568.97  107.41 4585.36  107.54  4595.2  107.31 4624.72  107.47
 4650.95  107.35 4657.51   107.1 4673.91  107.48 4683.75  107.36 4726.38  107.77
 4752.62   107.6  4772.3  108.06 4808.37  108.06 4818.21  108.36 4828.05  108.18
  4867.4  108.59 4873.96   108.4 4903.48  108.59 4913.32   108.8 4946.11  108.58
 4965.79  109.06  4995.3  108.32 5005.14  108.51  5011.7  109.18 5018.26   108.8
 5034.66  108.83 5060.89  108.66 5093.69  108.98 5106.81  108.78 5119.92  109.07
  5139.6  108.55 5152.72  108.42 5165.84  108.66 5178.96  108.63 5188.79  108.89
 5208.47  108.63 5215.03  108.83 5241.27   108.8 5264.22  108.59 5290.46  108.72
 5293.74  108.93 5313.42  108.67 5326.53  108.84 5339.65  108.63 5352.77  108.87
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 5369.17  108.69 5379.01  108.99 5401.96  108.05 5418.36  108.02 5424.92  108.45
 5447.88  108.98 5457.71  109.48 5470.83  109.44 5480.67  109.06 5500.35  109.73
 5506.91   109.5 5520.02  109.87 5546.26  109.41  5556.1  108.18 5562.66  107.75
  5572.5  109.28 5598.73  108.99 5628.25  109.04 5641.37  108.67 5654.48  108.94
 5674.16  108.88 5687.28  108.36  5700.4  108.64  5716.8  108.41 5729.91  108.68
 5743.03  108.54 5772.55  108.63 5779.11  108.35 5788.94  108.59  5811.9  108.05
 5825.02  108.25 5838.14  107.86 5847.98  109.47 5854.53  109.99 5864.37  108.44
 5880.77  108.61 5890.61  108.45 5897.17  107.95 5907.01  108.09 5916.85  108.86
 5926.68  110.08 5949.64  111.46 5966.04  111.69 5975.88  112.58 5985.71  115.74
 5998.83  114.84 6011.95  115.44 6015.23  113.91 6021.79  112.86 6034.91  112.93
 6048.03  113.37 6061.14  113.32 6070.98  112.97 6080.82  113.16 6090.66  112.86
 6123.45  114.15 6136.57  114.12 6166.09  112.96 6185.76  112.61 6202.16  112.85
 6218.56   113.8 6234.96  113.71 6251.35  113.99 6261.19  113.83 6277.59  114.46
 6287.43  115.28 6313.67  114.74 6320.22  114.18 6333.34  114.13 6343.18  114.47
 6353.02  115.31 6375.98  115.63 6382.53  115.45 6402.21  115.74 6412.05  115.59
 6421.89  116.29 6431.73  115.89 6441.57  116.22  6451.4  115.54 6471.08  114.97
  6484.2  114.27 6526.83  114.97 6536.67  115.27 6559.63  115.29 6576.03  115.71
 6585.86  115.56  6612.1  115.79  6644.9   116.5 6684.25  116.66  6723.6  117.25
 6733.44  117.78 6749.84   118.1 6762.96  119.02  6772.8  118.61 6805.59  118.76
 6835.11  117.21 6841.67  117.25  6851.5  115.54 6861.34  115.58 6871.18  116.71
 6877.74  116.19 6907.26  115.58 6923.65  115.93 6933.49  116.84 6940.05  115.92
 6953.17  116.99 6963.01  115.47 6966.29  115.51 6972.85   116.9 6982.69  117.19
 7002.36  115.53 7015.48  115.24  7028.6  114.53 7038.44  115.32 7048.28  114.91
 7064.67  115.06 7074.51  115.43 7090.91  115.01 7100.75  115.63 7113.87  116.08
 7120.42  115.62 7130.26  115.54 7146.66  114.87 7149.94  115.15 7163.06  114.93
 7186.01  115.25 7195.85  114.93 7212.25  115.19 7218.81  115.64 7238.49  115.94
  7251.6   116.6    7268  116.52  7284.4  116.92 7304.08  116.95 7317.19  117.36
 7346.71  117.53 7353.27  117.92 7363.11  117.57 7376.23  118.58 7382.79  119.79
 7389.34  120.03  7395.9  119.55 7402.46  119.85 7441.82   120.3 7451.65  121.43
 7461.49  123.03 7481.17  123.07 7497.57  124.51 7520.52  125.01 7533.64  125.55
 7563.16  127.15 7599.23  129.79 7645.15  132.45 7664.82  133.75 7677.94   134.1
 7691.06  133.45 7697.62  133.56 7710.74  134.93 7733.69  136.02 7743.53  136.02
 7750.09  135.45

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 1060.15    .025 1330.15    .085 5985.71     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1053.15 1407.15           859.81    1625 1934.01            .1       .3
Left Levee      Station=  105.34      Elevation=  128.71
Right Levee     Station= 7733.69      Elevation=  136.02

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            128.38    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.20    Wt. n-Val.                0.066      0.027     0.081
  W.S. Elev (ft)            128.18    Reach Len. (ft)          859.81    1625.00    1934.01
  Crit W.S. (ft)            114.61    Flow Area (sq ft)       14858.12   13735.73   109845.10
  E.G. Slope (ft/ft)      0.000091    Area (sq ft)            14858.12   13735.73   109845.10
  Q Total (cfs)           235000.00     Flow (cfs)             19826.72   81020.22   134153.10
  Top Width (ft)           7471.84    Top Width (ft)           947.81     354.00    6170.03
  Vel Total (ft/s)            1.70    Avg. Vel. (ft/s)           1.33       5.90       1.22
  Max Chl Dpth (ft)          54.46    Hydr. Depth (ft)          15.68      38.80      17.80
  Conv. Total (cfs)       24670350.0    Conv. (cfs)            2081413.0   8505519.0   14083420.0
  Length Wtd. (ft)          1694.87    Wetted Per. (ft)          957.30     361.97    6179.08
  Min Ch El (ft)              73.72    Shear (lb/sq ft)            0.09       0.21       0.10
  Alpha                        4.51    Stream Power (lb/ft s)      0.12       1.27       0.12
  Frctn Loss (ft)             0.18    Cum Volume (acre-ft)    192163.60   71879.25   221170.80
  C & E Loss (ft)             0.11    Cum SA (acres)          23304.28    2924.04   25935.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 170.83*

INPUT
Description: RGV-04, 7-foot wall applied.
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  123.08    6.74  123.51   13.48  121.88   28.28  120.65   34.58  120.38
   47.17  120.39   59.71  121.75   62.86  122.53   70.76  125.78   78.57  127.93
  102.57  128.17  103.24  128.17  103.24  121.17  113.24  120.97  204.24  119.69
  207.24  120.44  231.24  119.96  237.24  118.46  247.24  118.26  253.24  116.76
  276.92   115.3  308.76  113.99  319.38  113.87  359.71   114.4  370.33  114.13
  380.94  112.57  389.43  112.36   395.8  113.04  408.54  112.88  436.14  113.41
  444.63  113.23  467.98  113.75  474.35  113.51  499.83  114.02  527.42  113.01
  535.92  113.33  544.41  111.93  557.15  111.63  565.64  111.72  584.75  110.62
  597.48   110.3  620.84  110.83  637.82  112.08  654.81  111.94  669.66  110.72
  680.28  110.41  705.75  110.88  758.82  110.25  767.32  110.44  775.81  109.91
  790.67  109.88  809.78  108.94  824.64  108.77  837.38  108.39  854.36  108.95
  890.45  108.78  907.43  108.46  937.15  108.49  966.88   108.8  979.61  108.65
   988.1  108.92 1002.97  108.85 1019.95  108.98 1028.44  109.59 1032.69  109.43
 1045.42  109.95 1064.53  109.44 1075.14  109.73 1079.39  110.22 1094.25  109.77
 1106.98  110.64  1126.1  109.97 1136.71  109.98  1145.2  110.41 1153.69  110.14
  1164.3  110.72 1170.67  110.56 1181.29  110.81 1194.03  110.65 1204.64  110.85
 1211.01  110.45 1234.36  110.63 1240.73  110.52 1253.47  110.84 1272.57  110.63
 1283.19  110.82 1300.17  110.47 1308.67  111.14 1319.28  110.84 1346.88  110.52
 1357.49  111.05  1376.6  110.75 1389.33  111.03 1399.95  110.82 1408.44  111.16
 1425.42  110.68  1431.8   111.1 1438.17  110.76 1444.54  111.01 1463.64  110.75
 1470.01  111.08 1482.74  110.47 1516.71  110.73  1525.2  111.12 1548.55  110.61
 1557.05  110.98 1569.79  110.68 1588.89  110.91 1616.49  110.48 1637.72  110.54
 1648.33     110  1682.3  110.06 1699.28  109.65 1718.39  109.98 1739.62  110.06
 1748.11  110.35 1754.48  109.88 1773.59  109.53 1790.57  109.53 1796.94  109.17
 1820.29  109.08 1826.66  110.18 1835.15  109.62 1850.01  109.88 1856.38  110.44
 1862.75  109.87 1873.36  109.61 1890.34  110.12 1896.72  110.53 1909.46  110.34
 1924.31  110.95 1934.93     111 1949.79  110.63 1962.53  111.15  1968.9  110.99
 1977.38  109.87    1988   110.3 2002.86  109.92 2011.35  110.73 2024.09  110.85
 2028.34  111.42 2041.07  111.23 2049.57  110.14 2066.55   109.5 2083.53  109.84
 2087.78  109.66 2094.15  111.38  2098.4  111.83 2109.01  112.02 2119.62  112.63
 2125.99  113.48 2130.24   113.2  2142.2  109.01 2154.17  105.72    2170103.3103
 2182.44102.0568 2186.17  101.84 2200.77   99.62 2218.16   97.75 2235.62   94.95
 2238.79   94.12 2253.08   91.41 2281.06   84.46 2295.65   80.35 2310.23   78.19
 2324.85   76.64 2332.15   76.38 2346.75   74.84 2359.03   77.26 2371.32   81.19
 2383.61   86.03 2395.89   90.26 2397.12   92.11 2423.47    94.1 2441.4397.01582
 2465.0799.22183 2490.07  101.32 2507.77  102.52 2528.85  103.44 2534.19  103.41
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2542.25	104.62	2554.99	105.8	2555.11	106.95	2563.41	108.13	2574.47	108.66
2594.31	108.95	2620.76	108.41	2627.37	107.01	2645.01	107.01	2651.62	108.3
2667.05	108.5	2678.07	107.75	2682.48	107.06	2697.9	107.1	2708.93	107.41
2722.15	107.28	2741.99	107.33	2753	107.19	2779.46	107.49	2799.29	108.04
2816.92	108.23	2825.75	108.75	2841.17	109.15	2858.81	109.02	2872.03	109.14
2889.66	108.31	2924.93	107.55	2944.77	107.49	2962.4	107.66	2980.03	108.16
2993.25	108.92	3024.1	108.94	3041.22	109.4494	3068.17	109.91	3092.41	109.98
3110.03	110.26	3132.06	110.21	3165.11	110.56	3189.35	111.09	3206.97	110.87
3211.38	111.27	3217.99	110.61	3229.01	110.43	3257.65	110.53	3310.53	110.48
3321.54	110.62	3334.76	110.35	3359	110.11	3394.26	109.99	3403.06	110.49
3411.88	110.45	3420.69	109.32	3431.71	110.27	3451.54	110.13	3462.56	109.8
3480.18	109.63	3491.2	109.82	3522.05	109.75	3533.06	110.06	3541.87	109.82
3577.12	109.86	3588.14	109.6	3618.99	109.36	3627.8	109.94	3636.62	109.53
3654.25	109.56	3674.07	109.81	3687.29	111.2	3698.3	111.54	3711.53	111.38
3731.36	111.43	3768.81	111.23	3788.64	111.34	3843.72	110.94	3856.95	111.37
3865.75	110.99	3872.37	111.22	3909.82	111.01	3929.65	111.14	3953.89	110.89
3960.5	110.5	3975.92	110.98	3991.35	110.8	4002.36	110.45	4008.97	110.62
4026.6	110.43	4035.41	110.55	4061.85	110.4	4073.71	110.54	4080.11	111.18
4105.92	110.74	4138.96	110.39	4174.22	110.61	4201.85	110.16	4221.07	110.34
4244.73	110.14	4260.14	110.49	4278.74	112.32	4291.56	112.37	4297.95	112.03
4317.19	111.94	4336.4	111.01	4368.44	110.58	4381.25	111.1	4394.55	110.95
4425.39	111.35	4438.61	111.68	4458.44	111.61	4462.85	111.8	4487.09	112.08
4495.9	112.43	4511.33	112.39	4517.93	112.13	4528.95	112.56	4548.78	112.4
4557.59	112.61	4584.03	112.4	4597.25	112.75	4617.08	113.03	4628.1	112.95
4661.15	113.24	4667.76	113.42	4700.8	113.56	4720.64	113.86	4742.67	113.85
4765.69	114.2	4784.9	114.63	4806.57	114.54	4819.79	114.84	4883.68	115.16
4893.83	115.03	4914.53	115.26	4936.56	115	4949.78	115.15	4964.3	114.67
4976.22	114.85	4980.63	115.25	5013.67	114.9	5053.33	114.93	5075.37	114.55
5092.44	114.66	5105.26	115.47	5118.07	116.69	5130.89	117	5150.28	116.87
5170.11	116.96	5183.33	116.74	5227.4	116.94	5242.82	116.48	5280.27	117.33
5295.7	116.58	5322.14	117.69	5339.77	118.57	5350.78	118.21	5357.39	119.14
5380.78	119.03	5394.85	119.78	5403.66	119.81	5434.51	119.55	5502.81	120.26
5518.23	120.05	5535.86	120.22	5546.87	121.61	5553.48	121.04	5564.5	121.12
5582.13	120.86	5595.35	122.22	5610.77	123.51	5621.79	123.67	5628.4	124.18
5635.01	125.86	5643.82	125.54	5652.63	125.98	5659.25	124.79	5668.06	124.95
5685.68	125.64	5705.52	125.81	5713.94	126.21	5727.54	126.48	5736.36	126.42
5756.19	125.86	5769.41	125.71	5780.43	125.98	5791.44	126.65	5820.08	126.91
5837.71	127.83	5853.91	127.6682	5859.74	127.61	5875.17	128.03	5881.78	128.49
5897.2	128.76	5921.44	128.69	5928.05	128.95	5941.27	128.66	5947.88	128.27
5969.91	128.01	5995.85	128.56	6020.59	128.53	6031.61	128.74	6055.84	128.56
6077.88	128.7	6104.31	128.64	6130.75	128.88	6148.38	129.4	6157.19	129.91
6163.8	129.73	6185.83	129.77	6205.67	129.18	6210.07	129.25	6216.68	128.47
6223.29	128.56	6229.9	129.13	6234.31	128.82	6254.14	128.3	6265.15	128.24
6271.76	128.56	6276.17	128.1	6284.98	128.63	6291.59	127.87	6298.21	128.6
6304.82	128.84	6318.03	128.16	6335.66	127.61	6342.27	128.05	6348.88	127.88
6366.51	128.25	6377.52	128.11	6392.95	128.67	6414.98	128.08	6441.42	128.43
6448.03	128.36	6463.58	129.02	6485.48	129.56	6507.52	129.66	6520.74	129.56
6529.55	129.77	6560.4	129.91	6569.21	130.42	6573.62	131.03	6604.52	131.41
6613.28	131.7	6626.49	133.23	6639.72	133.42	6650.73	134.47	6674.97	135.12
6694.8	135.9	6719.03	137.19	6771.91	139.22	6785.14	138.99	6793.95	139.73
6809.37	140.44	6844.14	140.12	6850.77	138.41	6859.04	137.74	6867.33	138.86
6873.95	138.99	6880.58	137.1	6893.83	136.13	6902.11	135.8	6917.02	135.88
6933.58	135.37	6940.21	133.97	6955.12	133.82	6963.4	134.2	6979.97	134.44
6984.93	134.15	7006.47	134.1	7018.06	133.59	7024.69	132.95	7031.31	133.38
7041.25	132.88	7046.22	133.5	7049.54	133.01	7059.47	133.09	7071.07	133.72
7085.97	135.39	7104.2	135.22	7112.48	133.92	7115.79	134.38	7124.08	134.45

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.186	2125.99	.066	2182.44	.015	2534.19	.066	4438.61	.076

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2154.17 2542.25 859.81 1625 1934.01 .1 .3
Left Levee Station= 103.24 Elevation= 128.17
Right Levee Station= 6811.06 Elevation= 140.515
Blocked Obstructions num= 1

Sta L	Sta R	Elev
2574.87	5737.23	108.61

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 170.5

INPUT
Description: RGV-04, 8-foot wall applied, Bathymetric elevations translated
from IBWC 2008 Cross-sections
Station Elevation Data num= 456

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	124.1	6.56	124.45	13.12	121.03	16.4	120.32	45.91	120.28
59.03	123.19	68.87	126.49	75.43	127.61	99.43	127.85	100.1	127.85
100.1	119.85	110.1	119.65	201.1	118.75	204.1	119.5	228.1	119.02
234.1	117.52	244.1	117.32	250.1	115.82	255.79	115.76	268.91	115.88
285.3	115.44	304.98	115.34	318.1	114.48	327.94	114.34	373.85	112.06
380.41	112.04	403.36	111.12	416.48	110.96	423.04	110.57	439.44	110.61
482.07	112.1	501.74	112.51	518.14	112.09	534.54	109.09	541.1	108.53
547.65	108.77	557.49	110.22	560.77	109.9	577.17	109.92	596.85	110.67
619.8	111.06	632.92	110.71	642.76	111.25	652.59	111.17	668.99	111.76
678.83	111.27	688.67	111.44	701.79	112	708.34	111.81	718.18	112.28
734.58	111.33	744.42	111.16	760.81	110.34	773.93	111.02	787.05	108.24
793.61	107.88	806.73	107.69	819.84	107.89	826.4	107.23	849.36	105.73
869.03	105.1	885.43	105.75	895.27	105.7	905.11	106.2	924.78	107.91
931.34	108.71	944.46	108.8	957.58	108.45	967.41	107.07	980.53	106.03
996.93	105.42	1019.88	105.82	1036.28	106.47	1042.84	106.11	1059.24	106.14
1069.07	106.66	1075.63	106.25	1105.15	106.1	1118.26	106.27	1131.38	106.92
1134.66	106.46	1144.5	106.13	1157.62	106.1	1167.45	106.56	1196.97	105.29
1219.92	105.42	1239.6	104.97	1249.44	105.34	1265.83	106.44	1275.67	106.38
1321.58	106.69	1347.82	106.18	1367.49	106.24	1374.05	106.55	1393.73	106.46
1406.84	106.87	1429.8	106.92	1439.64	107.28	1459.31	107.01	1472.43	107.55
1495.39	107.44	1511.78	107.96	1521.62	107.72	1528.18	108.59	1534.74	108.94
1541.3	108.63	1560.97	109.69	1590.49	108.69	1606.88	109.26	1613.44	110.24
1623.28	110.26	1636.4	109.34	1642.96	109.62	1649.51	110.6	1656.07	111.07
1672.47	110.51	1685.59	109.72	1695.42	109.97	1701.98	109.73	1715.1	110.58
1728.22	110.04	1744.61	111.21	1754.45	110.92	1770.85	111.46	1790.53	111.19
1806.92	111.62	1816.76	110.85	1852.83	111.21	1862.67	110.97	1882.35	111.57
1902.02	111.45	1911.86	111.08	1928.26	111.42	1941.37	110.93	1954.49	110.72
1961.05	111.07	1967.61	112.06	1974.17	112.15	1984.01	111.45	1993.84	111.55
2006.96	111.03	2026.64	110.82	2043.03	111.87	2059.43	111.32	2062.71	111.58
2072.55	111.28	2092.22	111.81	2108.62	111.37	2115.18	111.43	2121.74	112.03
2138.13	111.64	2147.97	111.04	2157.81	111.86	2167.65	111.17	2177.49	111.67
2193.88	111.15	2207	111.17	2216.84	111.82	2223.4	111.01	2236.51	110.63

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 2243.07  111.17 2249.63  110.77 2266.03  110.83 2279.14  111.19 2288.98  111.16
  2302.1  111.93  2318.5  111.19 2328.33  111.36 2338.17  110.85 2351.29  111.57
 2370.97  111.02 2400.48  111.55 2423.43   110.8 2443.11  110.48 2459.51  110.71
 2469.34  110.43  2475.9  110.62  2492.3  109.54 2498.86  109.85 2511.98  109.46
 2544.77  109.58 2551.33  108.97    2571  108.62 2577.56  108.83 2593.96  108.75
 2600.52  109.12 2623.47  109.11 2626.75  109.47 2633.31  109.13 2646.43  109.64
 2656.27  108.71 2672.66  108.66 2685.78  108.09  2698.9  107.99 2712.01  108.15
 2721.85  107.46 2734.97  107.25 2744.81  107.51 2757.92  107.35 2767.76  109.71
 2774.32   109.8 2780.88  108.79 2803.84  109.67 2813.67  110.94 2823.51  109.97
 2839.91  109.43 2853.03  110.14 2866.14   110.4 2875.98   111.2 2895.66  110.77
 2918.61  111.91 2935.01  111.83 2948.13  111.16 2957.96  111.07 2977.64  112.11
 2987.48  111.79 2994.04  110.37 3000.59  109.55 3016.99  110.39 3030.11  110.15
 3039.95  109.63 3053.06  111.27 3059.62  111.65 3072.74   111.6  3079.3  112.78
 3089.14  112.29 3098.97  112.36 3105.53  111.52 3112.09  110.15 3131.77  109.29
 3138.33  108.81 3148.16  108.84 3164.56  109.41 3171.12  109.05 3180.96  112.45
 3187.52  113.34 3203.91  113.68 3220.31  114.76 3230.15  116.26 3236.71  115.58
 3243.26   113.8  3253.1  110.56 3259.66  109.41  3269.5  106.35 3276.06  104.85
 3279.34  104.76 3293.34  102.96 3303.34  101.96 3313.34  101.36 3333.34   97.96
 3363.34   94.96 3373.34   94.36 3423.34   89.36 3433.34   87.96 3443.34   86.96
 3453.34   85.36 3463.34   83.36 3473.34   82.96 3493.34   80.96 3503.34   79.36
 3513.34   78.96 3533.34   75.96 3543.34   79.46 3553.34   85.36 3563.34   93.36
 3573.34  100.36 3574.34  103.91 3682.63  104.76  3685.9  104.87 3692.46  107.47
 3702.29  109.13 3718.68  109.45 3751.45  109.59 3758.01  109.77  3787.5  109.41
 3820.28  109.29 3836.67  109.53 3843.22  109.32 3882.55  108.97 3928.43   108.9
 3954.65  109.51 3990.71  111.15 4003.82  112.02 4013.65  113.01  4020.2  113.34
 4036.59  113.26 4046.42  113.49 4085.75  113.63 4131.64  113.25 4144.75  113.47
 4164.41  113.52 4170.97  113.28 4197.19   113.2  4210.3  113.64 4226.69  113.67
 4246.35  112.68 4262.74  112.82 4275.85  112.46 4292.24  112.49 4364.35  111.87
 4393.85  111.81 4433.18  111.34 4479.06  111.27 4485.62  111.65 4488.89  112.67
 4511.84  111.59 4521.67  111.67 4538.06  112.21 4551.17  111.65    4561  111.87
 4574.11  111.69 4580.67   112.3 4583.95  113.17  4590.5  115.98 4597.06  116.17
 4600.33  115.73 4610.17  115.37    4620  113.68 4629.83  112.87 4636.39  112.76
 4642.94   113.9 4656.05  113.95 4669.16  115.08    4679  115.32 4705.22  116.51
 4734.72  117.27 4747.83  117.36 4767.49  118.39 4787.16   119.2 4800.27  119.51
 4813.38  120.15  4839.6  120.97 4849.43  121.55 4855.98  121.39 4875.65  121.79
 4892.04  121.89 4905.15  121.61 4914.98  121.74 4934.65  121.22  4941.2  120.83
 4954.31   121.6 4964.14  121.18 4993.64  120.68 5006.75  120.69 5013.31  122.16
 5019.86  124.56 5026.42  125.19 5042.81  125.11 5052.64  124.81 5062.47  124.96
 5082.14  124.86 5101.81  125.42 5108.36  123.94 5121.47  124.82 5134.58  128.06
 5141.14  128.99 5154.25  129.05 5164.08  131.07 5173.91  130.39  5190.3  131.12
 5213.24  131.89 5229.63  132.11 5242.74  133.65 5259.13  133.62 5272.24  135.61
 5278.79  135.66 5305.01   137.2 5311.57  138.15 5324.68  139.07 5334.51  138.71
 5354.18  138.81 5367.29  139.71 5377.12   139.9 5396.79  140.78 5403.34  141.48
 5423.01  142.02 5432.84  141.72 5442.67  140.97 5449.23   141.1 5459.06  142.11
 5468.89  142.21 5475.45  141.78 5488.56  141.77  5511.5  140.87 5534.45  140.44
 5554.11  140.86 5567.22  140.77 5586.89  141.61    5600   141.1 5609.83  140.29
 5622.94  140.27 5632.77  140.79 5642.61  140.69 5665.55  141.25 5681.94  141.25
 5698.32  141.64 5708.16  142.39 5724.54  142.59 5737.66  142.16 5767.15  142.28
 5780.26  142.67 5786.82  143.29 5796.65  143.59 5806.48  144.74 5845.82  144.56
 5855.65   144.2 5875.31  144.46 5888.43  145.01 5904.81  144.51 5944.15  144.28
 5947.42   143.8 5957.26  140.87 5967.09   139.5 5973.64  139.53 5983.48   141.1
 5990.03   141.8 6003.14  142.06 6006.42  141.61 6016.25  138.29 6042.47  136.38
 6058.86  135.73 6068.69  136.02 6088.36  135.93 6114.58  135.33 6121.13  134.94
 6134.24  132.15 6150.63  131.89 6163.74  131.88 6180.13  132.65 6212.91  133.16
 6222.74   132.6  6242.4  132.48 6265.35  132.54 6275.18  131.71 6288.29  131.54
 6294.85  130.61  6301.4  130.27 6314.51  131.14 6321.07   131.1 6327.62  130.21
 6334.18  130.16 6344.01   131.4 6350.57  130.43 6370.23  130.61 6380.06  131.57
 6393.17  131.89 6406.28  133.64 6422.67  135.26 6435.78  135.17 6448.89  134.82
 6458.73  134.95 6468.56  133.65 6475.11  132.37 6481.67   133.3 6494.78  132.96
 6498.06  133.45

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .186 3236.71    .066 3293.34    .015 3574.34    .066 4003.82    .076

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3276.06 3574.34          1270.17    1075 1060.89             .1       .3
Left Levee      Station=   100.1      Elevation=  127.85
Right Levee     Station= 5888.43      Elevation=  145.01
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1744.61  111.21

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            127.58    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               3.39    Wt. n-Val.                 0.181      0.015      0.070
  W.S. Elev (ft)            124.18    Reach Len. (ft)         1270.17    1075.00    1060.89
  Crit W.S. (ft)            118.77    Flow Area (sq ft)       40331.55   10130.68   16057.82
  E.G. Slope (ft/ft)      0.000295    Area (sq ft)            40331.55   10130.68   16057.82
  Q Total (cfs)           235000.00    Flow (cfs)              30869.70   173818.60   30311.67
  Top Width (ft)           4923.44    Top Width (ft)           3175.96     298.28    1449.20
  Vel Total (ft/s)            3.53    Avg. Vel. (ft/s)            0.77      17.16       1.89
  Max Chl Dpth (ft)          48.22    Hydr. Depth (ft)           12.70      33.96      11.08
  Conv. Total (cfs)       13674740.0    Conv. (cfs)             1796319.0   10114570.0   1763847.0
  Length Wtd. (ft)          1100.58    Wetted Per. (ft)         3185.60     310.01    1452.09
  Min Ch El (ft)              75.96    Shear (lb/sq ft)            0.23       0.60       0.20
  Alpha                       17.49    Stream Power (lb/ft s)      0.18      10.34       0.38
  Frctn Loss (ft)              0.30    Cum Volume (acre-ft)    190999.20   70938.21   216394.40
  C & E Loss (ft)              0.17    Cum SA (acres)          23223.10    2897.40   25621.11


Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 170.38*

INPUT
Description: RGV-04, 7-foot wall applied.
Station Elevation Data    num=     456
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  120.59    5.12  120.77   10.23  119.07   18.27  118.73   22.83  119.18
   31.97  121.09    35.8  121.52    46.8  124.45   53.71  126.29   58.83   126.9
   82.83  127.14    83.5  127.14    83.5  120.14    93.5  119.94   184.5  119.04
   187.5  119.79   211.5  119.31   217.5  117.81   227.5  117.61   233.5  116.11
  248.28  116.12  264.45   115.9   276.7  115.96  283.86  114.74  296.65  112.16
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   306.5  111.03  313.28  110.52  336.54  109.76  351.77  109.61  359.82  109.85
  366.47  109.61  400.29  109.04  426.31  109.41  432.95  109.63   452.9  109.84
  472.85  110.35  494.07  110.32  510.25  108.79  516.72  108.47  523.18  108.59
  532.88  109.29  536.11  109.07  549.31  109.02   571.7  109.52  592.54  109.58
  607.27   109.3  616.97  109.65  642.84  110.08  659.03  109.88     669  110.22
  681.65  110.14  691.35  110.38  702.24  109.96  712.21  109.82  718.86  109.28
  733.39  108.73  746.33   108.7  752.11  107.91  758.75  107.64  768.73  108.83
     792   108.8  798.65   107.8  808.62  106.95  815.27  106.97  825.24  107.64
   831.9  107.78  840.12  107.47  848.52   107.6  865.14     107  878.44  108.07
  891.74  108.65  901.57  108.33  915.01  107.18  927.44  106.73  937.14  106.06
  966.25  105.08   981.5  105.29 1005.06  105.98 1011.53  105.86  1037.4  106.25
 1054.64  105.72 1071.26  105.73 1085.91  106.03 1098.85  106.49 1102.08  106.28
 1124.72  106.03 1134.42  106.21 1163.53  105.83 1177.65  106.09 1197.59  106.09
 1205.57  105.93 1231.44  106.69 1264.08  106.23 1290.68  106.18  1312.3  105.87
 1331.69  106.06 1343.87  106.32 1357.57   106.1 1377.11  106.24 1387.09  106.54
 1402.85  106.71 1422.25  106.45  1443.6  107.02 1450.26  106.73 1460.22  106.72
 1473.99  107.06  1483.7  106.92 1496.64  107.49  1503.1  107.32 1513.42  107.66
 1551.62  107.23 1567.78   107.5 1574.25  108.09 1583.95  108.08 1596.89  107.66
 1603.36  107.81 1616.29  108.57  1645.4  108.06 1661.57  108.29 1674.51  108.83
 1687.44  108.53 1703.61  109.11 1719.54  108.86 1726.18  109.19 1748.89  109.44
 1765.06   109.9 1774.76  109.55    1796  109.53 1812.62  109.86 1825.91  109.39
 1835.88  109.56 1849.19  109.26 1869.13  109.58 1885.75  110.04 1902.38  108.84
 1910.59  108.71 1923.53  109.09  1939.7  108.76  1949.4  108.89 1962.34  108.64
 1981.74  108.61 1997.91  109.08 2014.08  108.63 2027.02  108.58 2046.42  108.88
 2062.59  108.69 2075.53  109.03 2091.69  108.83  2101.4  108.54  2111.1  109.01
 2120.81  108.87 2130.51     109 2141.74  108.29 2151.72  108.08 2159.61  108.19
 2169.32  108.79 2178.31  108.25 2188.72  108.02 2195.19  108.24 2201.65  107.99
 2221.53  108.04 2238.16  108.46  2253.4  109.09 2269.57  108.89 2279.27     109
 2288.97  108.79 2301.91   109.3 2321.32  109.14 2337.88  109.46 2350.42  109.51
 2377.78  109.13 2392.46  109.08 2411.03  109.33  2424.8   109.3 2440.97  108.92
 2447.44  109.14 2464.22  108.98 2487.49  109.54 2500.78  109.37 2517.41  108.89
 2525.06  109.13 2541.23  109.11  2547.7  109.34 2570.33  109.56 2592.98  109.63
 2602.68   109.1 2617.14  108.81 2650.39  108.59 2657.65  108.77 2667.01  108.61
 2683.63  107.96 2702.93  106.84 2712.63  107.94  2719.1  107.92 2725.57  107.36
 2748.21  108.04 2757.91  108.81 2767.61  108.55 2783.78  108.45 2796.67  108.85
 2809.96  108.76 2819.36  109.11 2838.76  108.76  2861.4  109.41 2877.57  109.36
  2900.2  108.57  2906.3  108.52 2929.32  109.06 2942.25  108.17 2958.42  108.66
 2981.06  108.26 2993.99   109.1  3013.4  109.51 3019.87  110.25 3035.72  110.27
 3052.21  108.63 3078.08  107.93 3092.14  107.99 3110.42  109.39 3120.12  111.39
 3126.59  111.86 3142.76   112.1 3158.93  112.87 3168.64  113.68  3175.1  113.39
 3195.85  108.99 3208.05  105.28 3211.71  104.79  3217.3  103.07 3227.83101.6244
 3237.44   99.66 3244.38   98.54 3259.81   95.11 3271.99 93.3989 3287.78   91.49
 3301.21   90.32 3321.34   87.96 3343.83   85.71 3370.95   82.21    3380   80.87
 3389.04   80.46 3407.12    79.3 3416.16   78.48  3425.2   78.26 3443.28   76.71
 3453.02   79.72 3462.77   84.06 3472.51   89.51 3482.25   94.58 3482.58 95.2469
 3483.23   96.56 3489.4797.93324 3499.77   100.2 3510.04  103.45 3539.86  104.56
 3549.94  105.97 3566.74  108.06 3573.46  108.07 3591.93  108.61 3598.32  109.99
  3607.9  110.85 3623.87  111.14 3635.77  110.94 3647.67  111.27 3689.33   111.2
 3701.22  110.28 3707.17  110.09 3713.12   110.4 3722.05  110.29 3733.95  110.51
 3754.94  110.55  3763.7   110.4 3790.48  110.43 3811.26   110.2 3817.19  110.32
    3835  110.16  3843.9  110.31 3861.71  110.31 3873.57  110.61 3903.26   110.8
 3912.18111.0645  3918.1  111.24  3944.8   112.5 3953.72  113.25 3968.55  112.95
 3980.42  113.46 3995.27  113.71 4021.97  113.65 4036.81  114.29 4042.75  114.07
  4075.4  113.89 4116.96  113.95 4155.72  113.48 4173.62  113.66 4194.48  113.35
 4210.05   112.8 4228.26  112.84 4245.17  112.51 4272.01  112.27  4322.7  111.96
 4352.52  111.56 4373.39  111.49 4382.34  111.62  4388.3  111.18 4394.26  111.29
  4417.6  111.02 4433.03  111.02 4441.97  110.79 4459.86  110.03 4468.57  109.93
 4475.85  110.17 4479.49  110.71 4492.66  110.41 4504.59  110.64 4513.53  110.54
 4516.52  110.92 4525.46  112.93 4537.38  113.09 4546.33     112 4555.28  111.94
 4581.44  112.54 4592.36  114.47 4597.02  114.93 4602.99   117.1 4608.95  118.36
 4614.22  118.33 4636.06   116.9 4643.34  116.69 4650.62  117.14 4665.18  116.91
 4679.75  117.13 4689.01117.0701 4701.38  116.99 4719.81  117.28 4737.16   117.3
    4764   117.8 4778.91  119.41 4784.87  119.86 4817.67  120.47 4839.96  120.97
 4869.09  121.34 4880.01  121.61 4887.28  121.48 4916.06  121.63 4941.91  121.09
 4966.75  120.94 4972.72  121.59 4984.65  123.86 5011.48  124.55 5035.34  123.85
 5044.28  124.63 5054.77  127.09 5062.06  129.17 5069.34  131.72  5074.1   132.7
 5080.06  133.18 5089.01  132.78 5094.97  132.86  5106.9  133.51 5116.67  133.69
 5138.52  133.77 5157.59  133.97 5160.37  134.22 5167.65  133.73 5182.21   134.6
 5196.78  136.23 5204.06  136.84 5218.63  137.15 5229.55  138.16 5240.47  137.98
 5261.95  138.67 5284.16  139.06 5302.37  139.16 5316.93  139.97 5335.14  139.99
  5349.7  140.95 5356.98  140.99 5386.11  141.76 5393.39  142.26 5407.96  142.78
 5422.97  142.52 5440.73  142.62 5455.29     143 5473.66  143.21 5488.06  143.63
 5503.47  144.34 5517.19  144.34 5539.25  144.15 5546.32  143.94 5557.14  144.44
 5568.16  144.23 5578.02  143.68 5590.01  143.63 5607.83  143.17 5640.99  142.73
 5662.83  142.83 5677.39  142.71 5699.24  143.09 5713.81  142.74 5724.73  142.29
 5739.29  142.24 5750.21  142.47 5761.14  142.34 5786.62  142.34 5804.83  142.12
 5823.03   142.2 5833.96  142.57 5852.16   142.6 5866.73  142.37 5899.49  142.21
 5914.05  142.31 5926.88   142.7  5938.8  143.79 5950.73  143.74  5956.7  143.33
 5962.66  141.98  5971.6   143.5 5986.51   143.6 5995.46  144.06 6007.39  144.27
 6019.65  144.25 6034.22  144.73 6070.77  144.05 6079.37  142.23 6085.82  141.46
 6090.12  141.44 6100.87  142.68 6109.47  142.89 6118.07  140.41 6137.65  137.27
 6144.54  136.87 6158.34  137.59 6172.13  137.47 6186.87  136.56 6195.47  135.58
 6214.82  136.82 6241.07  139.15    6246139.0946 6253.53  139.01 6281.48  139.13
 6287.93  138.75 6296.53  138.71 6305.13  138.06 6313.73  138.49 6326.63  137.96
 6333.08  138.52 6337.38  137.99 6350.28  138.07 6356.73  138.55 6365.33   138.7
 6384.68  140.28 6392.78  140.36 6408.33   141.3 6419.08  140.46 6423.38     141
 6434.13  141.16

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .186 3208.05    .066 3237.44    .015 3499.77    .066  3944.8    .076

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      3211.71 3539.86          1270.17    1075 1060.89            .1       .3
Left Levee      Station=    83.5      Elevation=  127.14
Right Levee     Station= 6034.22      Elevation=  144.73
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1885.75  109.01

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 170.26

INPUT
Description: RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     455
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  117.08   13.11  117.14   16.39  118.06   22.95  121.89   36.06  126.29
```

```
   45.89  126.29   69.89  126.53   70.56  126.53   70.56  120.53   80.56  120.33
  171.56  120.25  174.56  120.55  198.56  120.07  204.56  119.47  214.56  119.27
  220.56  118.67  239.29   116.3  255.68  116.55  275.35  109.84  285.18   107.7
  291.74  107.04  314.68   106.7  331.07  107.21  337.63  107.73  344.19  107.52
  354.02  107.62  367.13  107.38  376.96  107.49  390.08  107.99  403.19  107.87
  409.74  108.06   416.3  107.82  429.41  107.78  449.08   108.3  455.64  108.26
   475.3  108.66  494.97  108.36   504.8  108.48  514.64  108.13  524.47  108.12
  531.03  108.38  553.97  108.36  567.09  108.13  573.64  107.81  586.75  107.93
  603.14   108.4  612.98  108.23  622.81  108.67  632.65  108.38  642.48   108.7
  652.31  108.37  658.87   108.6  675.26  108.28  685.09  108.39  691.65  107.48
  701.48  107.38  724.43  106.04  730.98  106.93  737.54  109.28  740.82  109.82
  750.65  110.02  763.76  109.75  770.32   108.4  780.15  107.37  786.71  107.85
  796.54   109.7   803.1   110.2  809.66  109.86  819.49  109.77  835.88  108.29
  848.99  109.69   862.1  109.68  885.05  105.58  898.16  104.97  917.83  105.16
   937.5   104.7  950.61  104.89  957.16   105.2  986.67  105.73   996.5  106.01
 1003.06  105.94 1022.72  105.24 1039.11  105.36 1062.06  106.03 1075.17  106.15
 1101.39  105.86 1121.06  106.37 1130.89  106.38 1144.01  106.81 1153.84  106.76
 1163.67  107.03 1176.79  106.81  1189.9  107.23 1203.01  106.69 1216.12  106.47
 1229.23  105.92 1245.62   105.7 1255.46  105.75 1265.29  105.51 1281.68  105.59
  1307.9  106.12 1330.85  105.49 1340.68   105.6 1350.52  106.18 1370.18  106.13
 1386.57  105.87 1406.24  106.53  1412.8  105.98 1422.63  105.93 1432.46  106.19
 1465.24  106.01 1475.08  106.12 1481.63  105.56 1491.47  105.45 1507.86  105.78
  1530.8  105.74 1537.36  106.04 1543.91   105.9 1576.69  106.08 1602.92  106.33
 1616.03  106.77 1635.69   107.1 1658.64  106.92 1668.47  107.15 1678.31  106.59
 1684.86  107.03 1691.42  106.93 1704.53   107.6 1727.48  108.32  1753.7  107.99
 1763.53  108.52 1770.09  108.56  1783.2  107.63 1793.03  107.67 1806.15  107.01
 1819.26  107.58 1825.81  108.07  1842.2   108.7 1858.59  106.83  1871.7  106.62
 1874.98  106.25 1888.09  105.85 1901.21  106.23 1920.87  106.26 1940.54  106.43
 1950.37  106.37 1963.49  105.97 1983.15  105.87 2019.21  106.03 2061.82  106.03
 2071.66  106.56 2078.21  106.59 2088.05   106.1  2094.6  105.27 2104.44     105
 2117.55  105.35 2127.38  106.32 2130.66  105.56 2156.89  105.16 2163.44  105.36
 2173.28  105.15 2189.67  105.75 2196.22  106.28 2206.05  106.25 2212.61  106.53
 2238.83   106.7 2245.39  106.95 2278.17  107.33    2288  107.59 2294.56  107.43
 2320.78  107.64 2327.34  107.54 2353.56  107.79 2360.12  108.02 2379.79  107.97
  2392.9  108.41 2412.57  108.49 2435.51  109.52 2442.07  109.31 2448.62  109.79
 2455.18  109.25 2465.01  109.13 2471.57  109.43 2484.68  109.42 2507.63  109.74
 2520.74  110.11 2533.85  109.52 2543.68  109.69 2563.35  108.96 2583.02  109.35
 2596.13  109.11 2612.52  109.74 2628.91  108.59 2632.19  107.94  2645.3  106.38
 2671.53  105.91 2701.03  106.62 2710.86  107.11 2733.81  107.59 2740.36  107.56
 2753.47   107.1 2773.14  106.94 2789.53  106.59 2805.92  106.94 2819.01  106.92
 2835.37  106.56 2848.46  105.65 2858.27  105.56 2877.91  106.73 2897.54  106.94
 2930.26  106.87 2946.62  107.05 2959.71   107.7 2976.07  108.21 2982.62  107.27
 3005.52   106.9 3021.88   107.1  3031.7  106.98 3041.51  108.18 3048.06   109.6
 3057.87  110.31 3084.05  110.54  3090.6   110.9  3113.5  111.19 3126.59  109.82
  3136.4  107.58 3142.95  105.04 3146.22  104.76 3151.22   101.9 3162.22  100.17
 3169.22    97.5 3189.22   91.77 3203.22   89.29 3214.22   87.83 3226.22   86.57
 3244.22   84.07 3258.22    82.8 3269.22   81.45 3281.22   79.67 3300.22   78.07
 3317.22   77.67 3353.22   77.47 3366.22   80.92 3389.22   87.97 3398.22   91.79
 3408.22   96.35 3415.22  100.57 3418.22  102.77 3447.26  104.76 3450.53  105.33
 3457.07   107.5 3473.43  111.54 3476.71  111.98 3479.98   111.5 3493.07  112.22
 3506.15  112.56 3522.51  112.56 3529.06  112.83 3542.15  112.38 3555.24  112.99
 3561.78   112.8 3568.32  113.04 3581.41  112.72 3601.05  112.86 3614.13  111.16
 3620.68  110.79 3627.22  111.44 3637.04  111.24 3650.13  111.73 3682.85  111.49
  3712.3  111.76 3735.15  111.43 3741.68  111.69 3761.26  111.38 3771.05   111.7
 3784.11  111.79 3790.64  111.61 3803.69  111.97 3836.34  111.38 3852.66  111.66
 3865.71   112.3 3872.24  112.23 3882.03  112.61 3891.83   113.4 3908.15   112.6
 3914.68   112.8  3921.2  113.58 3937.53  113.91 3947.32  113.94  3966.9   113.7
 3973.43  113.89 3983.22  114.99 3989.75   114.6 4025.66  114.48 4038.71  114.53
 4071.37  114.38 4094.33  114.01 4107.44  114.03    4114  113.76 4133.68  113.67
  4146.8  113.33 4156.63  113.32 4173.03  112.93 4202.55  112.84 4212.38  112.55
  4225.5   112.5  4241.9  112.14 4297.65  111.91 4307.49  111.61  4320.6  111.59
 4330.44  111.28  4353.4  111.17 4363.24  111.52 4369.79   110.7 4376.35  110.98
 4412.43  110.59 4418.99  110.72 4428.82  110.27  4448.5  108.78 4458.34  108.59
 4478.01  108.85 4484.57   108.7 4491.13  108.97 4497.69  109.67 4507.53  109.42
 4510.81  110.15 4520.65  113.91 4523.92  114.24 4533.76   114.1  4543.6  112.26
 4553.44  112.09 4566.56  112.83 4579.67  112.75 4596.07  112.99 4599.35  113.75
 4605.91  118.43 4612.47  121.17 4628.87  121.49 4648.54  120.68 4678.06  119.76
 4701.01  118.66 4714.13  118.23 4727.25  118.19 4753.48  117.69    4783  118.25
 4799.39  120.91 4805.95  121.52 4842.02  121.59 4855.14  121.87 4881.38  121.67
 4907.61  121.72 4933.85  121.35 4950.24  121.44 4966.64  120.68  4989.6  120.46
 5005.99  120.48 5012.55  121.91 5025.67  126.75 5028.95  126.42 5045.35  127.26
 5055.18  127.98 5061.74  127.55 5071.58  127.39 5081.42  126.95  5084.7  127.21
 5091.26  128.58  5101.1  132.92 5120.77  139.53 5124.05  140.43 5130.61  141.19
 5140.45  140.42 5147.01  140.62 5160.12   142.2 5183.08  142.65 5206.04  142.72
 5215.87  142.59 5222.43   143.5 5228.99  143.54 5235.55  144.16 5245.39  144.45
 5255.23  144.27 5288.02  145.43 5297.86  145.17 5304.42  145.55 5314.25  145.61
 5330.65  146.12 5356.89  146.24 5360.17  146.14 5409.36  146.37 5422.48  146.26
 5442.15  146.36 5465.11   146.3 5494.62  146.52 5507.74  146.32 5533.97  146.47
 5543.81  146.28 5563.49  146.23 5576.61   146.4 5596.28  146.99 5612.68  146.63
 5629.08  146.89 5635.63  147.32 5642.19  146.78 5655.31  146.78 5661.87  146.58
 5678.27  145.58 5697.94  145.45 5711.06  145.19  5720.9  145.27 5786.49  144.66
 5806.16  144.64  5832.4  144.33 5871.75  144.13 5888.15  143.85 5937.34  142.77
 5963.57  142.75 5989.81  142.52 5993.09  142.61 6052.12  141.89 6061.95  141.95
 6075.07   143.3 6081.63  142.79 6088.19  142.77 6094.75  141.98 6098.03  140.07
 6101.31   139.3 6111.14  142.37 6120.98  142.35 6127.54  142.64 6137.38  143.85
  6150.5  144.22 6163.61  144.04 6180.01  144.45 6186.57  144.41 6206.25  143.33
 6216.08  143.74 6219.36  142.78  6229.2  138.31 6232.48  137.92 6239.04   139.2
  6245.6  139.25 6252.16  138.12 6255.44  138.56    6262  140.87 6268.55  142.35
 6278.39  145.29 6304.63  145.88 6317.74  145.81  6324.3  145.55 6337.42  145.52
 6343.98  145.12 6350.54  145.54  6357.1  147.51 6363.66  148.65 6370.21  148.87

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   45.89     .12 3203.22    .025 3398.22     .12 4605.91     .06
 6180.01    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        3113.5 3529.06          1559.58    2150 1999.52             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  3113.5  111.19       T
 3529.06 6370.21  112.83       T
Left Levee      Station=   70.56      Elevation=  126.53
Right Levee     Station= 6180.01      Elevation=  144.45
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 1144.01  106.81

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            125.77    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.31    Wt. n-Val.                0.120      0.083     0.111
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W.S. Elev (ft)	125.46	Reach Len. (ft)	1559.58	2150.00	1999.52	
Crit W.S. (ft)	116.54	Flow Area (sq ft)	41838.07	13089.65	15314.98	
E.G. Slope (ft/ft)	0.001401	Area (sq ft)	52886.40	13089.65	16274.84	
Q Total (cfs)	235000.00	Flow (cfs)	111064.30	85706.55	38229.11	
Top Width (ft)	4951.62	Top Width (ft)	3042.94	415.56	1493.12	
Vel Total (ft/s)	3.35	Avg. Vel. (ft/s)	2.65	6.55	2.50	
Max Chl Dpth (ft)	47.99	Hydr. Depth (ft)	13.75	31.50	10.26	
Conv. Total (cfs)	6277965.0	Conv. (cfs)	2967056.0	2289629.0	1021281.0	
Length Wtd. (ft)	1964.81	Wetted Per. (ft)	3052.55	425.68	1498.03	
Min Ch El (ft)	77.47	Shear (lb/sq ft)	1.20	2.69	0.89	
Alpha	1.79	Stream Power (lb/ft s)	3.18	17.61	2.23	
Frctn Loss (ft)	1.03	Cum Volume (acre-ft)	188316.30	70374.96	215629.30	
C & E Loss (ft)	0.24	Cum SA (acres)	23041.21	2880.49	25549.25	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 170.02

INPUT
Description: RGV-04, Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 446

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	117.82	6.56	118.15	16.39	119.31	19.67	118.94	26.23	117.17
52.46	117.05	59.02	117.3	62.3	117.91	68.86	121.62	85.25	126.02
88.53	126.34	112.53	126.58	113.2	126.58	113.2	116.58	123.2	116.38
214.2	111.97	217.2	112.72	241.2	112.24	247.2	110.74	257.2	110.54
263.2	109.04	265.59	109	275.43	107.86	281.98	107.5	288.54	107.58
304.94	109.89	318.05	109.9	341	107.65	354.12	105.47	357.4	105.25
445.93	105.25	452.49	105.42	468.88	106.25	488.55	105.4	501.67	105.88
508.23	105.61	547.57	105.68	554.13	105.5	570.53	105.41	577.08	105.66
596.76	105.92	606.59	105.6	626.27	105.75	632.82	105.53	649.22	105.51
659.06	106.11	675.45	106.5	685.29	107.23	695.12	107.05	704.96	107.45
724.63	107.24	754.14	107.33	763.98	108.18	773.82	108.47	786.93	107.82
803.33	107.34	823	106.63	829.56	106.73	839.39	107.23	852.51	106.38
862.35	106.17	878.74	106.26	891.86	107.29	904.97	107.15	914.81	107.32
924.64	107.74	931.2	107.32	941.04	107.2	957.43	107.53	963.99	107.95
970.55	108.02	990.22	107.47	1006.62	106.55	1023.01	106.81	1039.41	108.27
1055.8	108.1	1068.91	108.61	1075.47	108.46	1091.87	109	1101.7	108.29
1114.82	108.35	1147.61	109.21	1157.44	108.8	1170.56	109.62	1180.4	109.39
1190.23	110.07	1203.35	111.3	1213.18	112.04	1219.74	111.86	1232.86	112.02
1239.42	112.51	1252.53	112.41	1255.81	112.19	1272.2	112.64	1282.04	112.41
1295.16	112.72	1308.27	112.53	1311.55	111.92	1318.11	111.44	1337.78	110.63
1344.34	110.85	1347.62	110.31	1367.29	105.16	1373.85	104.79	1374	103.64
1379	89.64	1709	89.64	1714	103.64	2039.45	104.79	2046.01	104.97
2065.69	106.64	2078.8	106.94	2098.47	104.96	2101.75	104.76	2999.81	104.76
3003.07	104.94	3019.36	106.75	3029.13	107.01	3035.64	106.8	3045.42	107.06
3058.44	107.79	3064.96	108.48	3074.73	107.17	3077.99	107.26	3084.5	108.49
3094.27	111.17	3097.53	111.78	3104.04	112.08	3123.59	112.26	3143.13	112.12
3152.9	112.23	3175.7	111.86	3188.73	112.17	3195.25	111.38	3205.04	110.76
3214.87	111.55	3227.99	110.09	3231.27	110.35	3237.83	111.71	3247.66	111.57
3260.78	111.78	3280.45	111.37	3293.56	109.77	3303.4	111.23	3313.24	111.57
3323.07	111.28	3332.91	110.51	3346.02	108.83	3349.3	108.62	3372.25	109.31
3388.65	106.84	3395.21	105.46	3401.76	104.54	3414.88	104.35	3424.72	106.1
3434.55	107.47	3447.67	107.79	3454.22	108.36	3467.34	105.76	3477.18	105.04
3480.45	104.57	3487.01	104.33	3503.41	104.39	3509.96	104.79	3536.19	105.22
3552.59	105.81	3562.42	106	3582.1	104.74	3598.49	104.63	3611.6	105.09
3618.16	105.13	3628	105.72	3634.56	106.43	3644.39	106.9	3647.67	106.83
3667.34	108.35	3683.74	108.93	3700.13	109.2	3709.97	108.64	3716.52	108.65
3723.08	108.14	3729.64	108.09	3739.48	105.65	3746.03	105.14	3755.87	104.92
3765.71	104.4	3788.66	106.1	3795.21	107.48	3805.05	107.21	3808.33	107.5
3818.17	109.63	3834.56	112.28	3841.12	112.47	3864.07	112.5	3906.69	113.15
3926.37	113.01	3949.32	113.18	3965.71	112.88	3972.27	113.16	3985.38	112.84
4008.33	113.15	4018.17	112.87	4028.01	110.89	4034.56	110.39	4044.4	110.96
4047.68	110.4	4060.79	110.06	4073.91	110.12	4087.02	109.64	4096.86	108.68
4106.7	108.47	4119.81	107.13	4123.09	107.29	4142.76	109.32	4149.32	109.53
4155.88	109.31	4165.71	109.51	4178.83	109.44	4191.94	109.06	4201.78	109.41
4221.45	109.41	4228.01	108.57	4234.57	108.79	4241.12	109.8	4247.68	110.28
4257.52	109.78	4264.07	108.19	4267.35	107.82	4277.19	107.91	4287.02	108.25
4293.58	108.93	4303.42	109.09	4316.53	109.55	4326.37	108.85	4332.92	109.14
4342.76	109.19	4349.32	109	4365.71	108.02	4375.54	108.25	4385.38	108.09
4395.22	108.41	4401.77	109.3	4411.61	108.2	4421.44	108.38	4431.28	108.19
4437.84	107.67	4450.95	107.46	4457.51	107.57	4464.06	108.03	4470.62	107.9
4480.46	108.06	4483.74	107.87	4490.29	109.07	4493.57	109.13	4503.41	108.56
4509.96	107.94	4523.08	107.86	4539.47	108.16	4552.58	107.7	4568.98	108.06
4578.81	107.35	4601.76	107.38	4624.71	107.69	4641.1	107.64	4657.5	108.12
4677.17	107.88	4696.84	108.26	4706.68	108.22	4723.07	108.58	4746.02	108.45
4759.13	108.72	4768.97	108.59	4778.8	108.21	4791.92	108.64	4818.15	108.08
4854.21	108.12	4867.32	108.37	4877.16	108.18	4893.55	108.27	4903.39	108.61
4916.5	108.79	4932.89	108.65	4968.96	107.49	4982.07	108.24	4995.19	108.79
5005.02	108	5021.41	107.53	5027.97	107.63	5044.36	107.22	5073.87	107.46
5083.71	107.74	5100.1	107	5116.49	107.31	5132.88	107.18	5146	107.45
5172.23	107.69	5178.78	108.05	5205.01	108.31	5224.68	108.93	5244.35	109.21
5250.91	109.07	5273.86	109.34	5286.97	109.77	5293.53	108.75	5296.81	109.27
5303.37	114.5	5306.65	116.05	5309.92	116.4	5316.48	115.37	5326.32	115.39
5329.6	114.81	5332.87	113.22	5336.15	112.44	5345.99	111.87	5355.82	111.94
5362.38	112.83	5375.49	113.29	5385.33	113.26	5395.17	112.83	5398.44	113.24
5408.28	118.04	5418.12	124.77	5421.39	125.71	5427.95	125.58	5434.51	123.07
5441.06	122.77	5454.18	122.65	5467.29	122.78	5470.57	122.49	5477.13	122.8
5483.69	125.15	5486.96	125.86	5493.52	125.9	5500.08	125.46	5509.91	125.33
5536.14	125.27	5542.7	125.34	5552.53	125.91	5559.09	125.87	5562.37	124.92
5568.93	121.87	5572.21	121.42	5578.76	121.31	5588.6	121.6	5601.71	121.57
5647.61	122.29	5660.73	122.96	5683.68	123.69	5690.23	124.17	5696.79	123.92
5709.9	124.31	5729.58	125.82	5739.41	126.07	5745.97	125.37	5749.25	124.12
5752.52	124.31	5755.8	125.51	5765.64	126.97	5775.47	126.78	5785.31	127.01
5798.42	127.57	5811.54	127.81	5834.49	127.77	5844.32	128.23	5857.44	129.64
5863.99	130.7	5877.11	131.25	5886.94	132.03	5896.78	131.6	5906.62	131.77
5926.29	131.68	5936.12	132.13	5942.68	131.85	5959.07	131.95	5972.19	132.22
6011.53	132.76	6014.81	132.99	6024.64	132.97	6031.2	132.66	6054.15	132.73
6070.54	132.92	6083.66	133.45	6093.49	134.93	6103.33	134.8	6113.16	134.16

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 6126.28  134.91 6139.39  133.02 6142.67  133.51 6149.23   137.1 6155.78  137.92
 6165.62  137.95 6185.29  138.46 6211.52   138.6 6241.02  138.95 6267.25  138.94
 6280.37  138.81  6290.2  138.91 6322.99  138.75 6355.77  138.97 6372.17  138.52
 6385.28  138.38 6395.12  136.69 6401.67  137.57 6414.79  138.85 6431.18  139.02
 6447.57  138.66 6463.96  138.06 6503.31  137.83 6513.14  137.88  6519.7  138.24
 6532.81  137.71 6555.76  137.23 6575.43  136.92 6588.55  136.93 6595.11  136.75
 6624.61  136.33 6663.95  136.15 6677.07  135.98 6706.58  135.95 6739.36  136.56
 6765.59  136.57 6785.26   137.2 6801.65   137.5 6811.49  138.02 6821.32  138.22
 6831.16  138.19 6837.72  137.89 6850.83  137.96 6860.67  138.47 6873.78  138.09
 6896.73   138.1 6919.68  138.26 6932.79  139.13 6968.86  138.99 6991.81  139.03
 7001.64  138.25 7014.76  138.07 7021.31  138.24 7031.15  136.59 7034.43  136.48
 7040.98  137.23 7057.38  136.86 7060.66  137.85 7067.21  141.58 7070.49  142.39
 7080.33  142.71

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .177 1373.85    .066    1374    .015    1714    .066 2039.45    .131

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1373.85    1714           2106.1  389.75  107.13             .1       .3
Left Levee      Station=   113.2      Elevation=  126.58
Right Levee     Station= 7080.33      Elevation=  142.71
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3162.36 5718.88  112.11

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            124.50    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               2.71    Wt. n-Val.                 0.177      0.015      0.113
  W.S. Elev (ft)            121.79    Reach Len. (ft)          2106.10     389.75     107.13
  Crit W.S. (ft)            112.24    Flow Area (sq ft)       16876.09   10864.54   45480.97
  E.G. Slope (ft/ft)      0.000273    Area (sq ft)            16876.09   10864.54   45480.97
  Q Total (cfs)           235000.00    Flow (cfs)             13133.24  168991.80   52875.00
  Top Width (ft)           5346.98    Top Width (ft)          1260.65     340.15    3746.18
  Vel Total (ft/s)            3.21    Avg. Vel. (ft/s)           0.78      15.55       1.16
  Max Chl Dpth (ft)          32.15    Hydr. Depth (ft)          13.39      31.94      12.14
  Conv. Total (cfs)       14233670.0    Conv. (cfs)             795465.0   10235630.0   3202576.0
  Length Wtd. (ft)          427.93    Wetted Per. (ft)         1268.47     360.89    3751.51
  Min Ch El (ft)             89.64    Shear (lb/sq ft)           0.23       0.51       0.21
  Alpha                      16.92    Stream Power (lb/ft s)     0.18       7.97       0.24
  Frctn Loss (ft)             0.10    Cum Volume (acre-ft)    187067.50   69783.80   214212.00
  C & E Loss (ft)             0.23    Cum SA (acres)          22964.17    2861.84   25429.00


Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 169.9

INPUT
Description: RGV-04, End wall, New Section,  Bathymetric elevations translated
             from IBWC 2008 Cross-sections
Station Elevation Data    num=     454
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.85    9.71  122.92   29.12  123.31   53.12  123.55   53.79  123.55
   53.79  113.55   63.79  113.35  154.79  107.06  157.79  107.81  181.79  107.33
  187.79  105.83  197.79  105.63  203.79  104.13  209.11  104.05  248.48  104.14
  268.16  104.03  323.93  104.14  350.18  103.95  366.58  104.11  376.43     104
  382.99  104.11  405.95  104.13  425.64  104.01  455.16  104.11  484.69  104.06
  504.37  103.87  520.78   103.8  537.18  104.03  560.15     104  573.27  104.09
  583.11  104.32  596.23  104.27  625.76  104.73  642.16  104.54  665.13  104.83
  694.65  104.91  711.06  104.81  734.02  104.92  753.71  105.19  756.99   105.1
  776.67  105.22  796.36  105.09   806.2  105.24  819.32  105.14  839.01  105.32
  865.25  105.31  875.09  105.47  904.62  105.33  953.83  105.35  986.64  105.27
  999.76  105.41 1019.44  105.37 1055.53  105.15  1078.5  105.21 1091.62     105
 1098.18  105.18  1111.3  105.05 1124.43  105.08 1134.27  104.94 1160.51  104.94
 1176.92  104.74 1183.48  104.77 1199.88  104.53 1209.72  104.08 1216.29  104.02
 1229.41  104.19 1249.09  104.86  1265.5   105.1 1275.34  105.42 1285.18  105.51
 1301.58  105.36 1311.43  104.98 1331.11  104.94 1337.67  105.32 1357.35  105.92
  1367.2  106.12 1373.76  105.46 1386.88  104.76 1387.48  103.64 1392.48   89.64
 1722.48   89.64 1727.48  103.64 2938.65  104.76 2941.93  104.81 2948.49  105.77
 2964.89  107.79 2971.44  107.39 2974.72  107.62 2981.28  109.27 2984.56   110.6
 2987.84  111.26  2994.4  110.62 3000.96  110.45 3010.79  108.99 3014.07   108.9
 3020.63  107.86 3023.91  107.97 3033.75  107.03 3037.03  107.24 3043.59  108.44
 3046.87  108.56  3056.7  108.07 3063.26  109.44  3073.1  109.96 3082.94   107.7
 3086.22  107.76 3092.78  108.84 3102.61  110.74 3109.17  111.37 3115.73  111.52
 3125.57  112.12  3135.4  111.27 3145.24  111.64 3155.08  111.58 3161.64  111.23
 3171.48  111.33 3178.03  111.61 3184.59  111.27 3194.43  109.65 3197.71  109.72
 3204.27  110.96 3207.55  111.29 3220.66   111.9 3233.78  111.36 3250.18  110.37
 3256.74  110.12 3276.41  110.08 3282.97  110.34 3302.64     110 3319.04  109.87
 3341.99  108.39 3345.27  108.28 3351.83  108.94 3358.39  108.87 3364.95   107.9
 3371.51  108.63 3381.35  106.93 3384.62  106.88  3387.9  107.52 3394.46  109.61
 3407.58  110.55 3414.14  110.71 3430.53  110.64 3437.09  110.41 3446.93  110.36
 3469.88  109.97 3476.44  109.74 3492.84  109.75 3505.96  109.13 3515.79  108.26
 3528.91  107.82 3542.03  107.74 3548.58     107 3555.14  105.37  3561.7   105.2
 3571.54     106 3581.38  106.07 3591.21  106.33 3617.45  105.75 3633.84  104.58
  3656.8  104.65 3686.31  104.43 3715.82  104.62  3719.1  104.77 3728.94   106.2
  3735.5  107.82 3738.78  108.09  3751.9  107.82 3765.01  107.86 3771.57  107.64
 3781.41  106.34 3787.97  106.29  3797.8  105.19 3810.92  104.45 3827.32  104.58
 3837.16  104.47 3843.71  104.58 3850.27  105.23 3860.11  107.25 3866.67  108.03
 3873.23  107.98 3883.06  109.58 3889.62  110.37 3896.18  111.73 3899.46  112.15
  3909.3  112.53 3925.69  111.68 3935.53  111.06 3942.09  110.91 3948.65  111.06
 3968.32  111.06 3984.72  110.59 4010.95  109.62 4027.35  109.21 4040.47  109.57
 4053.58  109.19 4073.26  109.55  4083.1  110.31 4089.65  110.06 4092.93   109.3
 4096.21  107.93 4102.77  109.43 4106.05  109.58 4115.89  108.96 4125.73  107.52
 4135.56  108.15 4142.12  108.24 4155.24  109.26 4168.36   108.9 4184.75  108.24
 4191.31  109.23 4197.87  108.66 4201.15  108.66 4214.27  109.46 4224.11  109.14
 4233.95  108.45 4240.51  108.67 4247.07  108.32 4253.63   109.2 4260.18  108.54
 4270.02  110.39 4276.58  110.52 4286.42  109.74 4302.82  108.96 4315.94  108.85
 4325.78  108.16 4342.17  108.12 4348.73  107.84 4361.85  108.06 4371.69   107.8
 4381.53  108.05 4391.37  108.06 4401.21  108.39 4407.77  107.65  4417.6  107.61
 4427.44     108    4434  107.96 4440.56  107.62 4453.68  107.94 4460.24  107.79
  4483.2  107.69 4486.48   107.5 4502.87  107.46 4509.43  107.63 4522.55  107.34
 4529.11  107.48 4538.95   107.3 4548.79  107.37 4558.63  107.26  4594.7  107.71
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  4611.1  108.18 4617.66     108  4643.9  108.24 4663.57  108.25 4670.13  108.45
 4673.41  108.29 4686.53  108.22 4706.21  108.35 4716.05  108.54 4729.17  108.15
 4739.01   108.3 4745.56  108.06  4755.4   108.3 4765.24  107.83 4778.36  107.81
 4791.48  107.98 4817.72  107.85 4837.39   108.4 4866.91  108.82 4876.75  108.67
 4880.03  108.82 4893.15  108.43 4899.71  108.79 4912.82  108.36 4919.38  107.32
 4925.94  107.25 4935.78  107.57 4945.62  107.42 4962.02  107.95 4968.58  108.44
 4978.42  108.42 4988.25  108.66 4994.81  108.08 5007.93   108.7 5017.77  108.54
 5034.17  108.63 5047.29  109.08 5060.41  109.08 5066.96  108.89  5093.2  109.26
 5112.88  109.26 5135.84  109.51 5145.67  109.29 5165.35  109.76 5168.63  109.59
 5175.19  108.51 5178.47   110.3 5181.75   113.1 5185.03   114.9 5188.31  115.69
 5191.59  115.66 5198.15  114.69 5204.71  114.58 5207.99  114.98 5211.27  114.76
 5217.83  112.15 5221.11   111.9  5237.5   111.9 5247.34  112.77  5253.9  112.97
 5267.02  112.71 5276.86   111.8 5280.14  112.38  5286.7  118.16 5289.98  119.26
 5293.26  119.47 5309.65   119.1 5312.93  118.59 5319.49  118.67 5345.73  118.67
 5358.85  118.54 5365.41  119.08 5375.25  119.13 5385.08  118.64  5398.2   118.6
 5404.76  118.76    5431  118.64 5437.56  119.32 5444.12  119.34 5453.96   119.7
  5463.8   120.4 5486.75  121.47 5496.59  121.55 5512.99  122.18 5519.55  122.83
 5532.67  123.64 5545.79  123.88 5552.34  124.28 5565.46  124.29 5568.74  123.44
 5572.02  121.75  5575.3  121.53 5585.14  124.96  5591.7  125.96 5598.26  126.48
  5608.1  126.91 5640.89  127.87 5650.73   127.9 5670.41  127.62 5693.37  127.83
 5699.93  128.24 5709.76  127.89 5749.12  127.97 5762.24  128.28 5788.48  128.41
 5795.03  128.63 5804.87  128.55 5814.71  129.01 5827.83  130.21 5837.67  130.72
 5854.07     132 5863.91  133.85 5877.02  133.97 5893.42  133.91 5903.26  134.23
  5929.5  133.81 5936.06  133.86 5959.01   133.6 5975.41   133.2 5988.53  133.13
 5998.37  133.28 6004.93  133.11 6021.33  133.46 6031.17  133.33 6044.28  133.46
 6060.68   133.9 6070.52  134.33 6080.36  134.36 6086.92  134.18 6100.04  134.34
 6109.88  134.01 6113.15  134.65 6119.71  136.78 6129.55  137.96 6136.11  138.19
 6159.07  138.39 6178.75  138.35 6188.59  138.16 6195.14  137.61  6201.7  135.68
 6204.98  135.64 6211.54  136.76 6237.78  136.19 6257.46  135.46 6264.02  135.44
 6286.97  136.21 6296.81  135.81 6306.65  135.89 6316.49  136.19 6323.05  136.09
 6342.73  136.16  6362.4  135.88 6372.24   135.5  6395.2  135.24 6418.16  135.45
 6424.72  135.59 6431.28  135.47 6441.11  135.73 6457.51  135.73 6470.63  135.57
 6487.03  135.83 6490.31     136 6513.27  136.08 6529.66  136.26 6532.94  136.06
 6542.78  136.05 6565.74  136.27 6605.09  136.51 6628.05  136.55 6647.73   136.5
 6667.41  136.86 6673.97  137.46 6687.08  137.45 6690.36   137.3 6706.76  137.25
 6719.88  137.39 6726.44  137.83 6742.84  137.93 6759.23  138.27 6769.07  138.17
 6775.63  137.83 6805.15  137.78 6814.99  139.04 6824.83   139.4 6834.67   138.7
  6860.9  138.32 6864.18   138.1  6877.3  138.12 6887.14  136.79 6896.98  136.36
 6903.54  136.57  6910.1  135.87 6913.38  135.99 6919.93  136.77 6926.49  136.98
 6933.05  136.48 6936.33  135.73 6939.61  135.98 6946.17  137.39 6949.45  137.55
 6959.29  137.35 6972.41  139.01 6995.37  139.79 6998.65  140.03

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .188 1311.43    .066 1387.48    .015 1727.48    .066 2938.65    .187

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        1367.2 1727.48          2629.05  610.25  109.21            .1       .3
Left Levee      Station=   53.79      Elevation=  123.55
Right Levee     Station= 6824.83      Elevation=   139.4
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 1295.88  105.92 2987.95 5489.96  111.28

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            124.17    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               1.93    Wt. n-Val.                 0.173      0.015      0.093
  W.S. Elev (ft)            122.23    Reach Len. (ft)          2629.05     610.25     109.21
  Crit W.S. (ft)            114.19    Flow Area (sq ft)       20953.89   11355.55   48118.44
  E.G. Slope (ft/ft)      0.000210    Area (sq ft)            20953.89   11355.55   48118.44
  Q Total (cfs)           235000.00    Flow (cfs)              16436.22   155364.90   63198.89
  Top Width (ft)           5465.99    Top Width (ft)           1313.41     360.28    3792.30
  Vel Total (ft/s)            2.92    Avg. Vel. (ft/s)            0.78      13.68       1.31
  Max Chl Dpth (ft)          32.59    Hydr. Depth (ft)           15.95      31.52      12.69
  Conv. Total (cfs)       16222210.0    Conv. (cfs)              1134604.0   10724940.0   4362662.0
  Length Wtd. (ft)          612.61    Wetted Per. (ft)         1323.12     380.73    3798.09
  Min Ch El (ft)             89.64    Shear (lb/sq ft)            0.21       0.39       0.17
  Alpha                      14.56    Stream Power (lb/ft s)      0.16       5.35       0.22
  Frctn Loss (ft)             0.20    Cum Volume (acre-ft)    186152.90   69684.40   214096.90
  C & E Loss (ft)             0.39    Cum SA (acres)          22901.94    2858.71   25419.73


Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 169.83

INPUT
Description: Added blocked obstruction not in original,  Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     452
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  126.62    6.55  126.77    13.1  126.69   19.64  126.94   22.92  126.39
   36.01  121.92   42.56  118.93   52.38  115.35   55.66   114.3   62.21  112.92
   68.75  112.04    75.3  111.73   81.85  111.95   94.94  111.79  117.86  111.64
  130.96  111.81  157.15  111.64  183.34  110.85  202.99  110.46  216.08  110.34
  235.72  110.37  245.55  110.27  271.74  110.69  304.48  110.62  317.57   110.7
  333.94   110.6  340.49  110.47  353.59  110.45  386.33  110.68  412.52  111.22
  425.61  111.38  441.98  111.04  455.08  110.94  474.72  110.93     478   111.2
  484.54  112.21  491.09  112.56  497.64  112.64   540.2  112.43  550.02  112.25
  559.85  111.16  592.59  111.47  599.13  111.24  608.96  111.16   615.5  111.28
  625.33  111.07  635.15  111.15  648.24  111.02  661.34   111.1  667.89  111.51
  674.43   111.7  680.98   111.6  694.08  110.99   703.9  110.98  720.27  111.45
  749.74  111.24  769.38  111.55  789.02  111.43  795.57  111.46  811.94  111.28
  825.04  110.89  847.96  111.29  864.33  111.03  893.79  110.94  900.34  111.18
  910.16  112.11  926.53   113.1  933.08  113.11  939.63  112.88  946.17  112.29
  952.72  111.95  962.54  111.78  972.37  111.93  975.64   111.8  982.19  109.97
  985.46  108.55  988.74  106.44  992.01  104.76     994  100.84    1244  100.84
 1412.25  104.76  1415.5  104.92 1418.74  106.62 1421.99  108.99 1425.23  109.63
 1431.72  110.26  1444.7  110.17 1447.94   109.8 1457.68  107.31 1460.92  106.89
 1467.41  107.63 1473.93  109.15  1477.2  109.59 1483.74  109.82 1496.82  109.78
 1506.64  110.05 1516.45  109.87 1522.99  108.93 1536.07  108.73 1549.16  108.94
 1558.97  108.96 1568.78  109.48  1578.6  109.66 1581.87  110.05 1588.41  110.29
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 1594.95  111.06 1604.76  111.17 1621.12  110.34 1630.93  110.94 1637.47  110.76
 1644.02  110.83 1650.56  110.64 1660.37  110.82 1670.18  109.92 1683.27  110.47
 1693.08  110.73 1702.89   110.6 1709.44  110.72 1729.06  110.51 1751.96  109.49
 1761.77   108.8 1768.31  107.66 1778.13  107.77 1794.48  109.86 1804.29  110.06
 1810.84  110.47 1827.19   110.6    1837  110.01 1843.55  109.77  1859.9  109.74
 1872.99  109.11  1882.8  109.17 1889.34  109.86  1905.7  110.34 1925.32  110.44
 1931.86  110.08 1938.41  108.75 1941.68   108.4 1948.22  108.42 1954.76  107.96
  1961.3  107.79 1967.84  107.86 1980.93  108.46 1990.74  108.32 2003.82   107.2
 2013.64  105.96 2020.18  104.69 2023.45  104.48 2033.26  104.53  2062.7  104.37
  2085.6  104.49 2098.68  104.41 2121.58  104.45 2131.39  105.03 2137.93  104.81
 2147.75  104.97 2154.29  104.91  2164.1   104.6 2170.64  104.89 2173.91  105.54
 2180.45  107.78    2187  108.02 2193.54   107.9 2203.35  107.97 2209.89  107.81
 2216.43  107.89 2222.98  107.32 2232.79   107.6 2245.87  107.27 2262.23  107.27
 2268.77  106.92 2288.39  106.81 2298.21  106.61 2311.29   106.7 2314.56  106.91
 2334.19  107.55 2340.73  107.55 2353.81  108.06  2366.9  107.94 2373.44  108.14
 2383.25  108.69 2399.61  108.23 2409.42  108.34  2422.5   107.7 2432.31  107.99
 2451.94  108.42 2458.48  108.48 2471.57  108.29 2484.65  108.43 2491.19  108.75
    2501  108.75 2507.55  108.91 2517.36  108.71 2530.44  108.79 2533.71  108.52
 2543.55  108.88 2553.39  108.71 2573.07  108.53 2592.74  108.78 2605.86  109.45
 2612.42  108.92 2625.54  108.92 2628.82  108.81 2648.49  108.82 2655.05   108.5
 2658.33  108.59 2668.17  109.33 2674.73  109.09 2681.29  109.13 2687.84  109.68
 2697.68  109.45 2707.52   108.2  2710.8  108.02 2717.36  108.41 2723.92  109.19
 2730.48  108.47 2740.32  108.39 2756.71  107.59 2763.27  107.58 2773.11  107.26
 2786.23  107.44 2792.79  107.35 2796.07  107.59  2805.9  107.66 2812.46  107.55
 2819.02  107.23 2832.14   107.1 2848.54  107.43 2858.37  107.03 2887.89  107.06
 2901.01  107.19 2920.68  107.15 2927.24  107.38 2937.08  107.17 2956.76  107.48
 2966.59  107.45 2979.71  107.67 2986.27   107.6 2996.11  107.72 3009.23  108.06
 3019.06  108.03  3028.9  108.36 3042.02  108.12  3061.7  108.42 3071.54  108.25
 3078.09  108.34 3087.93  108.17 3094.49  108.34 3101.05  108.15 3107.61  108.26
 3124.01  108.23 3133.84  107.96 3143.68  108.11 3163.36   107.9 3169.92     108
 3176.48  107.89 3186.31  108.04 3196.15  107.59 3212.55  107.11 3219.11  108.42
 3232.23  108.17 3245.34  108.08  3251.9  108.33 3265.02  108.56 3281.42  108.72
 3287.98   108.7 3301.09  108.34 3307.65  107.93 3314.21  107.96 3320.77  108.26
 3333.89  108.04 3369.96  108.59 3376.52   108.5 3399.48  108.67 3409.31  108.94
 3435.55  109.05 3461.78  109.33 3468.34  109.33 3481.46  109.55 3488.02  109.52
 3510.98  109.73 3520.81  109.93 3524.09  108.94 3527.37  108.81 3533.93  112.58
 3537.21  113.83 3543.77  115.37 3547.05   115.7 3553.61  114.71 3560.17  114.56
 3566.73   114.7 3573.28  112.52 3576.56  111.99 3592.96  111.87 3596.24  112.49
  3602.8  112.72 3609.36  112.51 3625.75  112.67 3632.31  112.18 3635.59  112.52
 3642.15  116.95 3645.43  118.26 3648.71  118.62 3665.11  118.88 3671.67  118.57
 3694.62   118.3 3707.74  118.39 3717.58  118.82  3730.7     119 3750.37  119.07
 3766.77  119.31 3773.33  119.24 3779.89  119.53 3789.72  119.55 3802.84  120.43
 3819.24  120.54  3825.8  120.41 3832.36  118.77 3835.64  118.63 3838.92  119.08
 3848.75  121.02 3858.59  121.62 3865.15  121.71 3874.99  122.33 3878.27  122.37
 3891.39     123  3904.5  123.45 3914.34  123.64 3924.18  123.63 3930.74  123.88
 3953.69  124.37 3960.25  124.39 3966.81  124.85 3973.37  124.35 3979.93  124.34
 3986.49  125.13 3996.33  126.92 3999.61  127.31 4009.44  127.63 4035.68  127.72
 4042.24  127.85 4065.19  127.84 4078.31  127.91 4091.43  128.17 4114.39  128.34
 4117.67  128.45 4124.22  128.03 4137.34  127.82  4143.9  128.04 4157.02  128.22
 4163.58  128.47 4173.42   128.5 4186.53  128.85 4196.37  128.76 4209.49  128.85
 4216.05  128.75 4245.56  128.83 4258.68   129.1  4271.8  130.13 4281.64  130.13
  4288.2  130.57 4294.76  131.84 4298.03   132.1 4311.15  132.52 4324.27  133.36
 4343.95  133.52 4353.79  133.23 4363.62  133.14 4373.46   133.3 4386.58  133.02
  4399.7  133.07 4406.26   132.9 4425.93   132.7 4435.77  133.07 4439.05  133.05
 4445.61  133.44 4458.73  133.73 4465.29  133.65 4488.24  133.78  4494.8   133.6
  4511.2  133.66 4517.76  133.79 4537.43  133.64 4553.83  133.99 4563.67  134.85
 4573.51  135.39 4580.07  134.59 4583.35  133.47  4589.9  132.24 4596.46  132.24
  4606.3  132.99 4612.86  132.89 4619.42  132.42 4629.26  132.89 4635.82  133.45
 4652.21  133.59 4662.05  133.56 4668.61  133.38 4675.17  133.62 4685.01  134.44
 4694.85   134.9 4707.96  135.02 4714.52  134.92 4724.36  134.56 4740.76  134.79
 4747.32  134.51 4757.15  134.76 4763.71  134.58 4776.83  134.58 4786.67  134.17
 4796.51  133.91 4806.35  134.48 4816.18  134.11 4832.58  133.96  4845.7  133.67
 4852.26  133.67 4868.65  134.49 4871.93  134.32 4878.49  135.05 4885.05  135.39
 4898.17  135.43 4917.85  135.11 4934.24  135.36 4953.92  135.89 4963.76  135.81
 4970.32  135.94 4986.71  135.77 4999.83  135.85 5006.39  135.02 5009.67  134.87
 5029.35  135.24 5042.46   136.3 5049.02  136.59 5062.14  136.86  5068.7  136.79
 5081.82  136.98 5111.33   137.2 5137.57  137.17 5144.13  136.93 5153.96  137.38
 5160.52  137.35 5167.08  136.83 5173.64   137.1 5206.43  136.72 5219.55  137.56
 5235.95  137.69 5242.51  136.02 5245.79  135.56 5258.91  135.31 5265.46  135.57
 5272.02   136.4 5278.58  136.45

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .188  975.64    .066  982.19    .015    1244    .066 1431.72    .187

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        972.37 1431.72          1276.91    1300  905.72             .1       .3
Left Levee      Station=   19.64      Elevation=  126.94
Right Levee     Station= 5235.95      Elevation=  137.69
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0  926.53   113.1 1990.74 5278.58  108.32

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            123.58    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.62    Wt. n-Val.                 0.188      0.043      0.187
  W.S. Elev (ft)            122.96    Reach Len. (ft)          1276.91    1300.00     905.72
  Crit W.S. (ft)            114.80    Flow Area (sq ft)        9170.55    9521.44   31586.01
  E.G. Slope (ft/ft)      0.000960    Area (sq ft)             9170.55    9521.44   31586.01
  Q Total (cfs)           130000.00    Flow (cfs)              10244.18   77175.80   42580.03
  Top Width (ft)            3857.55    Top Width (ft)            939.40     459.35    2458.80
  Vel Total (ft/s)             2.59    Avg. Vel. (ft/s)            1.12       8.11       1.35
  Max Chl Dpth (ft)           22.12    Hydr. Depth (ft)            9.76      20.73      12.85
  Conv. Total (cfs)       4196095.0    Conv. (cfs)              330658.2   2491054.0   1374383.0
  Length Wtd. (ft)          1193.33    Wetted Per. (ft)          941.19     464.67    2464.94
  Min Ch El (ft)             100.84    Shear (lb/sq ft)            0.58       1.23       0.77
  Alpha                        5.94    Stream Power (lb/ft s)      0.65       9.95       1.04
  Frctn Loss (ft)              0.57    Cum Volume (acre-ft)    185243.80   69538.16   213997.00
  C & E Loss (ft)              0.10    Cum SA (acres)          22833.96    2852.97   25411.90


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 169.49
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INPUT
Description: revised reach length to 1300, Bathymetric elevations translated
             from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  126.44    3.28  113.11    6.56  111.89    9.83  111.02   16.39  109.99
   19.67  109.89   26.22  110.33   29.5   110.42   49.17  109.89   55.72  109.86
   65.56  109.99   85.23  110.11   88.5   110.01   95.06  109.61   98.34  109.63
  104.89  109.43  114.73  109.55  127.84  109.37  134.39  109.54  140.95  109.25
  144.23  109.19  150.78  109.34  157.34  109.23  163.89  109.26  173.73  109.17
  180.28  109.22  190.12  109.72  199.95  109.79  206.51   109.7   222.9   109.7
  236.01  109.67   252.4  109.78  258.95  109.75  265.51  109.92  268.79  109.93
   281.9  109.74  291.73  109.74  295.01  109.61  304.84  109.74   311.4  109.92
  337.62  110.32   340.9  110.23  357.29  110.32  360.57  110.28  390.07  110.17
  396.62  110.06  416.29  109.88  432.68  109.86  439.24  110.01  445.79  110.07
   458.9  110.05  472.02  109.89  481.85   109.9  498.24     110  501.52  110.06
  514.63  110.11   534.3  110.42  540.85  110.43  544.13  110.51  553.96  110.41
  557.24   110.3   563.8  110.23  570.35   110.3  576.91  110.53  590.02  110.66
  596.58  110.45  603.13  110.48  612.97  110.72  629.35  110.75  635.91  110.83
  645.74  110.74  655.58   110.7  671.97  110.46   681.8  110.42  688.36  110.34
  694.91  110.38  701.47   110.2  704.75  109.78   711.3   108.8  714.58  107.17
  717.86  105.27  721.14   99.37  722.14   98.82  726.14   98.84  733.64   98.31
  737.14    97.1  737.14   97.61  744.14   96.76  747.14   96.02  752.14   95.04
  760.14   93.27  762.14   93.04  770.14   91.72  784.14   89.58  788.64    89.1
  799.14    87.8  803.14   87.49  810.14   86.74  814.14   86.58  815.14   87.54
  819.14   86.44  843.14   85.76  846.14   85.79  854.14   85.61  869.14    85.4
  884.14    85.1  900.14   84.44  917.14    84.3  933.14    84.7  950.14   85.07
  968.14    85.3  985.14    85.7 1001.14    86.2 1017.14    86.5 1033.14    87.4
 1050.14    88.2 1066.14    88.5 1083.14    88.3 1099.14      89 1116.14    92.1
 1117.14   92.43 1133.14    98.8 1146.14   99.47 1147.14    99.6 1156.14    99.8
 1166.14    99.2 1176.14    99.2 1187.14   100.1 1261.74  104.76 1265.01  105.08
 1271.56  106.71  1278.1  107.51 1284.65  108.56 1297.74   109.1 1301.01  109.12
 1304.29  108.94  1314.1  107.99 1320.65  107.83 1323.92  108.18 1333.74  108.63
 1340.29  108.77 1343.56  108.57 1350.11  107.76 1353.38   107.6 1356.65  107.59
  1363.2  107.83 1373.02  108.28 1379.56  108.37 1386.11  108.34 1389.38  108.72
 1395.94  108.73 1399.22  108.84 1412.35  108.89 1425.47   108.6 1428.75  108.57
 1441.87  108.88 1448.43  108.84    1455   109.3 1461.56  109.47 1468.12  109.39
 1474.68  108.97 1477.96  109.33 1481.24  109.43 1491.08  108.83 1497.65   108.5
 1500.93  108.06 1504.21  108.05 1507.49  108.23 1514.05  108.16 1517.33  108.33
 1527.17  108.41 1537.02   108.1 1543.58  108.06 1553.42  107.91 1566.54  108.04
 1576.39  107.97 1582.95  108.21 1589.51  108.22 1599.35  108.56 1602.63  108.48
 1609.19  108.11 1612.47  108.14 1619.04  108.82 1622.32  108.87  1625.6   108.7
 1632.16  108.03 1635.44  107.77 1645.28  107.15 1648.56  107.51 1655.12   108.9
 1661.69  108.79 1668.25  108.39 1678.09  108.43 1684.65  108.19 1691.21  108.24
 1701.06  108.11 1704.34  108.21  1710.9  108.04 1717.46  108.37  1727.3   108.6
 1737.15  108.59 1743.71  108.75 1750.27   108.8 1763.39  108.77 1769.95  109.04
 1776.52  108.81 1783.08  108.96 1806.04  109.12 1822.45   109.4 1835.57  109.53
 1842.13  109.71 1855.25  109.65 1861.82  109.71 1871.66  109.59 1878.22  109.63
 1884.78  109.54 1891.34  109.17 1894.62  109.22 1917.59  110.12 1927.43  110.22
 1930.71  110.36 1933.99  110.35 1947.12  110.46 1953.68  110.35 1956.96   110.5
 1960.24  110.49 1963.52  109.28  1966.8  109.51 1970.08   112.6 1973.36  114.87
 1976.64  115.51 1979.93  115.38 1989.77  114.44 1993.05  114.25 1996.33  113.82
 2006.17  112.04 2009.45  111.72 2016.01  111.81 2022.58  111.79 2025.86  111.87
 2032.42  112.61  2035.7  112.66 2042.26  112.54 2045.54  112.67 2058.66   113.7
 2065.23   113.9 2068.51  113.88 2075.07  114.26 2081.63  114.46 2094.75  114.41
 2098.03  114.33  2104.6  114.45 2107.88  114.37 2117.72  114.47 2124.28  114.43
 2127.56  114.54 2140.68  114.69 2143.96  114.62 2153.81  114.76 2160.37  114.59
 2163.65  114.21 2166.93  113.68 2170.21  113.45 2176.77  113.77 2180.05  114.04
 2183.33  113.96 2186.61  114.05 2193.18  114.67 2203.02  115.45 2212.86  115.61
  2222.7  115.68 2235.83  116.16 2242.39  116.35 2248.95  116.75 2262.07  117.79
 2265.35  117.95 2278.48  118.12 2281.76   118.1  2291.6  118.31 2298.16  118.75
 2304.72  119.61 2314.56  121.07 2317.85  121.49 2324.41  121.92 2330.97  122.23
 2337.53  122.36 2347.37  122.04 2363.78  122.15 2373.62  122.25 2383.46   122.4
 2386.74  122.39 2390.02  122.19  2393.3  121.76 2396.58  120.64 2399.86  119.07
 2409.71  114.11 2412.99  112.63 2416.27   111.9 2426.11  111.79 2435.95  111.77
  2445.8  111.82 2455.64  111.81 2465.48  111.88 2468.76  111.97 2472.04  112.49
 2475.32  113.75 2488.45  119.74 2491.73  120.95 2495.01  121.75 2498.29  122.01
 2504.85   122.8 2511.41   122.6 2521.25  122.64 2524.53  122.59  2531.1  122.81
 2537.66  122.85 2540.94  123.01 2544.22  123.45 2554.06   124.3 2560.62  124.26
 2570.46  124.48 2577.03  124.94 2580.31  125.29 2586.87  126.18 2590.15  126.79
 2593.43  127.56 2599.99  127.95 2626.24  128.45 2639.36  129.06 2642.64  129.12
 2655.76  129.01 2675.45  128.52 2678.73   128.5 2688.57  128.66 2698.42  128.67
  2701.7  128.52 2708.26  128.43  2718.1  128.54 2724.66  128.42 2737.78  128.57
 2750.91  128.58 2757.47  128.52 2767.31  128.55 2773.87  128.62 2783.72  128.56
    2787  128.68 2790.28  128.94 2796.84  129.65 2800.12  129.73 2813.24  129.41
 2823.08  129.75 2829.65  129.91 2842.77  129.99 2846.05  129.93 2849.33  129.69
 2852.61  129.26 2855.89  129.09 2862.45  129.58 2869.02   129.7 2875.58  130.05
 2882.14  130.25 2885.42  130.52 2891.98  130.47 2901.82  130.63 2908.38  130.89
 2911.67  131.11 2921.51  131.96 2924.79  131.96 2934.63  132.18 2951.03  132.43
  2957.6  132.26 2960.88  132.36 2964.16  132.16    2974  132.11 2983.84  132.01
  2990.4  132.05 2993.68  132.17 3006.81  131.96 3010.09  131.99 3016.65  131.78
 3023.21  131.87 3033.05  131.85 3039.62   131.7  3042.9   131.5 3046.18  131.55
 3052.74  132.33  3059.3  132.73 3065.86  132.57 3072.42   132.1 3088.83  131.54
 3101.95  131.23 3105.23  131.35 3124.92  131.11 3131.48  131.59 3134.76  131.53
 3141.32  131.08 3151.16  130.88 3154.44  131.03    3161  131.76 3170.85  131.48
 3180.69  130.94 3187.25  131.02 3193.81  131.27 3200.37  131.41  3213.5  132.44
 3220.06  132.45 3226.62  132.14 3239.74  132.84  3246.3  132.74 3252.87  132.15
 3259.43  132.83 3269.27  132.97 3272.55   132.9 3275.83  132.58 3285.67   130.6
 3288.95  130.66 3292.23  131.79 3295.52  132.38 3302.08  133.15 3305.36  133.25
 3318.48  133.05 3357.85  132.37 3364.41  132.18 3374.25  132.02  3384.1  132.04
 3387.38  132.57 3390.66  133.94 3393.94  134.42 3403.78  134.53 3410.34  134.44
 3430.03  134.61 3446.43  134.71 3452.99  134.84 3459.55  134.81  3469.4  134.88
 3475.96  135.03 3479.24  134.97  3485.8  135.09 3498.92   135.1 3512.05   135.5
 3518.61  135.52 3541.57  135.84 3544.85  135.74 3557.98  135.69 3564.54  135.61
 3574.38  135.67 3580.94  135.86  3587.5  135.73 3590.79  135.49 3603.91   134.2
 3613.75   133.7 3630.15  133.93 3643.28  133.98 3646.56  133.93  3656.4  134.58
 3662.96  134.81 3666.24  134.77  3672.8  134.37 3682.65  134.38

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066  752.14    .025 1117.14    .085    1455     .06 1917.59     .06
 2639.36    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         711.3  1278.1           188.88 1299.95 1556.14             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   711.3   108.8       T
  1278.1 3682.65  107.51       T
Left Levee      Station=       0      Elevation=  126.44
Right Levee     Station= 2639.36      Elevation=  129.06
```

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	122.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.066	0.049	0.064
W.S. Elev (ft)	122.63	Reach Len. (ft)	188.88	1299.95	1556.14
Crit W.S. (ft)	103.20	Flow Area (sq ft)	8923.37	17400.47	13101.31
E.G. Slope (ft/ft)	0.000282	Area (sq ft)	8923.37	17400.47	13103.67
Q Total (cfs)	130000.00	Flow (cfs)	18096.99	85799.93	26103.09
Top Width (ft)	2516.37	Top Width (ft)	710.36	566.80	1239.21
Vel Total (ft/s)	3.30	Avg. Vel. (ft/s)	2.03	4.93	1.99
Max Chl Dpth (ft)	38.33	Hydr. Depth (ft)	12.56	30.70	10.57
Conv. Total (cfs)	7739913.0	Conv. (cfs)	1077455.0	5108338.0	1554120.0
Length Wtd. (ft)	1248.34	Wetted Per. (ft)	718.46	575.61	1247.15
Min Ch El (ft)	84.30	Shear (lb/sq ft)	0.22	0.53	0.19
Alpha	1.60	Stream Power (lb/ft s)	0.44	2.63	0.37
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	184978.60	69136.44	213532.30
C & E Loss (ft)	0.04	Cum SA (acres)	22809.78	2837.66	25373.45

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 169.14

INPUT
Description: Left bank elevations adjusted to 126.7 to match surface elevations. Original IBWC Cross-section data applied to this section

Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4000	126.7	4067	126.7	4100	126.7	4100	84.64	4623.8	84.64
4623.8	124.74	4723.8	124.74						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4000	.048	4067	.06	4100	.015	4623.8	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4100	4623.8	48.38	50.04	47.52 .2	.5

Left Levee Station= 4000 Elevation= 126.7
Right Levee Station= 4723.8 Elevation= 124.74

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	122.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.		0.015	
W.S. Elev (ft)	122.07	Reach Len. (ft)	48.38	50.04	47.52
Crit W.S. (ft)	97.06	Flow Area (sq ft)		19605.81	
E.G. Slope (ft/ft)	0.000043	Area (sq ft)		19605.81	
Q Total (cfs)	130000.00	Flow (cfs)		130000.00	
Top Width (ft)	523.80	Top Width (ft)		523.80	
Vel Total (ft/s)	6.63	Avg. Vel. (ft/s)		6.63	
Max Chl Dpth (ft)	37.43	Hydr. Depth (ft)		37.43	
Conv. Total (cfs)	19880420.0	Conv. (cfs)		19880420.0	
Length Wtd. (ft)	50.04	Wetted Per. (ft)		598.66	
Min Ch El (ft)	84.64	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.58	
Frctn Loss (ft)		Cum Volume (acre-ft)	184959.30	68584.25	213298.30
C & E Loss (ft)		Cum SA (acres)	22808.24	2821.38	25351.32

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

INLINE STRUCTURE

RIVER: Rio Grande
REACH: Lower Reach RS: 169.13

INPUT
Description: Anzalduas Dam
Distance from Upstream XS = 30
Deck/Roadway Width = 15
Weir Coefficient = 3.21
Weir Embankment Coordinates num = 2

Sta	Elev	Sta	Elev
4100	124.64	4623.8	124.64

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Weir crest shape = Ogee

INLINE STRUCTURE GATE Gate #1
Height = 34.75
Width = 75
Invert = 84.64
Gate Type = Radial Radial Coefficient= .6
Trunion Exponent = .16
Opening Exponent = .72
Head Exponent = .62
Trunion Height = 14
Weir Coefficient = 3.21
Weir crest shape = Ogee
Number of Gate Openings = 6

Sta	Sta	Sta	Sta	Sta	Sta
4137.5	4227.26	4317.02	4406.78	4496.54	4586.3

CROSS SECTION

RIVER: Rio Grande

REACH: Lower Reach RS: 169.12

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	122.84	4100	122.84	4100	72.14	4623.8	72.14	4623.8	128.54
4723.8	128.54								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	4100	.015	4623.8	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4100	4623.8	100.93	99.44	96.53 .2	.5

Left Levee Station= 0 Elevation= 122.84
Right Levee Station= 4723.8 Elevation= 128.54

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	121.07	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.41	Wt. n-Val.		0.015		
W.S. Elev (ft)	120.66	Reach Len. (ft)	100.93	99.44	96.53	
Crit W.S. (ft)	84.56	Flow Area (sq ft)		25416.73		
E.G. Slope (ft/ft)	0.000019	Area (sq ft)		25416.73		
Q Total (cfs)	130000.00	Flow (cfs)		130000.00		
Top Width (ft)	523.80	Top Width (ft)		523.80		
Vel Total (ft/s)	5.11	Avg. Vel. (ft/s)		5.11		
Max Chl Dpth (ft)	48.52	Hydr. Depth (ft)		48.52		
Conv. Total (cfs)	29907520.0	Conv. (cfs)		29907520.0		
Length Wtd. (ft)	99.44	Wetted Per. (ft)		620.85		
Min Ch El (ft)	72.14	Shear (lb/sq ft)		0.05		
Alpha	1.00	Stream Power (lb/ft s)		0.25		
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	184959.30	68564.31	213298.30	
C & E Loss (ft)	0.02	Cum SA (acres)	22808.24	2820.78	25351.32	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 169.1

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	122.84	99	122.84	100	108.14	150	83.64	707	83.64
757	108.14	758	128.54	857	128.54				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.14	99	.015	758	.14

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
99	758	1118.21	1200.01 1232.42	.1	.3

Left Levee Station= 0 Elevation= 122.84
Right Levee Station= 857 Elevation= 128.54

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	121.05	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.49	Wt. n-Val.		0.015		
W.S. Elev (ft)	120.56	Reach Len. (ft)	1118.21	1200.01	1232.42	
Crit W.S. (ft)	95.38	Flow Area (sq ft)		23037.45		
E.G. Slope (ft/ft)	0.000030	Area (sq ft)		23037.45		
Q Total (cfs)	130000.00	Flow (cfs)		130000.00		
Top Width (ft)	658.45	Top Width (ft)		658.45		
Vel Total (ft/s)	5.64	Avg. Vel. (ft/s)		5.64		
Max Chl Dpth (ft)	36.92	Hydr. Depth (ft)		34.99		
Conv. Total (cfs)	23588940.0	Conv. (cfs)		23588940.0		
Length Wtd. (ft)	1191.96	Wetted Per. (ft)		693.23		
Min Ch El (ft)	83.64	Shear (lb/sq ft)		0.06		
Alpha	1.00	Stream Power (lb/ft s)		0.36		
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	184959.30	68509.01	213298.30	
C & E Loss (ft)	0.08	Cum SA (acres)	22808.24	2819.43	25351.32	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 168.85

INPUT
Description: Extended block obstruction, Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	127.06	19.67	126.76	29.51	124	45.9	118.38	59.01	114.77
75.4	110.67	88.52	108.73	98.35	107.74	114.74	107.61	121.3	107.11
134.41	107.28	140.97	107.76	167.2	107.45	173.75	107.82	186.87	107.83
199.98	107.46	213.09	107.82	219.65	107.46	239.32	108.13	255.71	108.02
265.55	107.4	281.94	107.66	288.49	107.25	311.44	107.3	318	107.68
324.56	107.3	370.45	107.55	383.57	107.37	403.24	107.48	413.07	107.82
422.91	107.13	436.02	106.76	449.13	107.5	465.53	107.12	472.08	106.64
481.92	106.62	501.59	105.69	514.7	106.79	534.37	106.06	557.32	106.52
567.15	106.39	586.82	107.47	596.66	106.8	606.49	107.1	636	107.35
645.84	108.12	652.39	107.42	665.51	106.97	678.62	107.46	685.18	107.21
695.01	107.51	714.68	107.37	727.79	107.62	737.63	106.99	744.19	107.59
763.86	107.07	770.41	107.28	780.25	106.84	796.64	107.47	819.59	107.56
826.15	107.84	842.54	107.31	862.21	107.26	868.76	107.65	888.43	106.8
898.27	107.16	927.77	107.43	937.61	107.04	967.12	107.1	976.95	107.61
993.34	107.98	1003.18	107.56	1009.73	108.01	1032.68	108.19	1045.8	108.06
1052.35	107.64	1062.19	107.93	1078.58	107.94	1085.14	107.59	1094.97	107.79
1104.81	108.86	1114.64	108.9	1127.75	107.96	1144.15	108.95	1150.7	108.4

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 1163.82     109 1176.93  109.14  1196.6  109.69 1206.43  109.26 1222.83  109.42
 1239.22  108.99 1249.05  108.42 1255.61  108.48 1278.56  110.27 1294.95  110.43
 1301.51  109.68  1317.9  109.82 1337.57  110.71  1347.4  110.07 1357.24  111.95
 1380.19  109.72 1386.74  108.56 1403.14   109.1 1416.25  110.01 1426.08  109.03
  1439.2  108.58 1445.75  108.97 1458.87  108.17 1475.26   108.3 1485.09  108.79
 1491.65  108.52 1501.49  108.91 1508.04  108.52 1534.27  108.88 1557.22  109.74
 1586.72  109.26 1596.56  109.29 1606.39  108.49 1616.23  108.37 1626.06  109.14
  1635.9  108.76 1655.57   108.9  1665.4  107.44 1685.07  107.42 1708.02  108.53
 1724.41  108.55  1740.8  108.25  1757.2   109.1 1773.59  108.18  1786.7  108.39
 1803.09  107.87 1812.93  108.79 1826.04   109.1 1845.71  110.43 1855.55  109.86
 1875.22  111.53 1885.05  110.27    1908  110.74 1921.11  110.47 1940.78  111.71
  1953.9  110.88 1967.01  111.56 1976.84   110.7 1986.68  110.97 1999.79  109.13
 2026.02  105.97 2035.85  106.35 2042.41  106.08 2068.64  108.41  2075.2  107.43
 2088.31  103.92  2104.7   102.6 2117.81  102.42 2134.21  102.52 2147.32  102.94
 2160.43  102.81 2176.83   103.4 2180.11  103.17 2189.94  103.92 2206.33  104.13
 2212.89  104.72 2235.84  104.79 2255.51   106.5 2265.34  108.09 2285.01  109.69
 2291.57  109.52 2304.69  110.59 2330.91  111.33 2337.47  111.07 2350.58   111.3
 2373.53   110.9  2393.2  111.44 2409.59  111.38 2419.43  110.63 2432.54  111.28
 2455.49  110.95 2468.61  111.87 2471.88  112.47 2491.56  111.24 2501.39  111.35
 2527.62  110.88 2547.29  111.62 2573.52  110.51 2603.02  110.82 2612.86  110.43
 2632.53  111.94 2642.36  111.68  2652.2  110.76 2675.15  110.78 2691.54  111.53
 2711.21  110.95 2734.16  111.09 2747.27  110.91 2753.83   111.2 2783.33  111.11
 2793.17  111.76 2799.73  111.34  2819.4  111.32  2848.9  112.32 2871.85  111.34
 2888.24  111.52 2901.36  111.29 2924.31  111.56 2947.26  111.27 2963.65  111.91
  2986.6  112.08 3006.27  110.06 3019.38  109.21 3025.94  109.38 3045.61  109.13
 3055.44  109.59    3062  109.46 3078.39  111.43 3111.18  110.35 3124.29  109.12
  3137.4  108.64 3160.35  109.24 3166.91  109.75 3186.58  108.66 3193.14     109
 3202.97  108.23 3222.64  108.43 3235.76  109.82 3242.31  109.79 3261.98   110.6
 3284.93  110.95 3301.33  112.94 3317.72  112.69 3324.27  113.31 3343.94  113.27
 3363.62   112.8 3370.17  113.78 3376.73  113.73 3386.56  112.74 3402.96  113.03
 3422.63  112.94 3432.46  112.35 3468.52  109.06 3484.92  105.74 3501.31  105.52
 3524.26  106.85 3537.37  106.03 3553.76  106.03  3563.6  105.66 3586.55  105.25
 3616.05  104.07 3632.45  104.43 3645.56  106.17 3652.12  106.56 3665.23  108.33
 3681.62  109.03 3688.18  108.96 3714.41  110.31 3720.96  111.07 3727.52  111.16
 3734.08  109.55 3743.91  109.42 3750.47   111.4 3757.03  111.76 3773.42   110.6
 3779.97  109.06 3793.09  108.53  3806.2  107.35 3832.43  107.97 3838.99  107.75
 3861.94  107.97 3868.49  108.94 3875.05  108.53 3891.44  108.22 3907.83  108.99
 3920.95  109.09 3934.06  109.71  3943.9  109.77 3950.45  109.36 3970.12  109.38
 3983.24  109.15 3989.79  108.42 4006.19  108.52  4019.3  108.03 4035.69  106.34
 4038.97  105.61  4065.2   95.85 4075.03    93.5 4081.59   89.08 4088.15   88.09
 4105.15   81.02 4115.15   79.64 4125.15   77.64 4135.15   76.64 4145.15   75.04
 4155.15   74.64 4165.15   73.04 4175.15   72.64 4185.15   71.64 4195.15   72.64
 4205.15   72.64 4225.15   73.64 4235.15   73.64 4245.15   73.04 4255.15   73.04
 4265.15   74.64 4275.15   75.04 4285.15   76.04 4325.15   76.04 4345.15   77.64
 4355.15   79.64 4365.15   81.02 4373.15   83.44 4455.36   88.09 4458.64   88.12
 4465.19   91.87 4478.31   97.88 4484.87    99.8 4501.26  102.84 4504.54  103.71
 4514.38  108.85 4517.65  109.76 4527.49  109.96 4534.05  112.22 4537.33  112.66
 4550.44  112.67    4557  111.43 4566.84  110.61 4573.39  111.24 4583.23  111.25
 4589.79  110.49 4599.62  110.91 4606.18  110.46 4625.85  110.14 4632.41  110.27
 4658.64  110.14  4711.1   110.1  4727.5   110.3 4763.56  110.01 4779.96  109.54
 4793.07  109.78 4802.91   109.5  4835.7   109.1 4871.77   109.9 4891.44  111.27
 4907.83  111.69 4920.95  112.77 4934.06  111.49  4943.9  111.18 4973.41  111.72
  4989.8  111.86  5006.2  111.61 5029.15  111.78 5068.49  111.44 5088.17  111.47
 5111.12  112.06 5127.51  111.46 5143.91  111.21 5157.02  111.38 5179.97  111.13
 5189.81  111.73 5212.76  110.91 5229.16  111.25 5242.27  110.77  5284.9  110.52
 5298.01  110.57 5317.68  110.27 5360.31  110.21 5370.14  109.61 5396.38  109.02
 5402.93   109.9 5416.05  109.32 5422.61   108.6 5435.72  108.38 5445.56  105.46
 5465.23  103.03  5484.9  101.61 5488.18  101.72 5494.74  103.58 5507.85   110.8
 5520.97   119.9 5527.53     123 5543.92  125.24 5566.87   125.5 5576.71   126.7
 5586.55  129.14  5593.1  132.19 5599.66  133.19 5622.61   132.6 5632.45   134.7
 5635.73  134.15 5639.01  132.17  5655.4  119.68 5658.68  118.86 5668.52  118.45
 5671.79  117.77 5678.35  114.61 5681.63  114.06 5694.75  114.13 5698.03  113.56
 5707.86  106.89 5714.42   100.1 5724.26    92.7 5730.81    91.6  5888.2    91.6
 5894.75   93.03 5904.59   99.75 5907.87   102.5 5917.71  112.59 5920.98  115.17
 5924.26  115.47  5934.1  114.93 5943.94  115.66 5960.33  127.02 5966.89  131.28
 5973.45  134.51 5976.72  135.28 5989.84  136.28 5999.68   137.9 6012.79  143.13
 6019.35  144.68 6025.91  145.01 6035.74  142.97  6042.3  142.42 6048.86     143
 6052.14  142.35 6065.25  131.43 6071.81  127.11 6075.09  126.06  6088.2  124.84
  6104.6  124.36 6111.16  121.63 6117.71  116.55 6120.99  114.81 6134.11   110.6
 6143.94  110.41  6150.5  111.27 6157.06  112.93  6166.9  113.73 6173.45  117.11
 6180.01  119.47 6186.57  123.33 6189.85  123.88 6202.96  124.09 6219.36  123.39
 6232.47  123.73 6252.14  125.12  6258.7  125.16 6265.26  123.62  6275.1  119.85
 6281.65   121.1 6291.49  120.89 6298.05  119.45 6307.88  121.04 6314.44  120.91
    6321  119.63 6330.84  120.75 6337.39  122.85 6340.67  123.15 6350.51  122.08
  6366.9   121.9 6380.02  122.12 6389.85  122.66 6402.97  122.74 6409.53  124.24

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0      .2  3943.9      .2  4065.2    .066 4105.15    .015 4373.15    .066
 4517.65    .116

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3943.9 4534.05          1531.01 1524.99  1539.3             .1       .3
Left Levee      Station=       0      Elevation=  127.06
Right Levee     Station= 5632.45      Elevation=   134.7
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 3757.03  111.76 4550.44 6409.53  112.67

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            120.87    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.23    Wt. n-Val.                 0.200      0.087      0.116
  W.S. Elev (ft)            120.64    Reach Len. (ft)          1531.01    1524.99    1539.30
  Crit W.S. (ft)             94.09    Flow Area (sq ft)       34908.07   19417.43    7828.56
  E.G. Slope (ft/ft)      0.000711    Area (sq ft)            34908.07   19417.43    7828.56
  Q Total (cfs)           130000.00     Flow (cfs)             29775.56   89619.00   10605.44
  Top Width (ft)           5483.22    Top Width (ft)           3904.59     590.15     988.48
  Vel Total (ft/s)            2.09    Avg. Vel. (ft/s)            0.85       4.62       1.35
  Max Chl Dpth (ft)          49.00    Hydr. Depth (ft)            8.94      32.90       7.92
  Conv. Total (cfs)       4875887.0    Conv. (cfs)             1116787.0   3361324.0   397776.4
  Length Wtd. (ft)         1528.38    Wetted Per. (ft)         3906.68     601.78     990.95
  Min Ch El (ft)             71.64    Shear (lb/sq ft)            0.40       1.43       0.35
  Alpha                       3.43    Stream Power (lb/ft s)      0.34       6.61       0.47
  Frctn Loss (ft)             0.76    Cum Volume (acre-ft)    184511.20   67924.23   213187.50
  C & E Loss (ft)             0.04    Cum SA (acres)          22758.12    2802.23   25337.33


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION
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RIVER: Rio Grande
REACH: Lower Reach RS: 168.58

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	104.61	6.56	106.49	19.68	111.65	29.52	112.69	42.64	116.17
68.88	125.02	72.16	125.77	88.56	125.75	124.64	113.58	131.2	112.71
141.04	112.91	147.6	112.33	177.12	112.7	183.68	113.09	206.64	113.23
213.2	113.6	223.04	113.15	246	113.67	259.12	113.69	268.96	114.17
282.08	114.16	298.48	113.32	321.44	113.56	341.12	114.58	364.08	113.75
396.87	114.28	409.99	114.8	419.83	114.17	449.35	113.71	469.03	114.04
475.59	113.6	488.71	113.6	501.83	112.38	524.79	111.56	551.03	111.43
573.99	110.36	583.83	110.4	603.51	111.42	619.91	110.97	639.59	107.34
655.99	105.32	669.11	105.04	682.23	103.75	698.63	103.53	728.15	104.2
741.27	103.91	767.51	103.9	806.87	104.37	826.55	104.19	846.23	104.74
862.63	104.39	879.03	104.83	915.11	105.02	924.95	104.85	938.07	105.61
964.31	105.4	987.27	105.42	1006.95	105.09	1020.07	103.97	1036.47	104.02
1052.87	103.73	1069.27	104.85	1088.95	104.06	1095.51	104.83	1105.35	104.41
1125.03	104.56	1131.59	104.24	1144.71	104.54	1154.55	104.03	1170.95	104.81
1180.79	104.62	1190.63	103.51	1203.75	103.26	1229.98	103.98	1243.1	103.53
1256.22	103.79	1275.9	103.59	1298.86	103.66	1308.7	104.11	1331.66	103.71
1361.18	103.97	1374.3	103.5	1384.14	103.98	1390.7	103.77	1397.26	104.51
1420.22	103.71	1430.06	103.78	1436.62	104.46	1453.02	103.9	1459.58	104.13
1482.54	103.69	1495.66	104.45	1502.22	103.91	1518.62	104.07	1535.02	103.26
1571.1	103.79	1580.94	104.66	1603.9	104.28	1617.02	104.33	1630.14	105.01
1656.38	104.3	1676.06	104.58	1685.9	104.41	1695.74	104.81	1758.06	104.2
1761.34	103.81	1774.46	103.89	1810.54	103.57	1817.1	103.9	1840.05	103.64
1853.17	103.81	1863.01	103.41	1902.37	103.48	1918.77	104.05	1931.89	103.44
1958.13	103.54	1964.69	103.82	1984.37	103.67	1990.93	103.91	2007.33	103.64
2013.89	103.96	2036.85	103.43	2056.53	103.46	2079.49	104.27	2112.29	103.65
2125.41	104.16	2131.97	103.99	2145.09	104.65	2161.49	105.87	2171.33	105.92
2184.45	105.23	2207.41	105.36	2223.81	105.68	2233.65	104.96	2243.49	105.11
2253.33	104.23	2286.13	104.42	2302.52	104.75	2322.2	104.74	2351.72	105
2377.96	104.64	2394.36	104.62	2410.76	104.97	2427.16	105.72	2469.8	105.75
2486.2	106.4	2492.76	106.13	2515.72	106.67	2528.84	106.17	2558.36	106.83
2571.48	107.31	2591.16	107.56	2607.56	107.15	2627.24	107.96	2640.36	110.61
2660.04	109.17	2676.44	107.03	2722.35	106.94	2738.75	107.34	2748.59	107
2774.83	107.3	2787.95	108.16	2797.79	108.06	2807.63	108.9	2837.15	108.46
2856.83	108.92	2869.95	108.53	2892.91	108.65	2912.59	109.33	2922.43	109.33
2942.11	110.74	2971.63	110.78	2991.31	106.98	2997.87	104.75	3007.71	102.65
3020.83	101.4	3037.23	101.59	3047.07	101.29	3056.91	101.69	3096.26	101.49
3106.1	102.47	3112.66	104.19	3129.06	106.8	3138.9	109.91	3152.02	110.46
3165.14	109.29	3174.98	110.14	3204.5	109.61	3224.18	110.39	3234.02	110.22
3240.58	110.79	3260.26	110.74	3270.1	111.4	3276.66	110.88	3309.46	110.62
3319.3	110.34	3332.42	110.63	3358.66	110.1	3368.5	111.66	3388.18	110.52
3407.86	110.53	3417.7	111.1	3430.82	110.28	3447.22	110.68	3453.77	110.36
3470.17	111.45	3512.81	111.25	3539.05	111.39	3548.89	111.09	3594.81	111.52
3601.37	111.11	3607.93	109.76	3624.33	108.29	3637.45	105.55	3647.29	104.67
3666.97	103.89	3689.93	103.6	3709.61	103.74	3735.85	104.82	3781.77	105.85
3798.17	106.01	3808.01	106.9	3827.69	106.85	3840.8	107.56	3850.64	107.45
3867.04	108.16	3883.44	107.61	3945.76	107.86	3975.28	107.47	3981.84	107.72
4008.08	107.31	4031.04	108.13	4044.16	107.75	4057.28	108.92	4093.36	108.86
4113.04	109.79	4122.88	109.66	4132.72	110.34	4139.28	109.71	4155.68	109.82
4162.24	110.2	4178.64	109.55	4185.2	109.95	4211.44	109.34	4221.28	109.87
4240.96	109.16	4254.08	110.05	4273.76	110.84	4290.16	111.85	4313.12	112.22
4332.8	111.9	4359.04	112.22	4385.28	111	4411.53	111.58	4424.65	113.19
4434.49	111.12	4441.05	109.16	4460.73	106.76	4480.41	108.08	4500.09	108.07
4513.21	109.9	4532.89	110.4	4546.01	111.92	4555.85	112.1	4562.41	111.69
4572.25	109.47	4575.53	109.37	4582.09	110.8	4611.61	112.21	4621.45	114.3
4624.73	114.26	4657.53	107.88	4664.09	107.45	4680.49	108.96	4703.45	108.77
4710.01	105.41	4723.13	101.95	4729.69	101.19	4749.37	101.16	4762.49	102.86
4775.61	105.62	4795.29	105.59	4808.41	101.78	4824.81	99.93	4828.09	99.24
4841.22	94.55	4851.06	92.18	4857.62	88.74	4864.18	87.93	4884.18	79.96
4924.18	80.13	4964.18	80.16	4980.18	72.86	5015.18	72.16	5032.18	70.46
5049.18	69.86	5064.18	71.56	5077.18	72.16	5094.18	72.46	5104.18	80.03
5124.18	79.96	5133.1	87.93	5139.65	88.57	5152.77	95.85	5156.05	97.12
5162.61	97.89	5172.45	96.1	5179	95.85	5185.56	96.45	5195.4	98.83
5201.96	101.82	5208.52	107.15	5218.35	108.66	5234.75	108.78	5247.86	109.55
5267.54	108.14	5274.1	108.65	5290.49	107.69	5303.61	108	5323.28	107.87
5339.68	106.35	5352.8	105.97	5365.91	106.55	5382.31	105.13	5395.42	104.94
5408.54	105.92	5418.38	108.23	5428.21	112.04	5457.73	112.58	5477.4	110.83
5490.52	110.84	5500.35	110.31	5513.47	110.52	5523.31	109.97	5536.42	110.3
5579.05	109.36	5585.61	109	5611.84	108.99	5621.68	109.78	5638.08	109.87
5654.47	110.44	5657.75	110.14	5680.7	105.8	5683.98	105.48	5706.94	105.17
5726.61	106.03	5733.17	106.7	5749.57	107.38	5759.4	107.47	5785.64	106.79
5824.98	107.4	5847.94	107.06	5861.05	107.38	5884.01	111.46	5890.57	112.23
5897.12	111.73	5913.52	111.66	5933.19	113.24	5949.59	113.51	5965.99	115.05
5972.54	114.63	5979.1	113.37	6028.29	113.67	6057.8	113.54	6064.36	113.86
6077.47	113.54	6087.31	113.79	6100.43	113.03	6113.54	113.85	6129.94	112.71
6136.5	112.88	6143.06	112.02	6162.73	111.95	6169.29	112.38	6179.13	111.99
6202.08	112.49	6221.75	111.65	6244.71	112.13	6257.82	111.7	6284.06	111.73
6333.24	111.54	6359.48	112.14	6375.87	111.73	6405.38	111.89	6418.5	112.29
6451.29	114.23	6467.69	114.58	6480.8	116.88	6493.92	122.41	6503.76	123.4
6516.87	122.17	6536.55	122.92	6552.94	124.11	6575.9	123.99	6585.73	126.15
6592.29	126.34	6602.13	124.92	6605.41	123.55	6611.97	117.13	6618.52	112.97
6628.36	112.21	6641.48	112.18	6648.04	109.71	6657.87	102.91	6667.71	100.32
6680.83	98.84	6690.66	95.15	6693.94	92.69	6700.5	91.6	6880.85	91.6
6884.13	92.06	6897.25	98.12	6900.53	98.83	6907.08	103.41	6913.64	110.14
6920.2	115.89	6930.04	122.81	6936.6	124.38	6939.88	123.46	6946.43	123.64
6952.99	126.78	6962.83	126.65	6979.22	123.17	6985.78	123.09	6992.34	125.18
6995.62	125.37	7008.74	124.26	7018.57	121.84	7025.13	121.12	7041.53	114.59
7054.64	111.76	7077.6	111.23	7084.15	110.4	7097.27	110.17	7116.95	110.49
7123.5	111.1	7149.74	109.95	7162.85	109.97	7169.41	110.42	7182.53	110.25
7202.2	110.4	7218.6	109	7231.71	109.04	7241.55	109.5	7257.95	109.36
7264.5	108.89	7274.34	109.19	7287.46	108.79	7310.41	108.71	7320.25	109.99
7326.81	111.87	7343.2	114.77	7349.76	114.21	7369.44	110.24	7375.99	109.55
7389.11	113.18	7395.67	113.9	7408.78	113.42	7418.62	113.89	7431.74	113.95

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	72.16	.12	4884.18	.025	5124.18	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4703.45 5218.35 1510.38 1525.35 1543.94 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	4703.45	108.77	T
5218.35	7431.74	108.66	T

Left Levee Station= 72.16 Elevation= 125.77
Right Levee Station= 6592.29 Elevation= 126.34

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	120.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.120	0.076	0.085
W.S. Elev (ft)	119.97	Reach Len. (ft)	1510.38	1525.35	1543.94
Crit W.S. (ft)	96.46	Flow Area (sq ft)	47037.48	16650.57	11387.20
E.G. Slope (ft/ft)	0.000365	Area (sq ft)	57722.37	16650.57	12071.95
Q Total (cfs)	130000.00	Flow (cfs)	52336.85	61290.13	16373.01
Top Width (ft)	6382.42	Top Width (ft)	4597.75	514.90	1269.78
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)	1.11	3.68	1.44
Max Chl Dpth (ft)	50.11	Hydr. Depth (ft)	10.23	32.34	8.97
Conv. Total (cfs)	6808725.0	Conv. (cfs)	2741133.0	3210059.0	857533.3
Length Wtd. (ft)	1522.90	Wetted Per. (ft)	4607.19	533.56	1273.59
Min Ch El (ft)	69.86	Shear (lb/sq ft)	0.23	0.71	0.20
Alpha	2.38	Stream Power (lb/ft s)	0.26	2.61	0.29
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	182883.40	67292.88	212835.90
C & E Loss (ft)	0.01	Cum SA (acres)	22608.71	2782.89	25297.43

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 168.3

INPUT
Description: Extended block obstruction, Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	101	9.84	101.04	36.07	100.56	52.47	102.76	68.87	107.15
91.83	113.83	98.38	116.48	124.62	124.51	134.46	125.28	144.3	124.83
167.25	117.43	180.37	112.81	186.93	112.17	203.33	111.53	213.17	111.95
229.56	111.56	252.52	112.06	275.48	111.49	311.55	111.92	327.95	111.72
350.91	111.86	357.46	112.28	393.54	111.82	406.66	112.04	432.89	111.7
446.01	111.27	482.09	111.76	491.92	111.19	498.48	111.7	508.32	110.69
518.16	111.15	528	110.34	544.4	110.3	564.07	110.85	580.47	110.45
590.31	110.92	603.43	110.8	613.26	111.22	636.22	111.22	649.34	111.78
672.3	111.23	688.69	111.39	695.25	111.01	714.93	111.07	734.61	111.68
741.17	111.3	783.8	111.75	790.36	111.43	800.2	111.94	806.76	111.6
823.15	111.94	832.99	111.35	862.51	111.97	888.74	112.03	898.58	112.46
937.94	111.98	947.77	112.87	964.17	112.24	977.29	112.74	1006.8	112.52
1026.48	112.77	1036.32	112.51	1049.44	113	1056	112.43	1075.67	112.44
1088.79	112.89	1108.47	112.31	1141.27	112.28	1180.62	112.9	1193.74	112.6
1219.97	112.95	1249.49	112.75	1256.05	113.12	1275.73	113.15	1318.36	113.82
1328.2	113.52	1370.83	113.6	1397.07	114.6	1413.47	113.84	1420.02	114.33
1456.1	114.08	1462.66	114.46	1485.62	114.4	1492.17	114.8	1498.73	114.27
1528.25	114.84	1538.09	114.33	1587.28	114.36	1593.84	113.88	1633.19	113.19
1646.31	113.76	1669.27	113.79	1718.46	110.04	1744.7	106.48	1757.82	105.89
1774.21	105.86	1790.61	103.67	1816.85	103.61	1843.08	103.83	1852.92	104.62
1866.04	103.74	1879.16	103.65	1902.12	104.24	1925.07	103.67	1957.87	103.64
2003.78	103.37	2023.46	103.72	2066.09	103.41	2085.77	104.06	2112.01	103.96
2125.12	104.33	2141.52	104.21	2151.36	103.7	2177.6	104.19	2193.99	103.92
2216.95	104.26	2226.79	103.84	2246.47	103.73	2259.58	104.5	2272.7	103.58
2289.1	103.81	2305.5	104.7	2321.9	104.56	2338.29	105.98	2348.13	104.61
2361.25	105.06	2371.09	104.03	2390.77	103.7	2397.32	104.78	2407.16	104.1
2417	105.44	2436.68	103.85	2456.36	104.46	2469.47	104.46	2476.03	103.72
2495.71	104.15	2518.67	105.11	2541.62	103.69	2564.58	103.72	2571.14	104.47
2600.66	103.39	2607.21	103.51	2649.85	103.36	2662.97	103.86	2685.92	103.2
2705.6	103.37	2718.72	103.95	2738.4	104.23	2787.59	105.99	2803.99	107.27
2820.38	106.89	2833.5	107.26	2849.9	107.06	2863.02	107.4	2869.58	107.1
2885.97	107.93	2899.09	109.67	2931.89	109.54	2941.73	107.3	2958.12	107.16
2977.8	107.39	2997.48	108.35	3013.88	108.51	3023.71	108.01	3036.83	108.64
3043.39	108.24	3072.91	108.47	3082.75	109.12	3095.86	109.33	3122.1	108.61
3138.5	108.71	3158.17	108.27	3184.41	109.34	3220.49	109	3233.6	109.46
3246.72	109.33	3259.84	109.96	3289.36	110.25	3295.91	109.67	3315.59	109.74
3325.43	110.39	3335.27	109.96	3358.23	109.74	3368.06	110.84	3384.46	110.98
3391.02	110.37	3410.7	111.86	3427.1	110.55	3446.77	110.86	3456.61	110.42
3473.01	105.54	3489.41	103.32	3502.53	102.75	3545.16	102.73	3577.95	103.84
3587.79	103.64	3643.54	105.64	3653.38	106.56	3659.94	106.47	3679.62	105.21
3715.69	105.31	3728.81	107.59	3745.21	108.04	3774.73	105.02	3787.84	104.35
3804.24	104.25	3817.36	104.6	3853.43	104.5	3866.55	104.1	3896.07	104.37
3912.47	104.73	3922.3	104.59	3938.7	105.05	3971.5	104.91	4001.01	105.92
4017.41	103.7	4033.81	102.69	4060.04	102.67	4073.16	103.06	4089.56	103.1
4105.96	103.76	4112.52	104.42	4148.59	105.51	4171.55	107.44	4187.94	107
4201.06	107.36	4230.58	107.01	4263.37	107.69	4266.65	107.04	4292.88	107.14
4306	106.66	4315.84	106.87	4355.19	106.41	4374.87	106.38	4381.43	106.74
4404.38	106.32	4420.78	106.97	4433.9	106.06	4447.02	106.39	4460.13	106.18
4466.69	106.58	4492.93	105.77	4506.05	106.44	4522.44	106.64	4548.68	106.29
4561.8	106.46	4568.36	107.3	4604.43	107.63	4637.22	108.53	4647.06	109.14
4670.02	108.62	4679.86	109.71	4702.81	110.9	4722.49	110.88	4732.33	111.46
4742.17	111.07	4765.12	111.85	4784.8	111.65	4794.64	112.08	4814.31	111.32
4827.43	111.21	4837.27	111.97	4856.94	111.85	4886.46	110.17	4902.85	108.59
4919.25	105.82	4932.37	107.27	4955.33	107.32	4965.16	110.2	4971.72	110.95
4984.84	109.58	4994.68	109.64	5004.52	106.72	5014.36	102.6	5020.91	101.09
5027.47	101.12	5043.87	103.71	5050.43	105.56	5060.27	105.63	5066.83	104.47
5073.39	101.49	5083.22	98.76	5089.78	97.56	5109.46	92.1	5116.02	88.6
5122.58	87.79	5124.58	86.12	5171.58	81.97	5191.58	81.02	5211.58	80.52
5241.58	80.52	5251.58	80.02	5271.58	80.32	5291.58	79.72	5301.58	80.02
5321.58	80.02	5331.58	79.52	5351.58	79.62	5381.58	79.02	5401.58	79.32
5411.58	81.02	5414.43	87.79	5420.99	88.61	5434.1	93.3	5443.94	96.34
5450.5	99.43	5463.61	100.72	5483.29	103.12	5496.4	103.81	5522.64	102.82
5558.7	102.81	5575.1	103.44	5584.94	104.76	5598.05	107.17	5607.89	105.54
5627.56	106.2	5670.19	105.87	5693.14	106.31	5706.26	107.45	5712.82	110.3
5716.1	110.81	5732.49	111.03	5755.44	110.1	5771.84	109.95	5834.14	109.95
5850.53	109.43	5870.21	110.11	5883.32	109.82	5909.55	110.16	5919.39	109.63
5952.18	109.59	5962.02	109.27	5984.97	109.34	5998.09	109.73	6014.48	109.23
6024.32	109.69	6057.11	109.51	6073.5	109.72	6106.29	109.31	6145.64	109.51
6155.48	110.02	6165.31	109.62	6207.94	109.76	6230.89	109.43	6244.01	109.99
6263.68	109.59	6273.52	110.49	6286.63	109.41	6319.42	108.89	6329.26	109.04
6352.21	108.48	6430.91	107.98	6450.58	108.32	6460.42	108	6483.37	108.48
6493.21	108.3	6503.05	108.99	6519.44	108.88	6529.28	108.41	6548.95	108.38
6565.35	108.79	6578.46	108.36	6591.58	108.99	6598.13	108.35	6611.25	108.7
6637.48	108.61	6647.32	109.14	6653.88	108.11	6673.55	108.05	6689.94	108.5

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 6703.06  108.48 6709.62  109.07 6722.73   108.5 6732.57  108.98 6748.97  109.19
 6765.36  109.04  6775.2  108.41  6821.1  108.29 6840.78  108.49 6847.33  108.92
 6863.73  108.48 6880.12  108.52 6903.08  109.39 6916.19  114.12 6922.75  117.42
 6939.14  127.27 6942.42  127.71 6965.38  126.31 6978.49   126.2 6988.33   125.6
 7001.44  126.45 7011.28  128.42 7017.84  128.57 7030.96  129.85 7037.51  129.38
 7040.79  128.08 7050.63   121.2 7057.19  117.32 7067.02  114.16 7083.42  114.24
 7089.98  112.67 7103.09   103.8 7106.37  101.13 7112.93   97.92 7119.49   92.79
 7126.05    91.6 7293.27    91.6 7299.83    93.6 7309.67  103.46  7319.5  111.82
 7326.06  113.48  7335.9  112.92 7342.46  113.67 7349.01  115.95 7358.85  120.27
 7368.69  125.53 7378.52  127.56  7381.8  127.36 7388.36  124.46  7398.2  125.59
 7421.15  126.41 7440.83  130.29 7457.22  127.63 7467.06  124.78 7473.61  121.89
 7480.17  120.57 7493.29  115.27 7512.96  113.37 7526.08   110.2 7542.47  110.19
 7549.03  111.16 7571.98  112.41 7598.21  112.65 7621.17  112.14 7640.84  112.18
 7653.96  111.69 7696.58  111.61 7706.42  111.25 7726.09   111.4    7772  111.25
 7791.67  111.68 7804.79  111.41  7834.3  111.61 7840.86  111.98 7857.25  111.55
  7896.6  111.93 7909.72  112.69 7926.11  112.42 7932.67   111.8  7958.9  110.64
 7972.02  111.69 7981.85  113.07 7988.41  114.65 7998.25  114.49 8004.81  112.97
 8027.76  111.56 8040.88  112.02 8060.55  111.95 8076.94  111.36 8086.78  111.66

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0      .2 5089.78      .2 5109.46    .066 5171.58    .015 5411.58    .066
 5443.94    .116

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4971.72 5598.05          1645.88    1675 1663.72             .1       .3
Left Levee      Station=  134.46      Elevation=  125.28
Right Levee     Station= 7030.96      Elevation=  129.85
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1658.06 4974.18  110.98 5737.23 6942.05  111.06

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            119.16    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.19    Wt. n-Val.                 0.200      0.103      0.116
  W.S. Elev (ft)            118.97    Reach Len. (ft)          1645.88    1675.00    1663.72
  Crit W.S. (ft)             99.09    Flow Area (sq ft)       35987.81   16998.58   10983.40
  E.G. Slope (ft/ft)      0.001176    Area (sq ft)            35987.81   16998.58   10983.40
  Q Total (cfs)           130000.00    Flow (cfs)              35068.39   75220.52   19711.08
  Top Width (ft)           6762.84    Top Width (ft)           4809.24     626.33    1327.28
  Vel Total (ft/s)            2.03    Avg. Vel. (ft/s)            0.97       4.43       1.79
  Max Chl Dpth (ft)          39.95    Hydr. Depth (ft)            7.48      27.14       8.28
  Conv. Total (cfs)       3790933.0    Conv. (cfs)             1022630.0   2193507.0   574795.2
  Length Wtd. (ft)         1661.36    Wetted Per. (ft)         4811.26     639.54    1330.08
  Min Ch El (ft)             79.02    Shear (lb/sq ft)            0.55       1.95       0.61
  Alpha                       2.92    Stream Power (lb/ft s)      0.54       8.63       1.09
  Frctn Loss (ft)             1.03    Cum Volume (acre-ft)    181258.80   66703.73   212427.30
  C & E Loss (ft)             0.04    Cum SA (acres)           22445.62    2762.91   25251.41


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 168

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  119.98   13.12  124.23   29.52  124.25    32.8  123.56    49.2  117.39
   55.76  115.33   78.72  106.72   88.56  105.09  101.68  103.86  114.81  104.47
  141.05  104.51  180.41  104.01  318.18  104.67  367.38  105.24  383.78   105.7
  403.46  105.67  442.82  105.98  452.66  105.79  488.74  106.05  511.71  105.96
  528.11  106.19  600.27  106.24  619.95     106  633.07  106.59  678.99  106.42
  685.55  105.71  695.39  105.63  705.23  106.55     761  106.25  783.96  106.39
  797.08  106.12   810.2  106.39  829.88  106.18     843  106.51  852.84  106.21
  888.92  106.56  931.57  106.08  957.81  106.54  990.61  106.43 1007.01  106.12
 1059.49  106.29 1105.41  106.04  1157.9  106.25 1177.58  106.58 1197.26  106.26
 1236.62  106.47 1275.99  105.99 1298.95  106.74 1318.63  106.57 1331.75  107.19
 1341.59  106.89 1377.67  107.45 1394.07   109.5 1403.91  109.57  1423.6   106.1
 1430.16  105.61 1449.84  105.64 1469.52  106.35 1479.36  105.76 1492.48  105.63
 1515.44  106.96 1535.12  105.85 1544.96  106.24 1584.33  105.27 1597.45  105.28
 1633.53   104.6 1640.09  103.72 1659.77  104.02 1666.33  104.69 1676.17   104.4
 1699.13  104.45 1705.69   103.8 1728.65  104.34  1738.5  103.96 1774.58  104.62
 1781.14  104.09 1794.26  104.51  1820.5  104.03 1846.74   104.2 1856.58  105.09
 1872.98  103.86 1892.67  104.26 1902.51     105 1909.07  104.56 1932.03  104.36
 1948.43  103.86 1958.27  104.26 1987.79   103.5 2014.03  104.26 2020.59  103.94
 2036.99  104.09 2046.84  103.67 2059.96  104.51  2102.6  104.41 2122.28  103.74
 2158.36  105.11 2171.48   105.3  2184.6  104.22 2194.44  104.59  2217.4  107.69
 2223.96  107.89 2243.64  106.66 2260.04  107.43 2269.88  106.27 2296.12  106.75
 2305.96  106.27 2322.36  106.29 2335.48  107.74 2345.32  107.98 2358.44  106.07
 2368.28   105.2  2381.4  106.06 2391.25  106.15 2401.09  106.99 2420.77  107.29
 2427.33  107.94 2440.45  107.32 2453.57   107.3 2499.49  107.84 2525.73  107.22
 2578.21  107.13 2614.29  107.65 2633.97   106.6 2643.81  104.73 2653.65  103.83
 2666.77  103.43 2686.45  103.46 2696.29  103.93 2735.65  103.32 2755.33  103.54
  2778.3   105.6 2784.86  105.44 2801.26  104.08 2817.66  103.83 2834.06  104.05
 2850.46  105.81 2866.86     107 2879.98  104.61 2902.94  103.49  2925.9  104.05
 2935.74   103.7 2955.42  104.05 2965.26  103.45 2994.78  103.67 3001.34  104.13
 3017.74  103.92 3037.42  105.26 3053.82  103.74 3076.78   103.6 3109.58  104.17
 3119.43  104.67 3132.55  103.82 3152.23  103.51 3198.15  103.69 3227.67   103.5
 3250.63  103.87 3270.31  103.39 3280.15  103.78 3306.39  103.92 3316.23  103.74
 3345.75  104.21 3388.39  104.53 3450.71  105.34 3470.39  106.43 3496.64  105.82
 3516.32  106.03 3522.88  106.83 3549.12  106.63 3562.24  107.43 3572.08  106.94
 3581.92  107.61 3591.76  107.47  3601.6  106.46 3631.12  106.36 3640.96  106.59
  3650.8  106.16  3683.6  106.48 3706.56  106.19  3732.8  106.24 3768.88  106.72
 3801.68  106.73 3827.92  107.34 3850.89  106.82 3893.53  107.45 3913.21  107.09
 3932.89  107.54 3982.09  107.53 4011.61  110.73 4024.73  110.96 4054.25  109.09
 4067.37  109.58 4073.93  109.13 4093.61  108.93 4110.01  110.69 4116.57   110.3
  4146.1  109.57 4152.66  110.18 4169.06  110.61  4178.9  112.05 4208.42  110.64
 4214.98  111.28  4244.5  111.21 4274.03  109.81 4296.99  110.84 4313.39  110.58
 4336.35  111.19 4342.91  112.32 4359.31  111.15 4369.15  111.19 4388.84  109.08
 4405.24  107.74 4415.08  107.58 4421.64  108.64  4444.6  109.55 4457.72  110.43
 4480.68  109.58 4503.65   108.3 4520.05  108.02 4526.61  107.16 4543.01  106.39
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 4562.69  106.98 4569.25  106.63 4608.61   107.8 4618.45  109.18 4638.14   108.5
 4647.98  108.57 4667.66  110.09 4674.22  109.62 4684.06  110.42 4703.74   108.9
 4713.58  109.61 4736.54  109.14 4762.79  106.93 4782.47  108.93 4795.59  108.97
 4808.71   109.8 4818.55  109.29 4828.39   109.4 4841.51  107.35 4851.35  107.85
 4861.19   107.4 4890.72   109.2 4907.12  109.94 4916.96  108.77 4933.36  109.07
  4943.2  110.64  4959.6  111.04 4979.28  109.53 4995.68  110.59 5008.81   108.9
 5031.77  110.37 5058.01  110.72 5067.85  109.29 5074.41  110.98 5080.97   111.6
 5094.09  111.88 5103.93  111.17 5117.05  111.75 5130.18   111.2  5143.3  111.68
 5166.26  111.86 5172.82  110.45 5182.66  105.31 5195.78   99.14 5205.62   96.98
 5218.74   96.26 5235.14   97.06 5251.55   99.33 5264.67  102.62 5271.23  103.28
 5284.35  106.32 5297.47  107.35 5307.31  107.12 5317.15  103.16 5333.55   92.67
 5340.11   89.12 5346.67   87.56 5366.67   85.11 5386.67    85.1 5394.67   76.98
 5404.67   76.54 5421.67   77.09 5469.67   77.84 5482.67   77.64 5494.67   77.94
 5508.67   77.34 5520.67   77.74 5538.67   77.57 5546.67   85.23 5566.67   85.14
 5626.67    85.2 5655.02   87.56  5658.3   87.59 5664.86   90.82 5668.14   91.47
 5684.54   91.03 5694.38   94.16 5704.22   94.28 5727.18   95.36 5733.74   95.25
 5753.41   93.19 5766.53   92.79 5786.21   94.35 5792.77   96.47 5809.16  102.82
    5819  108.67 5825.56   110.3 5832.12  110.56 5841.96  109.95 5855.07  110.08
 5894.42   108.8 5937.05  108.28 5982.96  108.46 6015.76  108.09 6045.27  108.46
 6064.95  108.48 6094.46  109.56 6114.14  109.32 6150.21   108.1 6169.88  108.28
 6186.28  108.09 6219.07  108.95 6228.91  108.55 6255.15  108.57 6284.66  107.55
 6307.62  107.12 6327.29  107.32 6343.69   107.8 6379.76  109.74 6399.44  110.06
 6428.95     111 6438.79   110.4 6448.62  110.83  6468.3  109.79  6484.7   109.6
 6491.26     109 6514.21  108.53 6533.89     109  6563.4  107.95 6583.08   108.6
 6596.19   108.3 6635.54  108.41 6648.66  108.08 6668.34  108.44 6691.29  108.06
 6707.69  108.27 6756.88  108.33 6763.44  108.55 6792.95     108 6815.91  108.14
 6855.26  107.05 6861.82  107.12 6894.61  106.15 6901.17  106.35 6940.52  105.25
 6986.43  104.88 6999.55  105.07 7019.22  104.17 7042.18  104.64 7074.97  104.56
 7088.09  104.86 7111.04  104.83 7137.28  106.01 7147.12  106.19 7166.79  107.45
 7193.03   110.8 7199.58  112.04 7209.42   112.9 7215.98  114.49 7222.54  119.18
 7225.82  120.57 7235.66  122.19 7245.49  124.78 7252.05  124.67 7258.61   123.6
 7265.17  123.94 7281.57  126.63  7291.4  128.65 7301.24  128.22 7304.52  127.34
 7314.36  122.48 7320.92  116.48  7324.2  114.78 7330.76  113.47 7347.15  112.42
 7353.71  109.33 7360.27  105.18 7376.67   91.63 7557.03    91.6 7560.31    93.4
 7566.87   99.25 7583.26  106.82  7593.1  112.39 7596.38  113.35 7616.06  113.51
 7632.45  119.62 7642.29  126.33 7648.85  129.15 7655.41  130.11 7661.97  130.08
  7671.8  128.35 7681.64  123.19  7688.2  121.25 7698.04  119.54 7720.99  114.48
 7727.55  114.41 7734.11  112.75 7743.95  108.47 7753.79  108.44 7763.62  110.99
 7770.18  111.04 7780.02  109.42 7793.14  109.33 7812.81  110.31 7822.65  109.52
 7835.77  107.32 7852.17  107.19 7865.28  106.68 7888.24  106.97 7901.35  107.47
 7943.99  106.06 7960.38  106.32 7980.06  108.44  7989.9  107.87 7999.73  105.94
 8006.29  105.61 8012.85  106.32 8029.25  106.06 8035.81  106.56 8045.64  105.49
 8062.04  104.59 8071.88  103.23 8111.23  105.07 8117.79  104.88 8127.63  105.81
 8140.74  105.45 8166.98  106.26 8176.82  106.01 8229.28  106.18 8235.84  105.76
 8265.36  106.09 8275.19  105.84 8288.31  106.54 8311.27  108.53 8324.38  108.01
 8363.74   107.6 8393.25  107.39 8429.32  107.48    8449  107.04 8465.39  107.39
 8481.79  108.22 8491.63  109.92 8498.19   112.8 8508.02  115.86 8517.86  116.41
 8530.98  112.51 8537.54  109.62  8544.1   108.3 8557.21  107.73 8567.05  108.62

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   29.52    .066 1597.45     .12 5394.67    .025 5546.67     .12
  7291.4    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5297.47 5832.12          1221.72  1587.5  1609.1             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5297.47  107.35       T
 5832.12 8567.05  110.56       T
Left Levee      Station=   13.12      Elevation=  124.23
Right Levee     Station= 7291.41      Elevation=  128.65

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            118.08    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                 0.095      0.099      0.120
  W.S. Elev (ft)            118.02    Reach Len. (ft)          1221.72    1587.50    1609.10
  Crit W.S. (ft)             98.92    Flow Area (sq ft)       52944.90   16122.01   10275.75
  E.G. Slope (ft/ft)      0.000384    Area (sq ft)            60964.38   16122.01   13915.33
  Q Total (cfs)           130000.00    Flow (cfs)              75397.44   45150.45    9452.12
  Top Width (ft)           7173.41    Top Width (ft)           5249.95     534.65    1388.80
  Vel Total (ft/s)            1.64    Avg. Vel. (ft/s)            1.42       2.80       0.92
  Max Chl Dpth (ft)          41.48    Hydr. Depth (ft)           10.08      30.15       7.40
  Conv. Total (cfs)       6637938.0    Conv. (cfs)             3849873.0  2305430.0   482635.2
  Length Wtd. (ft)         1395.42    Wetted Per. (ft)         5262.39     551.19    1391.00
  Min Ch El (ft)             76.54    Shear (lb/sq ft)            0.24       0.70       0.18
  Alpha                       1.48    Stream Power (lb/ft s)      0.34       1.96       0.16
  Frctn Loss (ft)             0.28    Cum Volume (acre-ft)    179427.10   66066.94   211951.80
  C & E Loss (ft)             0.01    Cum SA (acres)           22255.58    2740.59   25199.54


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 167.70*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  121.54    6.56  123.67   23.96  120.85   31.28 118.349   53.08  111.28
   62.38  108.84   74.79  104.81   80.99  103.78   87.18  104.03  100.52  103.74
   115.1  104.24   136.8     104  174.02  103.87  217.43   103.9  245.34  104.14
  330.23  104.33  363.18  104.61  372.49  104.54  397.29  104.91  440.71  105.07
  472.92  104.95  552.97  105.22  598.86  105.23  620.57  105.37  650.41  105.25
  664.33  105.58  694.99   105.7  713.05  105.57  726.01  104.98  735.32  104.06
  747.71  104.83  794.23  104.41  815.94  104.65  838.35  104.37  873.15   104.4
  887.07  104.67  902.77  104.47  935.79  104.69  981.04  104.42 1008.89   104.7
 1061.09  104.47 1116.77  104.62 1165.49  104.44 1242.06  104.85 1262.94  104.69
  1304.7  104.91 1346.48  104.77 1370.84  105.22 1391.72  105.26 1405.64   105.7
 1416.08  105.66 1454.36  106.05 1471.76  107.05  1482.2  107.15 1503.09  105.49
 1510.05  105.25 1530.93  105.27 1551.81  105.69 1576.17  105.29 1600.54  105.98
 1621.42  105.44 1631.86  105.64 1673.63  105.22 1692.69105.1844 1725.83  104.89
 1732.79  104.44 1753.67  104.58 1760.63  104.93 1795.43  104.88 1802.39  104.57
 1826.75  104.79  1837.2  104.62 1875.49  105.03 1882.45  104.78 1896.37  104.92
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1924.21	104.72	1952.05	104.8	1962.49	105.24	1979.89	104.62	2000.78	104.82
2011.22	105.23	2059.94	104.67	2070.38	104.87	2101.7	104.48	2129.54	104.88
2164.36	104.67	2178.28	105.1	2223.52	105	2244.4	104.77	2296.6	105.51
2310.52	105.01	2320.96	105.18	2345.32	106.69	2352.28	106.8	2373.16	106.23
2390.56	106.66	2401	106.11	2428.5	106.28	2456.69	106.13	2470.61	106.87
2481.05	106.99	2505.41	105.61	2529.78	106.03	2540.22	106.52	2561.1	106.7
2568.06	107.04	2605.25	106.69	2644.62	106.91	2672.46	106.65	2728.14	106.62
2766.43	107.02	2787.31	106.6	2797.75	105.67	2808.19	105.22	2828.52	105.03
2853.43	105.81	2884.34	105.66	2916.07	106.13	2940.44	107.24	2964.8	106.48
2992.88	106.5	3005.28	107.04	3039.4	107.8	3048.69	106.5	3058	106.99
3073.51	106.15	3097.05	106.36	3113.82	106.05	3128.37	106.24	3138.81	105.99
3177.09	106.37	3194.49	106.26	3215.37	106.84	3232.77	106.07	3257.13	106.04
3291.93	106.28	3302.38	106.55	3316.3	106.15	3368.11	105.54	3399.11	104.63
3417.71	104.88	3441.59	104.87	3462.47	104.36	3472.91	104.46	3511.19	104.24
3544.86	104.53	3578.97	104.51	3613.08	104.88	3653.88	105.11	3674.76	105.48
3702.61	105.18	3723.49	105.35	3730.45	105.77	3758.29	105.98	3772.21	106.51
3782.65	106.24	3793.09	106.51	3813.97	105.97	3842.56	105.51	3889.07	105.38
3941.8	105.78	3957.3	105.72	3985.21	106.03	4026.26	106.1	4054.1	106.44
4093.75	106.09	4115.45	106.56	4130.96	106.64	4144.59	106.39	4165.47	106.64
4192.99	106.73	4217.67	106.45	4249	108.24	4262.92	108.36	4289.12	107.35
4308.16	107.39	4336	106.93	4353.4	107.92	4391.69	107.14	4410.06	107.51
4426.49	108.45	4457.81	107.92	4478.29	108.17	4496.09	108.87	4534.11	108.21
4549.62	109.04	4562.03	110.23	4571.33	109.97	4600.51	111.78	4628.35	111.51
4639.55	110.32	4658.16	109.76	4670.56	108.65	4689.16	106.62	4708.4	106.45
4729.49	106.78	4771.05	105.92	4788.46	106.01	4803.91	105.45	4812.82	105.55
4833.7	106.5	4844.23	106.64	4853.53	107.33	4859.73	107.15	4890.74	108.64
4900.05	107.06	4909.35	106.24	4924.85	106.21	4945.07	107.14	4952.03	106.98
4962.47	107.57	4974.47	107.42	4983.35	106.91	5005.49	107.63	5018.15	107.24
5046	105.17	5066.89	105.89	5080.81	105.64	5105.17	106.24	5115.61	106.95
5139.97	106.77	5157.44	105.56	5163.64	105.77	5176.05	107.44	5197.76	108.12
5203.95	107.52	5213.26	105.43	5234.97	103.34	5265.98	101.47	5275.7	101.24
5293.1	101.73	5307.03	100.78	5331.1	102.02	5352.81	103.38	5369.68	103.46
5376.64	104.44	5383.6	104.76	5435.81	103.97	5455.15	104.75	5474.09	104.9
5481.05	103.91	5495.46	99.55	5505.41	97.21	5515.85	96.14	5529.77	95.85
5547.17	96.5	5557.42	97.44787	5564.58	98.11	5579.2	100.76	5594.71	100.96
5613.31	103.76	5621.02	103.32	5628.73	101.02	5646.73	91.99	5651.87	90.45
5667.55	87.55	5683.23	86.46	5691.44	81.09632	5692.91	80.35841	5697.33	78.14
5709.96	78.39	5722.59	78.07	5735.22	78.44	5761.9	78.3	5771.83	78.53
5808.26	78.28	5814.88	81.99	5817.39	81.92387	5823.61	81.76	5881.1	81.63
5907.28	82.53	5915.43	84.4	5929	84.15	5937.25	85.7	5945.91	89.91332
5947.63	90.75	5955.92	91.22	5972.48	95.04	5986.01	95.27	5996.87	95.94
6005.61	97.32	6013.16	97.66	6026.31	100.84	6032.16	102.86	6040.3	106.82
6051.17	109.88	6053.92	110.2	6059.42	109.42	6067.67	109.31	6073.18	110
6086.94	109.11	6092.44	107.84	6100.69	108.61	6119.95	108.85	6125.46	108.55
6147.47	108.47	6155.73	107.91	6163.99	109.11	6205.26	109.13	6237.76	108.8
6307.08	107.47	6339.18	107.58	6375.69	107.95	6422.65	107.59	6430.9	107.25
6450.17	107.15	6472.18	106.33	6502.45	106.22	6529.83	106.43	6542.01	106.13
6565.74	106.08	6596.01	105.68	6610.97	105.33	6639.37	105.04	6663.7	105.12
6683.99	105.37	6728.61	106.3	6750.11	106.42	6789.46	107.01	6801.63	106.76
6813.79	107.02	6838.14	106.47	6858.42	106.32	6866.54	105.99	6894.93	105.74
6919.27	106.14	6955.78	105.64	6980.12	106.11	6996.34	106.01	7045.02	106.05
7061.25	105.89	7085.59	106.28	7113.98	106.48	7127.1	106.85	7160.12	106.74
7195.12	106.82	7203.23	106.98	7239.74	106.96	7292.21	107.55	7311.47	108.26
7347.24	108.79	7373.61	108.93	7399.52	108.78	7429.79	108.92	7479.08	108.38
7495.31	108.49	7519.64	107.78	7548.12	108.01	7561.88	107.75	7588.61	107.61
7633.22	107.67	7669.19	108.28	7682.96	108.3	7707.72	109.18	7718.73	110.15
7740.75	111.54	7746.25	112.49	7763.04	117.16	7775.21	120.81	7779.28	121.65
7787.38	121.91	7799.54	123.38	7807.66	123.64	7815.77	123.18	7837.07	123.77
7842.57	124.75	7854.22	127.9321	7861.84	126.29	7875.63	119.17	7884.67	116.53
7896.81	111.69	7905.95	108.95	7919.74	106.27	7928.01	102.48	7941.32	98.35
7961.55	91.57	8101.67	91.56	8115.46	92.09	8137.51	91.98	8145.78	91.56
8178.86	91.56	8184.1	91.77	8196.25	95.93	8216.47	99.98	8222.97	101.91
8228.61	104.4	8239.51	107.8	8253.29	110.24	8256.94	110.5	8277.17	114.56
8289.31	118.17	8297.4	119.62	8305.5	120.15	8313.59	119.94	8325.72	118.83
8337.86	116.15	8349.78	114.26	8363.56	113.47	8374.58	112.37	8382.86	111.97
8394.51	112.8	8402.61	112.08	8414.75	109.83	8426.89	109.62	8439.02	110.71
8447.12	110.7	8459.26	109.98	8499.72	110.53	8511.86	110.01	8528.05	108.73
8564.46	108.31	8592.79	108.36	8608.97	108.62	8639.23	108.12	8661.58	107.23
8681.81	107.21	8708.15	108.66	8727.44	107.22	8738.46	106.99	8746.55	107.34
8766.79	107.22	8774.88	107.51	8793.61	106.53	8801.87	107.23	8819.39	106.45
8834.96	106.62	8867.95	107.43	8876.04	107.43	8888.18	108.05	8917.65	108.41
8936.95	109.17	8964.52	109.31	8972.79	108.58	8983.82	108.22	8994.85	108.47
9003.11	108.04	9021.71	107.75	9047.22	108.02	9070.26	107.91	9086.45	108.24
9114.78	109.32	9130.96	109.16	9149.22	109.29	9165.75	110.17	9198.83	109.98
9253.97	110.37	9267.76	111.1	9281.54	110.88	9295.32	112.52	9300.84	112.67
9311.86	111.72	9322.89	111.42	9337.33	112.75	9357.56	115.93	9369.7	116.45
9385.89	114.54	9393.98	113.24	9402.08	112.87	9418.25	113.16	9430.39	113.69

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	23.96	.066	1725.83	.12	5628.73	.025	6026.31	.12
7854.22	.085								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
5613.31	6051.17	1221.72	1587.5	1609.1	.1	.3

Left Levee Station= 6.56 Elevation= 123.67
Right Levee Station= 7854.7 Elevation= 128.295

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 167.4

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	123.11	22.96	116.06	32.79	112.43	49.19	107.69	59.03	106.09
72.15	102.41	78.71	101.6	85.26	103.02	91.82	103.43	114.78	104
137.73	103.5	177.09	103.61	190.2	103.86	223	103.64	252.51	103.99
278.75	103.86	304.98	104.06	347.61	103.99	377.13	104.19	386.97	103.95
413.2	104.19	419.76	104.04	459.11	104.33	482.07	104.11	527.98	104.1
547.66	104.25	626.36	104.24	649.32	104.5	688.67	104.5	728.02	104.91
747.7	104.72	760.82	104.3	770.66	102.07	783.77	103.14	813.29	102.95
832.96	102.55	855.92	102.96	875.6	102.61	918.23	102.63	934.63	102.89
947.74	102.68	990.37	102.84	1036.29	102.74	1055.96	102.89	1082.2	102.74
1177.3	102.95	1200.26	102.78	1249.45	102.91	1282.24	103.12	1351.11	103.13
1393.74	103.55	1400.3	103.45	1456.05	103.79	1492.12	104.45	1528.2	104.66
1551.15	104.6	1570.83	104.89	1610.18	104.88	1633.14	105.03	1659.37	104.95
1718.4	105.04	1728.24	105.15	1816.78	105.19	1839.74	105.1	1905.33	105.37
1918.44	105.22	1984.03	105.47	2006.99	105.24	2023.38	105.42	2105.37	105.36

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 2144.72  105.61 2154.56  105.49 2233.26  105.44 2292.29  105.71 2334.92  105.49
 2374.27  105.87 2413.63  105.62 2430.02  105.83 2475.93  105.68 2531.68  105.95
  2561.2  105.81 2567.76  105.96 2643.18  106.02 2669.41   105.9 2692.37  106.26
 2705.49  106.04 2715.33  106.36 2748.12  105.97 2777.63  106.11 2784.19  105.95
  2862.9  106.25 2872.73   106.1 2905.53  106.18 2931.76  106.59 2984.23  106.62
 3000.63   107.4  3020.3  107.99 3043.26  107.85 3069.49  108.68 3102.29  108.88
 3121.96  108.72 3141.64   109.2 3158.04  109.04 3171.15  109.46 3180.99  108.92
 3197.39   108.7 3207.23  109.46 3217.06   108.4  3226.9  109.82  3243.3   108.8
 3279.37  108.61 3285.93   108.3 3341.68  108.77 3358.08  108.53 3377.75  108.62
 3397.43  108.37  3449.9  108.51 3459.73  108.34 3515.48  108.54 3554.84  107.45
 3571.23  106.34 3587.63  105.66  3607.3  106.25 3620.42  106.17 3659.77  105.21
 3699.13  104.72 3741.76  104.83 3777.83  104.56  3813.9  104.91 3827.02  104.77
  3846.7  105.04 3886.05  104.41  3941.8  104.74 3948.36  105.01 3984.43  105.63
 4013.94   105.3 4033.62  105.59 4056.57  104.66 4086.09  104.62 4105.76  104.39
 4161.52  105.34 4177.91  105.14 4207.43  105.42 4240.22  105.37  4259.9  105.55
 4305.81  105.53 4322.21  105.14 4345.16  105.79 4361.56  105.95 4368.12  105.58
 4384.52  105.81 4414.03  105.65 4427.15  105.93 4450.11  105.29 4469.78  105.75
 4512.42  105.76 4528.81   105.3 4538.65  105.51 4555.05  105.01 4564.89  105.31
 4581.29  104.84 4607.52  105.37 4633.76  104.74 4656.71  104.56 4663.27   104.9
 4686.23  104.79 4699.35  105.24 4728.86  105.09 4741.98  106.49 4771.49  106.66
 4787.89  106.33 4804.29  107.34 4817.41  109.78 4827.25  109.31 4843.64  110.91
  4866.6  111.44 4879.72  112.23 4886.27  111.96 4899.39  110.58 4919.07  111.12
 4932.19  109.62 4938.75  108.18 4951.86  104.41 4958.42  103.75 4984.66  102.97
  4994.5  103.37 5004.34  103.13 5046.97  103.63 5063.37  104.26  5073.2  104.12
 5099.44  105.77 5115.84  106.55 5125.68  107.66 5132.23  107.13 5151.91  108.31
 5158.47  108.98 5165.03  108.38 5174.87  105.17 5184.71  103.84  5201.1   103.8
  5233.9  104.41 5253.57  105.29 5269.97  104.65 5286.37  105.87 5302.77  105.22
  5312.6  104.35 5335.56  103.04 5348.68  102.95 5368.36  102.22 5378.19  102.13
 5388.03  102.74 5417.55  106.27 5430.67  105.58 5447.06  103.32 5453.62  103.38
 5466.74     106  5489.7  106.36 5496.25  105.63 5506.09  102.03 5519.21    99.3
 5529.05    96.4 5552.01   93.12 5561.84   92.71 5578.24   93.09 5604.48   92.62
 5630.71   93.69 5653.67   96.12 5663.51   96.51 5670.07   97.57 5683.18   98.06
 5702.86   97.09 5715.98   97.23 5725.82   96.65 5752.05   96.81 5761.89   97.78
 5771.73   98.12 5784.85    97.9 5804.52   95.55 5817.64   95.22 5847.16   95.49
 5870.11   96.35 5883.23   97.31 5893.07   98.84 5899.63   98.61 5909.47   96.62
 5916.03   97.01 5929.14  100.17 5942.26   98.65 5948.82   97.09 5955.38   93.85
 5971.78   88.99 5984.89   87.08    5990   79.74    6000   79.74    6010   78.84
    6020   79.34    6040   78.94    6060   79.34    6080   78.94    6090   78.34
    6140   78.04    6160   77.34    6180   77.24 6188.22   87.08 6194.78   87.56
  6207.9   95.18 6227.57   99.17 6234.13  101.01 6243.97  100.96 6250.53   101.6
 6260.37  104.37 6270.21   109.2 6273.49  109.98 6280.05  108.69 6289.88  108.64
 6296.44  109.97 6312.84  108.33 6319.39  105.93 6329.23   107.7 6339.07  108.39
 6352.18  108.68 6358.74  108.22 6384.97  108.32 6391.53  107.06 6394.81   107.3
 6404.65  109.78 6424.32  110.09 6453.83  109.91 6473.51  109.61 6539.09  108.01
 6558.76  107.02 6575.16  106.56  6614.5  106.68 6660.41  106.31  6693.2  106.32
 6699.76  106.07 6712.88  106.48 6722.71  106.02 6745.67  106.16  6771.9   104.4
 6801.41  104.29 6807.97  104.08 6837.48  103.96 6860.43  103.64 6883.38  103.59
  6896.5  103.28 6919.45   103.4 6935.85  103.12 6978.48  102.93 7050.62  102.93
 7067.01  102.75 7093.24  103.04 7103.08  102.82 7132.59  102.91 7185.05  103.26
 7267.03  102.86 7306.38   103.3 7342.45  103.27 7388.35  103.72 7424.42  103.76
 7470.33  103.66 7496.56  103.98 7539.19  104.96 7552.31   105.5 7591.65  105.19
 7624.44  105.23 7667.07  105.64 7719.54  106.37 7729.37  106.98 7749.05  107.49
    7772  109.35 7814.63  110.99 7853.98  111.64 7876.93  111.79    7913  112.64
 7922.84  112.31 7939.23  112.33  7975.3  111.83 7985.14  112.04 8014.65  111.39
    8054  111.39 8070.39  110.89 8080.23  110.94 8122.86  110.39 8168.76  110.55
 8181.88  110.28 8198.27   110.5 8214.67  110.15 8224.51  110.41 8244.18  110.33
  8257.3  111.15 8270.42  111.01 8283.54  111.34 8290.09   112.7 8303.21  118.12
 8309.77  119.83 8319.61  119.89 8329.45  122.19 8339.28  121.63 8355.68  122.04
 8365.52  122.79 8385.19  122.71 8398.31  121.85 8404.87  123.08 8411.43  125.99
 8417.99  127.94 8421.27  127.31 8427.82  124.12 8437.66  115.93 8444.22  112.24
 8450.78   110.6 8460.62  110.53 8467.18  109.44 8480.29  104.49 8496.69   99.84
 8506.53   93.64 8516.37   91.51 8713.12   91.51 8729.52   92.58 8755.75   92.35
 8765.59   91.52 8804.94   91.52 8821.34   92.61 8834.46   92.59 8850.85   93.18
 8857.41   94.02 8867.25   97.52 8877.09  102.21 8893.48     107 8909.88  108.82
 8929.56  109.95 8955.79  110.19 8975.47  109.36 8998.42  109.05 9008.26   107.8
 9024.66  108.38 9037.77  108.15 9047.61  108.82 9057.45  111.09 9077.12  111.56
 9083.68  111.23 9119.76   110.3 9142.71   110.6 9165.67  111.14 9224.69  110.06
 9254.21  109.87  9270.6     110    9287  109.74 9332.91   109.8 9352.59  109.58
 9378.82  108.41 9401.78  108.08 9424.73  108.41 9434.57  108.97 9441.13  108.25
 9457.52  108.03 9464.08  108.39 9496.88  108.33 9523.11  108.54 9536.23  107.86
 9546.06  109.64 9578.86   109.7 9585.42  109.43 9608.37  109.48 9647.72  110.23
 9664.12  111.08 9683.79  111.04 9706.75  112.08 9713.31  111.99 9732.98  112.65
 9739.54  112.56 9749.38  111.08  9762.5  110.34 9775.62   110.8 9785.45  109.93
 9801.85  109.68 9837.92  110.04 9900.23  109.91 9946.14  110.41 9959.26  110.72
 9978.93  112.6210018.28  112.4710034.68  112.87 10047.8  112.8610083.87  113.28
10100.27  114.8510116.66  114.66 10126.5  116.0810133.06  117.8210139.62  118.02
10152.73  115.7710165.85  114.7210182.25  115.5810195.37  115.6210224.88   116.6
10234.72  116.3910254.39  116.9910267.51  118.0510280.63  118.6610293.74  118.77

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .106 5870.11    .106 5929.14    .066    5990    .015 6188.22    .066
 6273.49     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5929.14 6270.21         1756.68    2500 2391.12             .1       .3
Left Levee      Station=       0      Elevation=  123.11
Right Levee     Station= 8417.99      Elevation=  127.94
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0  3020.3  107.99 6296.4410293.74  109.97

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            117.57    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.18    Wt. n-Val.                  0.106      0.041     0.130
  W.S. Elev (ft)            117.38    Reach Len. (ft)          1756.68    2500.00    2391.12
  Crit W.S. (ft)            102.41    Flow Area (sq ft)       65008.61   10721.62   14404.92
  E.G. Slope (ft/ft)      0.000214    Area (sq ft)            65008.61   10721.62   14404.92
  Q Total (cfs)           130000.00     Flow (cfs)             66127.50   54963.23    8909.28
  Top Width (ft)           8282.78    Top Width (ft)          5910.49     341.07    2031.22
  Vel Total (ft/s)            1.44    Avg. Vel. (ft/s)           1.02       5.13       0.62
  Max Chl Dpth (ft)          40.14    Hydr. Depth (ft)          11.00      31.44       7.09
  Conv. Total (cfs)       8879703.0    Conv. (cfs)             4516866.0  3754286.0   608552.3
  Length Wtd. (ft)         2165.75    Wetted Per. (ft)         5918.47     355.73    2032.75
  Min Ch El (ft)             77.24    Shear (lb/sq ft)           0.15       0.40       0.09
  Alpha                       5.61    Stream Power (lb/ft s)     0.15       2.07       0.06
  Frctn Loss (ft)             0.42    Cum Volume (acre-ft)    175763.90   65087.30   210780.30
  C & E Loss (ft)             0.03    Cum SA (acres)          21942.57    2708.67   25073.07


Note:    Manning's n values were composited to a single value in the main channel.
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 167

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	122.83	26.24	114.8	42.63	108.97	52.47	106.51	65.59	105.42
75.43	102.02	85.26	102.05	91.82	103.28	108.22	103.89	131.17	103.17
173.81	103.34	216.44	103.83	242.67	103.88	288.58	103.27	298.42	101.25
318.1	102.14	337.78	101.7	370.57	101.76	386.97	102.09	400.08	101.68
452.55	101.78	472.23	102.25	485.35	102.01	508.3	102.54	534.54	104.48
541.1	104.03	587.01	104.55	623.08	104.04	639.48	104.43	649.32	104.12
682.11	104.32	718.18	104.04	731.3	104.64	741.14	104.18	750.98	104.64
760.81	103.62	767.37	104.1	787.05	104.01	803.45	104.5	823.12	104.56
832.96	104.16	885.43	103.85	928.06	104.15	957.58	103.84	1026.44	103.85
1049.4	104.4	1062.52	104.05	1095.31	104.14	1134.66	103.87	1170.74	104.55
1187.13	104.21	1233.04	104.28	1242.88	104.91	1249.44	104.42	1311.75	104.12
1337.98	104.87	1360.94	104.37	1380.61	105.06	1400.29	104.08	1406.85	104.53
1436.36	104.26	1459.32	104.44	1482.27	104.25	1511.79	104.64	1534.74	104.38
1541.3	104.7	1560.98	104.44	1570.82	105.01	1583.93	104.54	1597.05	104.96
1613.45	104.48	1646.24	105.01	1662.64	104.53	1672.48	104.86	1695.43	104.53
1701.99	105.04	1747.9	104.59	1757.74	104.85	1777.42	104.51	1859.4	104.63
1882.36	104.31	1898.75	105.04	1921.71	104.42	1954.5	104.7	1964.34	104.01
1970.9	104.38	2013.53	104.11	2082.4	104.44	2092.23	104.05	2102.07	104.57
2125.03	104.2	2138.14	104.54	2187.33	104.57	2203.73	104.21	2220.13	104.63
2236.52	104.31	2252.92	104.65	2315.23	104.36	2328.34	104.61	2344.74	104.28
2364.41	104.95	2393.93	104.49	2459.51	104.62	2469.35	104.37	2489.03	104.71
2498.87	104.36	2525.1	104.39	2554.61	105.27	2571.01	104.52	2590.69	104.79
2623.48	104.39	2639.87	104.85	2666.11	104.65	2689.06	104.9	2731.69	104.62
2744.81	104.97	2774.33	104.68	2790.72	105.03	2823.51	104.84	2875.98	105.4
2885.82	105	2954.69	104.96	2974.36	105.31	2994.04	104.89	3003.88	105.25
3036.67	104.92	3089.14	106.11	3102.25	108.12	3121.93	107.57	3148.16	107.39
3180.96	107.58	3203.91	107.45	3249.82	107.63	3292.45	107.44	3351.48	107.64
3397.39	107.46	3423.62	107.71	3462.98	107.48	3508.89	107.77	3544.96	107.62
3676.13	107.51	3695.81	107.65	3735.16	107.5	3807.3	107.7	3833.54	107.14
3856.49	107.64	3869.61	108.7	3876.17	110.64	3882.72	111.34	3892.56	110.01
3915.52	109.85	3928.64	108.74	3974.54	107.69	4000.78	107.99	4017.18	107.64
4040.13	108.22	4069.64	107.93	4089.32	108.29	4102.44	107.52	4112.28	108.46
4131.95	108.56	4158.19	107.66	4174.58	107.92	4207.37	107.94	4230.33	109
4246.73	107.85	4266.4	108.35	4305.75	107.87	4315.59	108.2	4341.82	108.2
4384.46	107.74	4413.97	107.87	4427.09	107.64	4443.48	108.09	4476.28	108.27
4489.39	107.83	4495.95	108.24	4525.46	107.83	4571.37	107.89	4584.49	107.57
4630.4	107.73	4705.83	107.59	4741.9	107.99	4814.04	107.52	4837	107.84
4886.19	107.65	4896.02	107.81	4951.77	107.64	5004.24	107.91	5023.92	107.67
5063.27	107.99	5073.11	107.65	5089.5	107.92	5128.85	107.91	5171.49	107.62
5191.16	107.96	5305.94	107.56	5325.61	107.88	5394.48	107.97	5407.59	108.62
5414.15	109.75	5430.55	108.73	5437.11	104.44	5443.67	98.64	5450.22	95.33
5460.06	93.6	5479.74	92.67	5489.58	86.75	5529.58	81.14	5534.58	73.88
5560.58	73.18	5583.58	71.78	5604.58	71.68	5616.58	72.69	5628.58	71.48
5639.58	71.28	5650.58	72.28	5682.58	72.38	5695.58	74	5705.99	86.72
5712.51	87.78	5719.02	90.4	5732.06	97.07	5745.09	101.08	5758.12	103.72
5774.41	103.26	5797.22	100.95	5810.26	101.45	5816.77	100.72	5833.07	96.83
5849.36	96.58	5868.91	95.79	5917.78	98.36	5934.08	100.86	5953.63	106.41
5960.14	107.6	5979.69	107.06	5995.98	108.74	6018.84	108.04	6038.52	109.77
6061.48	109.68	6084.44	108.34	6097.56	108.12	6107.4	106.75	6136.93	106.9
6159.89	105.92	6173.01	105.95	6182.85	103.55	6192.69	104.85	6199.25	104.7
6205.81	103.1	6232.06	101.51	6248.46	102.04	6261.58	101.59	6277.98	99.35
6291.1	98.48	6307.5	98.48	6327.18	97.84	6340.31	96.49	6356.71	95.86
6376.39	96.75	6402.63	95.96	6415.75	96.7	6425.59	99.44	6441.99	98.34
6451.84	96.99	6474.8	100.27	6484.64	100.29	6501.04	101.26	6517.44	97.77
6527.28	97.59	6543.68	94.85	6566.65	94.5	6576.49	95.02	6609.29	94.84
6619.13	96.3	6632.25	101.04	6642.09	103.76	6651.93	104.77	6661.77	106.65
6681.46	107.17	6704.42	105.17	6733.94	104.45	6743.78	105.43	6753.62	107.99
6773.3	109.85	6783.14	110.13	6812.67	109.77	6819.23	109.24	6842.19	108.95
6858.59	109.48	6874.99	109.52	6891.39	111.44	6904.52	110.05	6917.64	106.75
6930.76	106.34	6943.88	107.48	6963.56	105.86	6976.68	106.01	6986.52	106.99
7012.77	105.38	7029.17	105.56	7039.01	106.42	7045.57	104.84	7052.13	101.34
7065.25	99.64	7084.93	99	7104.61	99.4	7117.73	98.86	7130.86	99.28
7176.78	99.09	7186.62	99.53	7199.74	99.12	7212.86	100.31	7248.95	99.15
7268.63	100.15	7281.75	99.31	7288.31	99.64	7301.43	101.52	7307.99	103.55
7317.83	104.47	7330.95	104.18	7340.79	102.71	7353.92	101.95	7399.84	101.59
7422.8	101.73	7445.76	101.4	7465.45	98.96	7485.13	98.99	7501.53	99.95
7524.49	102.22	7531.05	102.51	7547.45	101.45	7563.85	99.14	7573.7	101.22
7606.5	100.52	7619.62	100.96	7639.3	99.96	7649.14	98.82	7675.38	100.12
7685.23	99.88	7704.91	100.39	7724.59	99.58	7731.15	100.02	7747.55	99.4
7763.95	99.84	7777.07	102.05	7806.6	102.89	7829.56	102.98	7852.52	102.55
7888.6	103.34	7898.44	102.75	7931.25	102.56	7947.65	102.94	7960.77	99.05
7990.29	99.36	8003.41	101.18	8019.82	100.72	8042.78	99.48	8085.42	99.92
8118.22	100.53	8144.47	99.55	8154.31	100.28	8160.87	99.58	8200.23	99.75
8213.35	99.23	8233.04	99.2	8265.84	99.78	8275.68	99.17	8324.88	98.89
8364.25	99.76	8374.09	98.9	8426.57	99.41	8449.53	99.03	8482.34	99.43
8502.02	100.3	8518.42	99.14	8541.38	100.04	8570.9	99.56	8587.3	98.9
8633.23	98.72	8702.11	98.75	8734.92	99.08	8744.76	99.54	8774.28	99.21
8866.13	99.01	9026.86	100.12	9053.1	100.66	9072.79	107.18	9082.63	108.33
9099.03	108.81	9151.51	108.91	9167.91	109.57	9200.72	109.04	9230.24	109.6
9279.44	109.72	9305.68	109.4	9354.89	109.49	9407.37	109.03	9413.93	107.29
9427.05	106.6	9446.74	107.75	9509.06	107.78	9532.02	107.58	9568.11	105.9
9581.23	105.83	9594.35	104.99	9620.59	104.97	9630.43	104.23	9640.27	104.75
9669.79	104.07	9725.56	104.64	9738.68	104.6	9755.08	105.93	9781.32	108.74
9817.41	110.7	9837.09	112.21	9843.65	113.19	9856.77	117.94	9869.89	124.18
9879.73	125.15	9886.29	127.26	9902.69	129.53	9919.1	136.31	9938.78	138.32
9945.34	137.57	9951.9	133.17	9965.02	122.95	9974.86	116.53	9984.7	113.52
9994.54	113.1410004.38		113.7310007.66		112.3810024.06		98.2110030.62		94.94
10043.75	91.6310047.03		91.4410211.04		91.44 10217.6		93.2410227.44		99.81
10240.56	101.7610247.12		106.0410260.24		112.1410263.52		112.7910296.33		113.44
10312.73	114.4410319.29		116.310332.41		117.0310352.09		113.0810365.21		114.57
10394.74	116.3 10401.3		114.5610407.86		114.0610427.54		115.7110443.94		116.14
10473.46	115.7410480.02		114.4410489.86		109.2910502.98		107.6810509.54		107.52

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	26.24	.066	5529.58	.025	5712.51	.066	9938.78	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5414.15 5995.98 1855.62 2500.27 1953.43 .1 .3
Ineffective Flow num= 2

```
   Sta L   Sta R    Elev  Permanent
       0 5414.15  109.75       T
 5995.9810509.54  108.74       T
Left Levee      Station=       0      Elevation=  122.83
Right Levee     Station= 9938.78      Elevation=  138.32

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            117.11    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                 0.066      0.055      0.066
  W.S. Elev (ft)            117.04    Reach Len. (ft)          1855.62    2500.27    1953.43
  Crit W.S. (ft)             99.15    Flow Area (sq ft)       39244.43   15422.02   31475.23
  E.G. Slope (ft/ft)      0.000175    Area (sq ft)            60450.81   15422.02   55578.96
  Q Total (cfs)           130000.00    Flow (cfs)              43925.43   48130.66   37943.91
  Top Width (ft)           9835.39    Top Width (ft)           5395.24     581.83    3858.31
  Vel Total (ft/s)            1.51    Avg. Vel. (ft/s)            1.12       3.12       1.21
  Max Chl Dpth (ft)          45.76    Hydr. Depth (ft)            7.27      26.51       8.16
  Conv. Total (cfs)       9817738.0    Conv. (cfs)             3317295.0   3634879.0   2865565.0
  Length Wtd. (ft)         2108.61    Wetted Per. (ft)         5399.65     603.43    3870.65
  Min Ch El (ft)             71.28    Shear (lb/sq ft)            0.08       0.28       0.09
  Alpha                       1.96    Stream Power (lb/ft s)      0.09       0.87       0.11
  Frctn Loss (ft)             0.33    Cum Volume (acre-ft)    173234.20   64337.08   208859.50
  C & E Loss (ft)             0.00    Cum SA (acres)          21714.60    2682.19   24911.43


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 166.6

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  115.83    16.4  121.78   26.24  122.95   39.37  122.83   55.77  117.64
   68.89  114.38   88.57  106.68  121.38  100.53  131.22   100.1  137.78  102.18
  147.62  103.64  173.87  102.88  216.52   103.4  269.01  103.23  282.13  103.58
  344.46  103.25  383.83  103.94  423.19  103.52  475.68  103.65  492.08  104.23
  508.49  103.65   557.7  103.91   574.1  103.56  652.83  103.82  659.39  104.22
  695.48  103.36  764.37  103.66  849.67  103.64  885.75  104.03  934.96  103.67
  984.17  103.94 1007.13  103.82 1043.22  104.17 1095.71  103.75 1105.55  104.02
  1131.8  103.75 1138.36  104.15 1190.85  103.43 1197.41  103.66 1243.33   103.7
 1253.18  103.48 1292.54  103.71 1305.67  104.22 1348.31  103.86 1364.72  104.14
 1387.68  103.84 1413.92  104.23 1433.61  103.73 1453.29  104.23 1482.82  103.79
 1512.34  104.29 1522.18  103.86 1541.87  104.32 1554.99  103.73 1581.23  103.69
  1604.2  104.09 1623.88  103.76 1640.28  104.46 1663.25  103.95  1722.3  104.08
 1728.86  104.46  1755.1  104.09 1764.95   104.5 1794.47  104.23 1833.84  104.76
 1869.93  104.08 1912.57  103.94 1922.41  104.29  1958.5  103.92 1997.87  103.98
 2050.36  103.07 2086.44  103.23 2112.69  103.66 2129.09  103.06 2148.77  103.05
 2214.38  103.51 2243.91  103.05 2302.96   103.2 2322.64  103.03 2362.01  103.66
  2414.5  103.32 2444.02  103.73 2457.15  102.64 2470.27  103.85 2486.67  104.21
 2509.64  103.87    2549   103.8 2601.49  104.15 2621.17  103.87 2693.35  104.13
 2703.19  103.86 2742.55     104 2762.24  104.39  2768.8   103.9 2811.45  103.92
 2827.85   104.3 2854.09  103.97 2896.74  103.99 2909.86  104.32 2929.55  103.87
 2972.19  104.27 2998.44  103.82 3034.52  104.31 3083.73   103.9 3103.42  104.44
  3139.5  104.26 3188.71  105.06  3224.8  105.17 3244.48     106  3257.6  107.81
 3270.72  108.43 3296.97  107.76 3303.53  108.34 3339.62  108.39 3356.02  108.09
 3411.79  108.54 3447.87  108.34 3474.12  108.67 3500.36  107.93 3513.49  108.48
 3539.73  107.96 3575.82   108.6 3588.94  108.19 3621.74  108.56 3641.43  108.13
 3664.39  108.72 3700.48  108.48 3710.32  107.91 3720.16  108.36 3756.25  107.93
  3815.3  108.51 3825.14  108.15 3851.38  108.45 3861.22  108.06 3887.47   109.3
 3900.59  106.79 3907.15  106.55 3920.27   104.5 3953.08  103.05 3979.32  102.67
 4028.53  102.79 4061.34  103.26 4100.71  104.29 4185.99  105.31 4238.48   105.5
 4258.16  106.39 4281.12  108.14 4300.81  108.93 4317.21  109.08 4350.01  110.31
 4359.85  109.89 4382.82  109.98 4409.06  108.14  4418.9  106.91 4441.86  106.43
 4491.07  109.26 4563.23  107.24 4576.36  107.68 4592.76  106.76  4602.6  107.12
 4664.93  107.56 4674.77   107.4 4779.74  107.58  4802.7  107.88 4822.38  107.61
 4960.16  107.93  4986.4  107.81  5002.8   108.1 5048.73  107.85 5058.57  108.39
 5081.53  108.34  5120.9  106.08  5153.7  105.52 5206.18  105.81 5334.12  105.59
 5357.08  106.07 5416.13  105.66 5507.98   105.6 5527.66  106.04 5550.62   105.8
  5570.3  106.23 5629.35  106.13 5671.99  106.33 5763.84  106.04  5770.4   106.4
 5809.77  106.04 5829.45  106.37 5878.66   105.9 5908.18  106.41 5940.98  106.01
 5957.38  106.16 6013.15  106.07 6036.11  106.39 6065.64  106.15 6114.84  106.26
 6124.68  106.55 6144.36  106.04 6180.45  106.14 6203.41  105.77 6232.93  107.85
 6249.34  104.69  6272.3  103.37 6324.78  102.78 6351.03  102.67 6364.15   103.3
 6387.11  102.39 6410.07   102.4 6429.76  100.28  6439.6   97.33 6459.28   94.66
  6472.4    94.3 6492.08   95.04 6518.33   99.74 6544.57  106.23 6560.97  107.27
 6577.37  106.17 6593.77   106.4 6603.61  107.23 6636.42  106.68 6652.82  107.37
 6669.22  106.45 6698.74  106.05 6708.59  106.77 6718.43  106.17 6728.27  106.72
 6741.39  106.38 6774.19  106.96 6790.59   105.9 6810.28     107 6826.68  106.71
 6833.24  107.36 6843.08  106.73  6856.2  106.94  6872.6  105.88 6905.41  105.05
 6915.25  105.64 6921.81  104.71 6934.93  105.14 6948.05   106.4 6967.73   105.3
 7003.82  104.11 7112.08  103.79 7131.76  104.32 7164.57  104.52 7177.69  103.96
 7246.58  104.26 7269.54  104.82 7279.39  104.37 7348.28  104.44 7374.52  105.05
 7423.73  107.69 7443.42  107.71 7449.98   105.1 7456.54  104.52 7472.94  104.52
 7489.34  102.38 7502.47  103.77 7518.87  102.99 7531.99  104.92  7548.4   104.8
  7564.8  103.85  7597.6   97.18 7617.29   89.56 7623.85   86.22 7630.85   80.15
 7637.85   79.11 7657.85   74.61 7677.85   73.91 7687.85   74.61 7697.85   73.61
 7757.85   73.61 7777.85   74.11 7787.85   73.61 7797.85   79.11 7801.85   80.15
 7836.85   84.41 7860.05   91.37 7866.61   94.34 7879.74  103.02 7883.02  103.78
 7896.14  103.36 7912.54  102.07 7968.31  101.83 8060.17  102.03 8109.38  102.87
 8132.34  102.93 8194.67  103.62 8230.76  103.75 8237.32  104.15 8286.52     103
 8319.32   102.7 8375.09  102.76 8417.73   102.6 8453.82  102.15 8493.18  101.93
 8532.54  102.39 8594.87  101.82 8657.19   101.8 8699.84  101.61 8749.04  101.68
 8801.52  101.42 8860.57  101.38  8939.3  100.93  8972.1  101.03 8985.22   98.95
 9008.18   98.95 9024.58  100.13 9047.54   99.63 9067.23  100.75 9083.63   99.33
 9096.75   99.32 9109.87   100.3 9119.71   99.55 9139.39  100.48  9188.6  100.85
 9198.44   99.63  9237.8  100.22 9250.92  101.02 9264.04   99.69 9293.57  100.36
 9303.41   99.89 9316.53  100.35 9339.49   99.63 9362.45   99.96 9408.38  100.15
 9431.34   101.6 9447.74   98.98  9454.3   98.85 9473.98  100.37 9513.34   99.55
 9536.31  101.07 9546.15  100.27 9575.67   99.05 9592.07  100.24 9615.03   99.45
 9657.68   99.86 9674.08    99.7 9697.04  100.49 9713.44  100.38 9726.56   99.27
 9749.52  100.06 9775.77   99.63 9788.89  100.13 9811.85   99.35 9828.25  100.14
 9847.93   99.89 9857.77  100.93 9864.33    99.8 9897.14  100.51 9916.82  100.33
 9923.38   99.74 9956.18  100.51 9962.74   99.95 9998.82   99.3210018.51   99.44
10041.47   101.210077.55  101.5610087.39  100.3510110.35  101.0610133.32  100.99
10146.44  100.3610175.96   100.810205.48   98.9410225.16   98.8510244.84   99.66
10254.69   98.9710277.65   99.6910290.77   99.2710333.41   99.1810349.81  100.13
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10372.78  103.93 10385.9  105.4910392.46  105.1510405.58  101.7110412.14  103.13
10425.26  107.4810438.38  108.2810454.78  110.8410481.02  111.0410494.15  110.09
10503.99  110.2510513.83   108.310536.79  111.2910549.91  110.9710592.55  111.18
10602.39  111.9810631.92  112.4610654.88  112.3510674.56   110.610690.96  110.18
 10717.2  110.2410727.04  110.8410743.45  110.5810756.57  109.3210766.41  109.59
10818.89  109.2910835.29  110.0610854.98  109.15 10884.5  109.6210910.74  109.61
10920.58  110.2310943.54     11010963.22  109.3210986.19  109.8510999.31  108.87
11045.23  109.4211074.75   108.611084.59  107.8911104.28  108.1411143.64  107.98
 11166.6  108.5811192.84  107.5811255.17  107.3911310.93  107.0411327.33   108.6
 11350.3  108.8511376.54  107.82 11415.9  108.2511425.74  108.7311461.83   107.8
11511.03  109.6111530.71   109.211550.39   109.611560.23   110.611576.64  110.21
11602.88  110.7211612.72  111.6211622.56  114.2811635.68  120.4911645.52  123.92
11655.36  123.6111694.73  126.3311707.85   123.911734.09  123.8911740.65  118.88
11747.21  115.5711757.05  113.5511776.73  112.7811789.85  106.6111802.97   98.42
11812.82    91.411944.03   91.4111947.31   92.0211953.87  101.1411966.99  114.55
11970.27   115.811986.67  112.7511993.23  113.0112019.47  111.4612042.43  111.16
12088.36  111.82 12098.2   111.6 12114.6  112.2712196.61   112.412216.29  112.03
12226.13  108.4612239.25  107.4212255.65  107.6312278.61  114.1112291.74  116.56

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .118 7502.47    .066 7630.85    .015 7801.85    .066 7879.74    .132

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7531.99 7879.74          417.48212330.936 2564.68             .1       .3
Left Levee      Station=   26.24      Elevation=  122.95
Right Levee     Station=11694.73      Elevation=  126.33
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 7531.99  105.44 7896.1412291.74  103.36

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            116.78    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                0.118      0.045      0.132
  W.S. Elev (ft)            116.69    Reach Len. (ft)          417.48    2330.94    2564.68
  Crit W.S. (ft)             98.82    Flow Area (sq ft)       78677.05   11252.52   42613.23
  E.G. Slope (ft/ft)      0.000144    Area (sq ft)            78677.05   11252.52   42613.23
  Q Total (cfs)           130000.00     Flow (cfs)             57210.88   43740.33   29048.79
  Top Width (ft)          11568.08    Top Width (ft)           7472.41     347.75    3747.92
  Vel Total (ft/s)            0.98    Avg. Vel. (ft/s)            0.73       3.89       0.68
  Max Chl Dpth (ft)          43.08    Hydr. Depth (ft)           10.53      32.36      11.37
  Conv. Total (cfs)       10848210.0     Conv. (cfs)            4774118.0  3650032.0  2424056.0
  Length Wtd. (ft)          1512.20    Wetted Per. (ft)         7476.87     360.22    3751.28
  Min Ch El (ft)              73.61    Shear (lb/sq ft)            0.09       0.28       0.10
  Alpha                        5.63    Stream Power (lb/ft s)      0.07       1.09       0.07
  Frctn Loss (ft)              0.29    Cum Volume (acre-ft)    170270.80   63571.54   206657.80
  C & E Loss (ft)              0.01    Cum SA (acres)          21440.53    2655.51   24740.88


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 166

INPUT
Description: New Cross-Section, Bathymetric elevations translated from
             Corrected Effective XS
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  109.71   18.91  115.51   37.82  121.87   56.73  122.43   63.03  121.44
    82.2  115.15    98.6  110.51  108.45  107.01  124.85  104.38  137.97    99.2
  144.53   98.77  160.94  103.15   183.9  103.89  193.75  103.01  229.83  103.05
  246.24  103.45  265.92  103.15  308.57  103.18  328.26  103.62  364.35  103.28
  374.19  104.02  410.28  103.47  449.65  103.59  466.05  103.24  495.58  103.19
   577.6  103.42  616.97   103.7  636.65  103.55  659.62  103.98  672.74  103.19
  695.71  103.56  738.36  103.81  840.06  103.67  879.43  104.18  892.55  103.71
  938.48  103.94  981.13  103.79 1000.82  104.16 1050.03  103.72 1099.24  104.09
 1151.73  103.56 1171.42  104.26 1184.54  103.73 1237.04  103.88 1273.12  103.72
 1309.21  104.38 1348.58  104.02 1381.39  104.23 1394.51  104.69 1424.04  103.74
 1483.09  103.84  1499.5  104.35 1522.46  104.39 1548.71   104.9 1558.55  104.23
 1607.76  104.21 1617.61  104.58 1634.01     104 1650.41  104.21 1706.19  103.92
 1735.71  103.98 1768.52  104.65 1781.64  104.47 1791.49  105.29 1821.01  104.34
 1830.86  104.96 1870.22  104.13 1880.07  104.66 1903.03   104.8 1919.44   104.2
 1962.09  104.04 1971.93   104.6 2004.74  103.79 2017.86  104.17 2030.98   103.5
 2063.79  103.52 2080.19  104.02 2086.76  103.63 2106.44  103.96 2145.81  103.28
  2165.5  103.88 2188.46  103.32  2198.3  103.74 2214.71  103.19 2254.08  104.41
 2280.32  103.46 2313.13  103.79 2322.97  103.57  2336.1  104.43 2345.94  103.88
 2385.31  103.32 2424.68  103.29 2450.92  103.66 2483.73  103.38 2513.26  103.92
 2526.38  103.47 2552.63  104.52 2565.75  103.75 2585.44  103.72 2595.28  103.18
 2628.09  103.88 2634.65  103.58 2674.02  103.94 2703.55  103.41 2729.79  103.87
 2756.04  103.91 2765.88  102.71    2779  104.15 2834.78  104.06 2841.34  104.35
 2880.71  103.75 2920.08  103.65 2952.89  104.02 3005.38  103.95 3021.78  104.21
 3041.47  103.82 3070.99   104.2 3130.05  103.91 3159.58  104.36 3205.51  104.01
 3228.47  106.13 3251.44  106.68 3294.09  106.28 3323.61  106.78 3336.74  106.45
 3379.39  106.55 3389.23  106.17 3523.74  106.43 3553.27  106.14 3579.52  106.33
 3586.08  106.79 3612.32  106.21 3641.85  106.24  3668.1  106.67 3681.22  106.33
  3753.4   106.6 3773.08  106.38 3812.45  106.53 3825.58  106.15  3855.1  106.09
 3874.79  106.99 3887.91  103.35 3904.31  103.21 3963.37  104.51 3983.05  104.63
 4042.11   105.8 4061.79   105.8 4071.63  106.57 4081.48     106 4091.32  106.43
 4114.29  106.04 4137.25  106.86 4147.09  106.09 4183.18  106.27 4209.43  106.76
 4222.55  106.12 4261.92  106.31 4317.69  106.89  4334.1  106.51 4353.78  106.86
 4376.75   108.4 4389.87  107.07 4409.55  107.62 4445.64  107.18 4478.45  107.74
 4507.98  107.41 4514.54  106.74 4540.78  106.97 4544.06  107.57 4567.03   107.2
 4599.84  107.13 4616.24  107.45 4688.42  107.21 4717.95  107.56 4829.49  107.67
  4862.3  107.32 4934.48  107.47  4947.6  107.75 5055.86  108.13 5068.99  106.21
 5088.67  105.44 5154.29  105.19 5193.66  105.45 5236.31  105.26 5246.15  105.64
 5295.36  105.17 5328.17  105.39 5397.06  105.48 5420.03  105.77 5439.71  105.25
  5475.8  105.49 5488.92  105.25 5551.26  105.57 5607.03   105.4 5695.61  105.74
 5718.58  105.54 5787.47  105.44 5869.49  105.93 5892.46   105.7 5912.14  106.14
 5921.98  105.74 6036.81  105.98 6118.83   105.7 6138.52  107.13 6161.48  106.36
 6168.04  107.48 6177.88  106.94 6194.29  108.01 6213.97  107.67 6223.81  105.73
 6233.66  106.81  6243.5  105.93  6259.9  107.47 6276.31  108.16 6299.27  108.31
 6305.83   109.4 6332.08  109.13 6351.76  109.62 6361.61  108.96 6374.73  109.21
 6391.13   107.3 6410.82  105.89 6423.94  106.06 6433.78  103.99 6450.19  103.33
 6476.43  103.44 6492.84  104.18  6515.8  103.79 6545.33  104.12 6594.54  103.82
 6614.23  104.59 6627.35   104.4 6640.47  105.73 6653.59  103.79 6683.12  103.18
 6702.81  103.59 6719.21   103.4 6752.02  103.74 6797.95  103.33 6873.41   103.7
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 6886.53  103.46 6912.77  104.14 6932.46  103.94 6948.86  104.39 6961.99  103.67
 6991.51  104.05 7001.36  105.18 7017.76  105.27 7040.72  103.88 7057.13  105.03
 7063.69     104 7076.81  103.79 7106.34  104.97 7119.46  106.12 7132.59  104.06
 7148.99  103.71 7178.52  104.16 7185.08  103.71 7234.29     104 7247.41  104.39
 7276.94  103.88 7293.34  105.26 7313.03  104.62 7342.55  105.03 7358.96  104.55
  7368.8  105.35  7385.2  104.51 7401.61  105.07 7431.14  104.78  7470.5  105.36
 7486.91  105.35 7506.59  106.44 7526.28  106.28 7545.96  106.61 7568.93  104.67
 7595.17  105.13 7634.54  104.53 7654.23  104.48 7660.79  105.38 7673.91  105.57
 7696.88   104.3 7739.53  104.13 7772.33  105.06 7792.02  103.99 7798.58  104.43
 7834.67  104.18 7851.07  104.57 7874.04  105.83 7887.16  107.34 7946.21  108.45
 7962.62  107.82 8021.67  108.74  8051.2  108.11 8093.85  108.59  8120.1  108.25
  8152.9   108.3 8182.43  107.82 8202.11  108.53  8221.8  108.13 8287.42  108.91
 8303.82  108.18 8330.07  108.33 8336.63  107.99 8395.68   108.4 8418.65  108.05
 8431.77  108.86 8451.46   107.9 8467.86  107.76 8520.35  108.14 8533.48  107.88
 8543.32  108.45 8559.72  112.22 8572.85  112.89 8589.25  112.34 8605.66  109.68
 8628.62  104.41 8661.43  103.55 8740.17  103.81 8825.47  103.62 8861.56  103.86
 8904.21  103.59 8966.55  103.81 9012.43  103.44  9061.6  103.82 9130.43  103.44
 9140.27  103.95 9169.77  111.85 9176.32  112.66 9202.55  113.16 9218.94  110.44
 9235.32  110.15 9261.55  108.82 9271.38  109.05 9281.21  108.16 9300.88  108.87
 9317.27  106.22 9330.38   106.4 9336.94  105.24 9353.32   106.6 9359.88  105.92
 9376.27  101.36  9386.1  100.47 9412.32  100.57 9425.43  100.04 9441.82   97.92
 9458.21   99.02  9474.6   98.22 9490.99   92.64 9513.93   87.55 9527.05    85.9
 9527.05   87.23 9533.61   83.89 9540.61   77.82 9547.61   76.78 9567.61   72.28
 9587.61   71.58 9597.61   72.28 9607.61   71.28 9647.61   71.28 9726.99    85.9
 9733.55   86.54 9743.38   90.48 9759.77   95.38 9772.88  100.66 9782.71  107.18
 9785.99  107.85 9795.82  106.77 9822.05   107.1 9848.27  106.89 9874.49  107.13
 9920.38  106.49 9940.04  106.68 9966.27  106.3210051.49     10610084.27  105.07
10146.55  105.2510166.21  104.87 10182.6  105.0910238.32   104.510287.49   104.8
10303.88  105.4510326.82  104.6810392.38   104.610444.82  104.28 10477.6  104.81
10487.43  104.3210526.77  103.9710543.16  104.1410575.94  103.85 10625.1  104.17
10664.44  103.8910710.32   104.110779.16  103.5610815.21  103.5610887.33  103.24
10929.94  103.3710962.71  103.1410985.66  103.6711015.16  104.9611051.21   107.7
11070.88   108.111133.16  107.7411162.66  108.0611188.88     108 11215.1  107.05
11251.16  106.9411300.33  107.3211326.55  108.81 11362.6  107.0311375.71  106.92
11388.83   108.411395.38  111.0111405.21  112.9711411.77  112.9311428.16  108.24
11447.83  107.3211474.05  107.9811519.94  108.2211555.99  109.4911578.94  108.73
11611.71     11011654.33  109.5111696.94   109.311713.32  110.2911752.66  110.57
11772.33  111.5411782.16  113.7311791.99  118.0511801.83  117.1811811.66  118.29
11847.71  118.5411896.88  117.8511916.55  111.5711932.94  101.1611942.77   97.58
 11952.6   95.3711959.16   91.8711965.71   90.52 12129.6   90.5212139.44   92.76
 12159.1  101.9812182.05  116.0712191.88  116.7612198.44  119.4712208.27  128.14
12214.83  130.9712224.66   131.612241.05  127.9912263.99  119.7412293.49  114.57
12303.33  110.4612313.16  109.3812322.99  105.39 12336.1  105.1512345.94  109.11
12352.49  110.5512385.27  112.0412401.66  111.7612421.33  110.0812444.27  109.76

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .118 8572.85    .066 9527.05    .015 9726.99    .066 9795.82    .132

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9300.88 9785.99           203.14 3680.24  4630.8             .1       .3
Left Levee      Station=   56.73      Elevation=  122.43
Right Levee     Station=11847.71      Elevation=  118.54
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    24.1 9293.17  108.72 9791.1711767.07  107.9711932.94 12159.1  101.98

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            116.48    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                 0.112      0.049      0.131
  W.S. Elev (ft)            116.33    Reach Len. (ft)           203.14    3680.24    4630.80
  Crit W.S. (ft)             99.68    Flow Area (sq ft)       69627.08   13146.17   16075.84
  E.G. Slope (ft/ft)      0.000275    Area (sq ft)            69627.08   13146.17   16075.84
  Q Total (cfs)           130000.00    Flow (cfs)              59062.40   58863.42   12074.18
  Top Width (ft)          11709.48    Top Width (ft)           9222.28     485.11    2002.09
  Vel Total (ft/s)            1.32    Avg. Vel. (ft/s)            0.85       4.48       0.75
  Max Chl Dpth (ft)          45.05    Hydr. Depth (ft)            7.55      27.10       8.03
  Conv. Total (cfs)       7845708.0    Conv. (cfs)             3564510.0  3552502.0   728696.1
  Length Wtd. (ft)         1820.26    Wetted Per. (ft)         9225.17     498.93    2005.15
  Min Ch El (ft)             71.28    Shear (lb/sq ft)            0.13       0.45       0.14
  Alpha                       5.47    Stream Power (lb/ft s)      0.11       2.02       0.10
  Frctn Loss (ft)             0.32    Cum Volume (acre-ft)    169560.10   62918.75   204930.10
  C & E Loss (ft)             0.03    Cum SA (acres)          21360.53    2633.23   24571.61


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 165

INPUT
Description: New Cross-Section, Bathymetric elevations translated from New
             Cross-Section 166
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  102.72   12.82  103.78   41.68  113.61   70.53  122.41   86.94  122.51
  119.74  112.99  139.42  106.59  172.23   98.76  191.91   103.4  218.15  102.83
  287.04  103.12  359.21  102.92  405.14  103.12  418.26  103.65  464.19  103.07
  572.44  103.48  667.57  103.57  680.69  104.22  693.81  103.26  716.78  103.73
  841.43  103.84  890.64  104.53  920.16   103.7  995.61  103.93 1077.62  103.89
 1120.27  104.22  1215.4  103.88 1267.89  104.45 1277.73  104.92 1307.25  104.12
 1320.37  105.05 1363.02  104.27 1408.94  104.66 1441.75  104.03 1461.43  104.55
 1474.55  103.99  1500.8  104.56  1533.6  104.05 1559.84  104.85 1576.24  104.45
 1641.85   104.3 1661.54  105.03 1677.94  104.34 1727.14  104.29 1812.43  104.87
 1861.64  104.41 1943.65  104.17 1960.05  104.75 1992.86  104.24  2019.1  104.46
 2065.03  103.77 2078.15  104.21 2133.92  103.69  2153.6  104.29 2186.41  103.49
 2212.65  103.91 2261.86  103.97 2330.75  103.39  2406.2  104.38 2465.25  103.84
 2471.81  103.41 2534.14  103.73 2543.98  105.09 2570.23  103.52 2685.05   103.6
 2714.57  104.03 2783.46  104.11  2793.3  103.65 2816.27  104.51 2835.95   103.5
 2855.63  103.39 2885.16  104.29 2901.56  103.63 2944.21  103.36 2957.33  103.89
  2996.7  103.72 3006.54  104.56 3052.46  104.54 3078.71  106.83 3088.55  106.36
  3131.2  106.29 3167.28  106.93 3183.69  106.44 3236.17  106.12 3268.98  106.68
 3305.07  106.01 3364.11  106.34 3377.24   105.9 3455.97  106.29 3482.21  105.95
 3570.79   106.3 3587.19  107.42 3600.31  106.47  3652.8  106.43 3685.61  106.92
 3767.62  106.26 3780.74  106.56 3836.51  106.06 3852.91  106.61 3879.16  106.02
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 3898.84  106.36 3908.68  102.53 3954.61  103.48 3967.73  105.39 3980.85  104.33
 3997.26  106.75  4023.5  107.91 4053.03  107.46 4079.27  105.36 4118.63  105.76
 4135.04  104.23 4154.72  105.02 4164.56  104.09  4190.8  104.34 4203.92  102.62
 4236.73  102.23 4269.53   105.2 4272.81  104.43 4302.33  105.67 4325.29  108.27
 4344.98  108.36 4361.38   105.9 4377.78  107.21 4400.74  106.25 4426.98  107.89
 4463.07  108.17 4492.59  106.25 4505.71   106.7 4541.79  106.04 4564.75  104.96
 4577.88  105.24 4604.12  104.36 4659.88  104.99 4669.72  103.19 4679.56  106.09
 4692.69  106.15 4718.93   104.6 4735.33  106.01 4748.45  103.94 4755.01   105.3
 4797.66  102.91 4820.62  102.91 4837.02  103.97 4850.14  102.44  4873.1  102.67
 4879.66  101.74  4905.9  101.58 4919.03  103.18 4964.95  103.23 4974.79  102.06
 4994.47  102.52 5004.31  106.14 5020.72  105.22 5030.56   103.1 5060.08  105.59
 5086.32   105.1    5106  100.94 5142.09  100.58 5224.09  100.93 5247.06  105.03
  5289.7  102.02 5312.66  102.97 5332.34  105.19 5352.02  105.79 5361.87  104.35
 5391.39  103.24 5427.47  103.79 5440.59  103.38  5506.2  104.72 5565.24  104.67
 5581.65   104.2 5601.33  105.61 5627.57  104.99 5663.65  107.07 5676.77  106.13
 5703.02  105.78 5716.14  104.86 5732.54  105.68 5758.78   105.5  5788.3  106.26
 5824.39  105.28 5857.19  107.67 5883.43  106.65 5896.55  104.38 5912.95  103.62
 5975.28  103.82 5991.68   103.2 6024.48  103.71 6103.21  103.55 6139.29  103.95
 6165.54  103.56 6227.86  103.72 6313.15  103.33 6401.72  103.61 6450.92  103.36
 6532.93  103.67 6562.45   104.2 6582.13   103.4 6683.82  103.31 6706.79  104.56
 6729.75   103.7  6821.6  103.51 6956.09  103.77 6988.89  104.25 7005.29  103.58
 7074.18  105.72 7113.54  103.42 7126.66  104.14 7146.34  103.52 7166.03  104.05
 7205.39  103.93 7215.23     105 7241.47  105.46  7287.4  104.29 7297.24  105.05
 7333.32  104.98    7353  103.84 7382.53  105.04 7451.41  105.56 7471.09  105.13
 7497.34  105.79 7530.14  105.44 7546.54  106.19 7582.62  104.75 7615.43  105.23
 7697.43  104.36 7730.24   105.7 7763.04  104.66 7825.37     104 7851.61  104.86
 7881.13  104.55 7910.65  105.71 7963.14  108.47  8035.3  108.73 8058.27  108.23
 8153.39  108.38 8173.08   107.9 8228.84  108.06  8235.4  108.67 8271.48  108.21
 8307.57  109.04 8323.97  108.17 8376.45  108.03  8402.7   108.5  8435.5  108.25
 8520.79  109.35 8540.47  108.45 8560.15  111.79 8592.95  113.51 8619.19  112.46
 8638.88  110.05 8655.28  106.34 8678.24  104.15 8707.76  104.42 8724.16  103.57
 8819.29  104.38 8848.81  103.84  8884.9  104.43 8943.94  103.61 9035.79  103.76
 9075.17  104.08  9121.1  103.84 9157.19  104.34 9167.03  103.99 9354.04  104.05
 9449.18  104.49 9475.43  104.32 9485.28  105.12 9537.77  104.59 9613.23  104.38
  9721.5  104.46 9977.41  104.16 10013.5  103.94   10066  104.1710098.81  104.71
10161.14   104.110187.39   104.410213.64  103.9410246.45   104.210315.34  103.75
10357.99  103.7810387.52  104.5310420.33  108.87 10443.3  104.6610456.42   105.1
10502.35  102.4310541.72  101.7510561.41  103.1410600.78  102.8310633.59  103.96
10653.27  101.6610689.36  102.4610702.49  101.6710732.02  102.1110748.42  101.21
10784.51  102.3810814.04   104.110840.29  102.0310863.25  104.2310925.59  107.61
10941.99     10510951.84  104.8510978.08  108.3111017.46  104.56 11027.3  104.42
 11043.7   102.211063.39   102.911079.79  101.44 11096.2  103.92 11112.6   100.4
11122.44  100.0611142.13  101.3211168.38   98.9111191.34   98.2711217.59   98.59
11237.28  100.3711273.37   98.8111302.89   92.1411322.58   90.1611338.98      90
11352.11   85.2711358.67   83.3811365.67   77.3111392.67   71.7711432.67   70.77
11462.67   70.7711493.18   85.2711499.75   85.8211525.99   97.5411532.56  101.37
11555.52  108.8411568.65  108.5911598.17  106.6811617.86  106.6311660.51  105.58
11690.04  109.5311745.78  107.9711788.41  108.5611827.76  108.3411850.72  109.17
11883.51  108.0111919.58  108.17 11932.7  107.1411985.17   107.212004.84  105.95
12024.52  107.2312096.66  108.0512116.34  107.4712195.04  107.3812214.71   107.8
12231.11  107.0512309.81  107.2212329.49  103.5612336.04  101.2712365.56   97.63
12401.63    96.912418.03   95.8112447.54   95.1212513.12   94.78 12549.2   95.36
12575.43   98.5612601.67   96.2812614.78   96.8212631.18   100.412637.74  105.38
12660.69  107.8212670.53  107.2112713.16  106.8812726.28  105.2112736.11  107.37
12775.46  107.7612837.77  107.4912860.73  106.6712903.36  106.6512942.71  105.67
12952.54  106.27 12975.5  105.8313044.36  106.0413086.99   105.613119.79  106.07
 13132.9  107.07 13165.7  107.1713182.09  106.1213195.21  106.4413250.96  106.21
13273.91   104.813293.59  105.45 13323.1  104.3713382.12  105.1213395.24  106.29
13428.03  104.9913454.27  105.2713506.74  104.4413536.25  103.19 13575.6   104.6
13631.35  103.6313677.26  104.4613710.05  104.2713726.45  103.6113746.12  104.37
13755.96  103.4513775.63  105.1213795.31  104.4813854.34  107.7713933.04  108.22
13962.55  109.3414044.53  107.7914054.37  107.2814172.42  106.8714198.66     107
14218.33  108.2614228.17     11014244.57  109.18 14254.4  109.8314303.59  108.96
14329.83     10714346.22   106.514408.53  106.6914418.37  106.3514454.44  107.09
14500.35  107.3614516.74  106.9214556.09   107.214595.45  108.8314651.19  110.26
14670.87  109.3714687.26  111.0914700.38  108.1214726.62   108.114759.41  108.89
 14792.2  108.47 14808.6  111.0114831.55  110.5814851.23  111.1814897.14  111.37
14906.97  110.5414949.61  111.3814972.56   113.115002.07  113.99 15044.7  113.48
 15061.1  114.6315080.77  114.3115103.73  115.2915126.68  115.4115146.36  119.68
15185.71  119.3515205.39  118.13 15234.9  117.5715254.57  113.8615264.41  109.98
15274.25  101.9415287.37   94.8915310.32   90.2615480.84   90.26 15487.4   92.71
15510.35  107.8615516.91  109.0215536.59  108.3815579.22  109.5715585.78  110.53

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .11810541.72    .06611352.11    .01511493.18    .06611788.41    .132

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     11237.2811555.52           200.92 3697.62 2252.28             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      011237.28  100.37       T
11555.5215585.78  108.84       T
Left Levee      Station=   86.94      Elevation=  122.51
Right Levee     Station=15146.36      Elevation=  119.68
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  139.42 3078.71  106.83

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            116.13    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.110      0.047      0.123
  W.S. Elev (ft)            116.08    Reach Len. (ft)           200.92    3697.62    2252.28
  Crit W.S. (ft)            107.37    Flow Area (sq ft)       119033.60    9588.87   24401.36
  E.G. Slope (ft/ft)      0.000124    Area (sq ft)            119166.50    9588.87   33974.68
  Q Total (cfs)           130000.00     Flow (cfs)             86529.32   31724.79   11745.89
  Top Width (ft)          15020.67    Top Width (ft)          11128.18     318.24    3574.24
  Vel Total (ft/s)            0.85    Avg. Vel. (ft/s)            0.73       3.31       0.48
  Max Chl Dpth (ft)          45.31    Hydr. Depth (ft)           10.70      30.13       6.83
  Conv. Total (cfs)       11690930.0    Conv. (cfs)             7781602.0  2853018.0  1056310.0
  Length Wtd. (ft)          1482.25    Wetted Per. (ft)        11141.40     331.06    3580.65
  Min Ch El (ft)              70.77    Shear (lb/sq ft)            0.08       0.22       0.05
  Alpha                        4.22    Stream Power (lb/ft s)      0.06       0.74       0.03
  Frctn Loss (ft)              0.17    Cum Volume (acre-ft)    169119.90   61958.34   202269.70
  C & E Loss (ft)              0.01    Cum SA (acres)          21313.07    2599.29   24275.20


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION
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RIVER: Rio Grande
REACH: Lower Reach RS: 163

INPUT
Description: New Cross-Section, Bathymetric elevations translated from New
Cross-Section 165
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	99.57	22.29	103.27	38.21	105.17	63.68	113.19	86.06	121.17
92.62	122.46	105.74	122.54	112.3	121.44	145.1	110.79	161.5	106.14
171.34	105.03	187.74	98.83	194.3	98.76	207.42	103.23	279.58	103.25
289.42	102.83	315.66	103.02	371.42	102.89	489.5	102.98	587.91	103.37
623.99	103.13	660.07	103.38	699.43	104.05	709.27	103.6	758.47	104.25
797.83	103.68	807.67	104.06	886.39	104.19	945.43	104.88	968.39	104.07
978.23	99.37	984.79	98.57	994.63	100.59	1017.59	99.5	1040.55	103.77
1053.67	98.78	1063.51	99.43	1079.91	94.69	1102.87	93.58	1119.27	90.76
1125.83	88.24	1138.95	87.22	1145.51	88.35	1158.63	93.81	1171.75	93.12
1184.87	89.39	1214.39	85.37	1234.07	84.36	1247.19	82.45	1260.31	82.06
2657.59	82.06	2690.39	83.8	2700.23	84.98	2723.19	89.02	2739.59	92.73
2752.71	93.82	2769.11	94.22	2782.23	96.93	2788.78	99.75	2795.34	99.24
2828.14	106.08	2851.1	105.4	2870.78	106.03	2893.74	105.72	2916.7	106.35
2959.34	105.72	2992.14	104.48	3011.82	104.76	3024.94	104.09	3051.18	104.49
3077.42	106.72	3120.06	106.67	3136.46	106.15	3182.38	106.53	3205.34	106.09
3257.82	106.65	3287.34	105.99	3313.58	106.66	3372.62	106.04	3421.81	106.42
3480.85	106.51	3510.37	106.8	3533.33	106.35	3559.57	106.57	3703.89	103.31
3756.37	102.79	3831.81	102.78	3858.05	103.16	3890.85	102.55	3913.81	103.64
3926.93	102.17	3940.05	103.03	3972.85	101.66	4022.04	101.26	4071.24	101.53
4110.6	101.11	4163.09	101.33	4172.93	100.99	4264.77	101.22	4310.69	101.01
4386.13	101.37	4445.17	101.22	4520.62	101.68	4559.98	102.45	4589.5	104.13
4599.34	105.74	4612.46	105.31	4622.3	102.83	4655.1	103.5	4678.06	103.19
4687.9	104.41	4720.7	102.7	4799.43	103	4812.55	105.19	4828.95	104.75
4838.79	105.35	4861.75	105.36	4868.31	103.15	4901.11	102.89	4917.51	102.04
4969.99	101	5035.59	101.61	5058.55	102.48	5091.36	101.85	5117.6	102.49
5137.28	101.99	5183.2	102.81	5222.56	102.34	5242.24	103.1	5265.2	102.58
5278.32	103.41	5301.28	106.01	5320.96	104.46	5340.64	104.53	5363.6	105.89
5396.41	104.87	5432.49	105.95	5448.89	106.97	5478.41	105.76	5517.77	104.65
5527.61	105.39	5547.29	104.77	5566.97	106.2	5580.09	105.93	5596.49	107.05
5622.73	105.91	5652.25	106.22	5662.09	105.42	5685.05	105.47	5708.02	106.65
5717.86	106.02	5763.78	106.93	5796.58	106.23	5812.98	104.93	5858.9	108.4
5878.58	108.06	5898.26	106.66	5908.1	104.75	5944.18	103.38	6009.79	103.3
6068.83	103.63	6104.91	103.34	6213.15	103.42	6239.39	103.28	6282.03	103.58
6331.24	103.59	6370.6	103.29	6446.04	103.38	6462.44	103.8	6501.8	103.26
6541.16	103.56	6626.45	103.62	6675.65	103.48	6688.77	103.77	6741.25	103.38
6833.09	103.53	6898.69	103.93	6938.06	103.52	6964.3	104.23	6970.86	103.6
7016.78	103.28	7046.3	103.97	7088.94	103.51	7111.9	104.37	7141.42	103.57
7147.98	104.29	7174.22	104.41	7197.18	103.67	7243.11	104.08	7295.59	103.86
7341.51	105.53	7357.91	103.58	7371.03	105.14	7397.27	104.81	7416.95	93.19
7439.91	86.34	7456.31	82.87	7463.31	76.8	7490.31	71.26	7510.31	70.56
7520.31	71.26	7530.31	70.26	7560.31	70.26	7590.82	84.76	7633.43	84.65
7649.83	85.46	7672.79	87.75	7689.19	91.25	7695.75	93.71	7721.99	97.37
7741.67	95.93	7761.35	98.31	7800.71	98.65	7830.23	98.05	7849.91	96.6
7863.03	97.95	7882.71	97.04	7895.83	98.34	7931.91	98.01	7941.75	97.14
7958.15	97.69	7974.55	95.61	7987.67	94.95	8017.19	96.11	8043.43	94.78
8086.07	98.03	8102.47	98.55	8109.03	97.97	8194.32	98.07	8207.44	97.05
8223.84	96.82	8256.64	94.52	8276.32	94.84	8292.72	96.88	8318.97	98.55
8332.09	101.27	8345.21	101.17	8361.61	98.64	8371.45	98.31	8423.93	98.87
8460.02	97.55	8505.94	96.69	8525.62	96.64	8558.43	97.38	8568.27	98.63
8610.91	100.89	8624.03	104.29	8643.71	105.17	8669.96	100.79	8706.04	100.81
8729	100.23	8758.52	100.6	8778.2	101.57	8801.17	105.5	8814.29	105.62
8827.41	107.42	8853.65	106.04	8896.29	107.74	8929.1	107.63	8988.14	108.19
9043.91	107.96	9112.79	105.7	9181.68	106.38	9217.76	107.03	9237.44	106.53
9306.33	106.61	9339.13	106.09	9368.65	106.61	9440.82	107.38	9522.83	106.22
9542.51	105.69	9588.43	105.98	9644.2	107.02	9663.88	108.12	9670.44	107.53
9703.24	107.44	9713.08	106.88	9772.13	106.48	9877.1	107.19	9886.93	106.77
9965.61	106.78	9985.28	107.7610001.67		107.1410077.08		108.4810083.63		108.98
10100.02	108.0810145.92		107.8210152.48		107.1810260.66		106.3710303.28		106.73
10322.95	106.3810336.06		104.3510349.18		106.1410359.01		105.3110365.57		103.16
10378.68	102.1910401.63		102.05 10421.3		102.5110437.69		106.5710483.59		106.51
10519.65	106.7710545.88		107.3410568.82		106.6410585.21		108.2710614.72		109.49
10650.78	109.0210660.62		105.8410673.73		10310690.12		100.7510726.18		101.24
10752.41	103.3510765.52		98.510775.36		97.4210791.75		101.23 10844.2		100.43
10867.15	102.2610899.93		101.33 10936		10110945.83		99.110981.89		99.29
11017.95	99.0611024.51		99.6511044.18		105.4211103.19		105.9411145.81		107.12
11191.7	107.4711290.05		107.211342.51		107.5511414.63		108.5611424.46		107.99
11460.53	107.9311483.47		106.7111522.81		106.7611535.93		106.4211598.22		106.9
11634.28	10611657.23		103.811749.02		104.5611778.52		105.0111808.03		104.87
11827.7	103.9911886.71		103.511899.82		103.9511955.55		104.7511965.39		105.61
11985.06	108.7412014.56		107.21 12053.9		108.7312067.02		109.7312080.13		108.95
12103.08	108.7212119.47		107.8312148.97		108.5712165.37		107.7812191.59		107.56
12204.71	108.08 12221.1		107.6912247.32		108.2512273.55		107.69 12326		107.31
12365.34	105.79 12371.9		106.9312388.29		106.1512407.96		107.2312430.91		106.46
12444.02	107.0512503.03		107.1412516.15		107.5312529.26		106.7912535.82		101.71
12542.37	99.2212555.49		101.512562.04		101.0112571.88		103.8612591.55		98.75
12607.94	97.9612624.33		98.6512657.11		97.8912666.95		99.1412680.06		107.07
12725.96	106.812742.35		107.1 12765.3		106.2212811.19		106.6712821.03		106.34
12896.43	105.8112922.66		106.1112935.77		105.4412978.39		105.8813001.34		105.54
13037.4	105.9613053.79		105.61 13066.9		106.1513125.91		105.69 13158.7		106.43
13198.04	105.713211.15		105.9913230.82		107.413243.93		105.5413289.83		104.6
13322.61	104.9513345.56		103.5813365.23		103.7313381.62		105.0413394.74		104.12
13404.57	99.9113417.68		103.4313443.91		103.8813453.75		103.2213479.97		102.99
13489.81	103.6813512.75		103.2213522.59		103.9213561.93		103.713604.55		104.36
13620.94	103.7313634.05		104.6213643.89		103.6913653.72		104.4613686.51		103.89
13702.9	102.5113716.01		103.7813725.85		103.1113748.79		103.4213788.13		103.04
13797.97	103.8813843.87		104.2413866.81		103.0213915.99		104.7213965.16		104.26
13978.28	104.8113994.67		103.6514011.06		103.6714034.01		104.57 14050.4		104.09
14096.3	105.09 14125.8		106.9414155.31		106.1814161.86		105.04 14171.7		106.21
14207.76	105.5614220.87		106.2814266.77		106.3514286.44		107.74 14293		107.08
14315.94	107.1314325.78		102.1414335.61		106.4214345.45		107.6914355.28		107.41
14378.23	108.5314401.18		108.3914417.57		113.414424.13		114.3414450.35		114.08
14460.19	113.4914479.86		109.6414489.69		110.1214496.25		109.1314535.59		108.72

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	105.74	.12	7463.31	.025	7649.83	.12	8332.09	.085
12067.02	.06								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
7397.27 7800.71 2552.46 4131.21 2270.67 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

```
       0 7397.27  104.81       T
 7800.7114535.59   98.65       T
Left Levee      Station=  105.74      Elevation=  122.54
Right Levee     Station=14424.13      Elevation=  114.34
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  945.43 2828.14  104.8810308.6614366.04  106.56

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.95    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                0.120     0.084      0.080
  W.S. Elev (ft)            115.94    Reach Len. (ft)         2552.46    4131.21    2270.67
  Crit W.S. (ft)            102.35    Flow Area (sq ft)       78616.87   12247.13   67754.52
  E.G. Slope (ft/ft)      0.000102    Area (sq ft)            85664.21   12247.13   68791.23
  Q Total (cfs)           130000.00     Flow (cfs)             48171.86   20935.29   60892.86
  Top Width (ft)          14406.34    Top Width (ft)          7268.02     403.44    6734.88
  Vel Total (ft/s)            0.82    Avg. Vel. (ft/s)           0.61       1.71       0.90
  Max Chl Dpth (ft)          45.67    Hydr. Depth (ft)          10.82      30.36      10.06
  Conv. Total (cfs)       12841310.0    Conv. (cfs)            4758384.0  2067975.0  6014956.0
  Length Wtd. (ft)         2702.23    Wetted Per. (ft)        7274.81     415.56    6748.43
  Min Ch El (ft)             70.26    Shear (lb/sq ft)           0.07       0.19       0.06
  Alpha                       1.47    Stream Power (lb/ft s)     0.04       0.32       0.06
  Frctn Loss (ft)             0.30    Cum Volume (acre-ft)    168647.50  61031.56   199612.90
  C & E Loss (ft)             0.00    Cum SA (acres)          21270.65   2568.66   24008.68


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 162.1

INPUT
Description: Extended block obstruction, Bathymetric elevations translated from
             IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  122.38   19.67  122.78    62.3  111.77    78.7  106.85   98.37   103.8
  114.77   98.23  121.32   98.73  127.88  101.81     141  103.58  163.95  103.46
  193.46  102.59  216.42  103.05  275.44  103.07  288.56  102.27  308.23  102.59
  331.18  104.54  354.14  104.45  370.53   95.67  386.93   92.11  413.16   82.07
   609.9   82.06  639.41   84.25  662.37   90.65   672.2   95.56  678.76   97.05
  691.88   96.39  701.71   99.45  718.11   99.06  744.34  100.53  760.74   98.27
  809.92    96.8  826.32   97.06  836.16   98.44  852.55   96.64   875.5   97.42
  908.29  100.48  921.41  100.75  927.97  102.75  944.36  102.93  973.88  105.65
  983.71  104.37 1009.95  103.77 1019.78  102.54 1042.74  102.37 1068.97  104.62
 1082.08  104.24 1114.87  105.14 1154.22  104.47 1167.34  106.16 1187.01  106.87
 1213.25  104.55 1223.08  104.69 1262.43  102.85 1275.55  102.67 1291.94  103.73
 1311.62   106.2 1341.13  106.58 1373.92  104.98 1380.48  103.91 1413.27  102.65
 1442.78   103.9 1449.34   103.5 1528.03  103.57 1541.15  105.32  1564.1  104.93
 1573.94  105.97 1590.33  105.79 1596.89  106.78 1613.29  105.38 1675.59  105.43
 1688.71  105.03 1728.05  107.17 1757.57  105.88 1777.24  107.89 1796.91  106.59
  1829.7     106 1842.82  106.88 1849.38  105.98 1872.33  106.12 1882.17  106.91
 1898.56  105.33 1931.35  106.33 1954.31  104.42 1983.82  105.59 2016.61  106.12
 2069.07  105.44 2095.31  104.06 2105.14  102.86 2118.26  105.54    2174   104.7
 2193.68  105.06 2210.07  103.79 2223.19  103.84 2236.31  105.22 2262.54  105.96
 2272.37   105.2 2292.05  105.98 2305.17  105.11 2344.51  106.02 2354.35  105.16
  2393.7  106.05 2426.49  105.43 2449.44  105.89  2472.4  105.32 2511.75  105.46
 2531.42  104.98 2547.82  105.55 2557.65  104.53 2606.84  103.68 2623.23  103.77
 2656.02  105.18 2682.26  104.13 2711.77  105.82 2724.89  105.14 2741.28  105.59
 2774.07  104.02 2803.58   104.5 2859.33  104.73 2872.44  105.75 2901.95  105.68
 2934.74  104.93 2947.86  105.59 2974.09  105.39 2997.05  106.56 3029.84  104.65
 3042.95  106.34 3056.07  106.35 3085.58  109.67 3118.37  117.18 3164.28  112.76
 3220.02  111.24 3229.86   111.6 3259.37  110.45 3292.16  111.17 3305.28  112.64
 3351.18  115.72  3380.7  118.56 3400.37  119.64 3413.49  119.45 3429.88  117.69
 3482.35  118.08 3502.02  118.57 3574.16  117.98 3606.95  119.12 3623.35  118.62
 3662.69  118.54 3675.81   119.2 3692.21  118.73 3718.44  119.44 3751.23  118.48
 3806.97  118.35 3826.65  117.17 3833.21   115.2 3859.44  111.77 3872.55  108.77
 3888.95  102.58 3895.51  101.78 3931.58  101.85 3954.53  102.44  3974.2  104.29
 4000.44  101.91 4049.62  103.56 4079.13     103  4115.2  103.93  4131.6  103.01
 4141.44   98.01 4167.67   87.29 4177.51   84.32 4197.51   82.17 4238.51   72.94
 4270.51   73.82 4297.51   73.74 4313.51   74.84 4327.51   74.14 4367.51   75.94
 4379.51   75.44 4400.51   76.44 4409.51   76.13 4413.55   84.32 4423.38   86.38
  4436.5   92.57 4456.17   88.33    4466   87.78 4492.23   89.99 4498.78   91.51
 4515.17   98.12 4538.12  105.04 4544.68  105.53 4570.91   105.1 4626.64  105.83
 4652.86  104.81 4679.09  104.95 4724.99  106.25  4738.1  107.96 4754.49  108.74
 4777.44  111.31 4829.89  114.11 4843.01  108.61 4852.84  106.72 4879.07  105.99
 4905.29  105.93 4921.69  106.49 4957.75  103.66 5003.64  102.51 5069.21   101.7
 5079.05  102.35 5108.55  100.74 5138.06  100.23 5147.89  101.05    5161  100.07
 5193.79   99.84 5203.62  100.52 5233.13  100.04 5249.52  100.51 5272.47  100.07
 5311.81  100.09 5347.87   99.24 5370.82    99.4 5406.88   98.93 5423.27   99.71
 5456.05   99.21 5465.89   99.94 5492.12  100.18 5508.51   99.06 5541.29    99.7
  5554.4   98.46 5570.79   99.94 5580.63   98.96  5600.3  100.95 5613.41  103.19
 5652.75  103.16 5659.31  102.56 5715.04  101.26 5734.71   96.12 5760.94   94.54
 5793.72   94.65 5846.17   95.96  5872.4   95.81 5931.41    96.8  5947.8    98.7
 5967.47   97.22 5990.42    97.2 6000.25   96.46  6023.2   92.43 6088.77   92.49
 6105.16   95.13 6118.27    96.1 6144.51   95.21 6164.19   92.59 6206.82   93.03
  6226.5   92.76 6256.01   95.93 6265.85   99.35 6308.48   98.44 6334.72   98.77
 6360.96  102.85 6374.07  101.46 6397.03  102.42 6406.87  101.94 6436.38  105.85
 6475.74  105.45 6498.69  105.92 6528.21  105.13 6649.55  104.58 6672.51  105.74
 6698.74  106.01 6724.98  104.74 6767.61  105.15 6836.48  105.38 6895.51  104.93
 6905.35  105.64 6918.47  104.96 6964.38  105.19 6980.78   105.8 7020.13  105.89
 7059.49  105.07 7161.15  106.77 7266.09  106.79 7334.96  106.59 7357.92  107.02
 7374.32  106.61 7423.51  106.58 7439.91  107.49 7512.06  107.14 7561.25   106.3
 7574.37  106.82 7613.72  106.41 7659.63  104.81  7728.5  107.04 7754.74  103.97
 7780.97  104.44 7807.21  106.87 7836.73  106.28  7872.8   106.2 7902.31  106.65
 7954.79  108.35 7994.14  108.66 8030.21  108.18 8049.89  108.46 8059.73   107.6
 8105.64   106.7 8167.95  106.17  8256.5  106.07 8279.46  106.31 8302.42  105.86
 8312.26  106.96 8331.94  106.05 8381.13  106.39 8390.97   106.9 8430.33  106.65
 8463.12  106.97 8548.39  105.83 8561.51  105.33 8627.11  106.29 8653.34  106.41
 8669.74  107.75 8702.54  107.12  8725.5  109.74 8755.01  111.09 8787.81  110.41
 8807.49  103.01 8814.05  102.09 8843.57  100.95 8863.24  100.87 8879.64  101.63
 8905.88  101.44 8922.28  102.23  8935.4  100.28 8951.79   99.49 8964.91  101.43
 9000.99  100.75 9010.83   99.15 9046.91   99.18 9060.02  100.64 9076.42   99.12
  9096.1   99.67 9132.18    97.4  9145.3   97.26 9155.13   95.21 9168.25   97.61
 9184.65   98.59 9201.05  106.31 9224.01  106.46 9269.92  105.52  9289.6  105.84
 9378.15  105.89 9414.23  106.31 9437.19  107.29 9463.42  106.26  9515.9  106.47
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 9545.42  105.81 9558.54  106.09 9637.25  105.47 9686.44  105.69 9702.84  104.75
 9729.08  104.58  9758.6  103.55 9768.43  103.87 9794.67  102.87 9850.43  103.14
 9899.62   104.9 9916.02  106.98  9935.7  106.95 9971.77  107.8410001.29  107.95
10037.37  106.8810073.44  107.56 10096.4  107.0610132.48  107.3710148.88  108.25
10168.56  108.110204.63  106.4610237.43  106.4810253.83  104.1910266.95  105.47
10299.74  103.23 10322.7  103.3110329.26  104.6110358.78  103.6410375.17  105.12
10394.85  105.2310407.97  103.7810444.05  102.9710450.61  105.0410480.12  107.18
10489.96     107 10499.8   99.9310512.92   97.8510526.04    98.710539.16  106.11
10545.72  107.1810585.07  106.2110594.91   106.610617.87   95.0810637.55   95.07
10644.11   98.1510667.07  100.1710696.58  100.2310716.26   98.6810729.38   99.67
10739.22   98.36 10758.9   97.7910765.46  103.7410778.58  106.4810857.29   106.4
10893.36  106.09 10903.2  106.59   10936   105.810988.47  105.1111037.67  105.07
11067.19  105.5711093.42  105.1311106.54  105.7611136.06  105.8911273.81  105.17
11303.32   105.811316.44  104.9611342.68  104.6111352.52  105.3311375.48  103.89
11457.47  103.4411480.43   105.311519.78  106.31 11565.7  102.7211608.33  104.08
11631.29   103.511667.37  103.8111683.77  105.0611700.17  105.2911713.28  104.41
11732.96   104.511769.04  103.4911801.83  103.5611814.95  104.3711851.03  103.73
11870.71  103.9811900.23  102.8611946.14  104.8511992.06  104.4112015.01  103.64
12031.41  106.2912044.53  107.4512064.21  107.8212080.61   107.312106.85   108.4
12139.64  107.0912215.07  107.1812244.59  107.7612283.95  106.0112297.07  106.47
12310.19  105.5412329.86   108.512346.26  109.3812362.66  111.2612379.06  114.22
12392.18  113.95 12405.3  110.4112434.81  107.8512451.21  108.2112497.13  106.99

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066   19.67     .12 4197.51    .025 4423.38     .12 5652.75    .085
 8755.01     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4115.2 4538.12          2695.37 2260.89 1608.69             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  4115.2  103.93       T
 4538.1212497.13  105.04       T
Left Levee      Station=   19.67      Elevation=  122.78
Right Levee     Station=12379.06      Elevation=  114.22
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  331.18  973.88  104.54

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.64    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.120      0.078      0.074
  W.S. Elev (ft)            115.62    Reach Len. (ft)          2695.37    2260.89    1608.69
  Crit W.S. (ft)             96.63    Flow Area (sq ft)       35788.83   13536.61   76761.84
  E.G. Slope (ft/ft)      0.000125    Area (sq ft)            36580.54   13536.61   90865.73
  Q Total (cfs)           130000.00    Flow (cfs)              23411.47   28530.86   78057.66
  Top Width (ft)          11944.56    Top Width (ft)           3562.63     422.92    7959.01
  Vel Total (ft/s)            1.03    Avg. Vel. (ft/s)            0.65       2.11       1.02
  Max Chl Dpth (ft)          42.68    Hydr. Depth (ft)           10.05      32.01       9.64
  Conv. Total (cfs)       11642160.0    Conv. (cfs)             2096617.0   2555083.0   6990460.0
  Length Wtd. (ft)          2091.72    Wetted Per. (ft)         3572.27     437.71    7993.26
  Min Ch El (ft)              72.94    Shear (lb/sq ft)            0.08       0.24       0.07
  Alpha                        1.57    Stream Power (lb/ft s)      0.05       0.51       0.08
  Frctn Loss (ft)              0.17    Cum Volume (acre-ft)    165066.00   59808.90   195451.60
  C & E Loss (ft)              0.04    Cum SA (acres)           20953.33    2529.48   23625.71


Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 161.4

INPUT
Description: Updated on left with new survey to Station 1032.71, extended
             cross-section and block obstruction, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     458
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   95.84       8   95.75   74.98   96.61   99.97   97.17  122.96   99.54
  150.96  103.86  175.95  104.45  191.94  104.26  204.94  104.44  314.91  104.01
  449.87  104.56  483.86  104.75  517.85   105.1  548.84  104.37  580.83  103.36
  606.83  102.93  657.81   102.6  666.81  102.25   696.8  102.51  749.79  102.17
  870.75  102.11  918.74  101.77  928.74  101.94  938.73  102.74  955.73   108.7
  967.73  112.55  989.72  120.67 1006.72  121.09 1013.71  119.77 1032.71  112.08
 1085.95   96.43 1118.76   96.61 1154.85   96.41 1200.78    96.7 1279.52   97.99
 1312.33   99.19 1332.01   98.87 1354.98   99.32 1417.32    99.3 1476.37   99.93
 1499.34   99.92 1512.46   100.7 1538.71  100.45 1548.55  100.82 1558.39  102.26
  1574.8  101.09  1591.2   101.8 1627.29  100.88  1660.1  101.86 1689.63  101.26
 1719.15  101.59 1758.52   100.4 1771.65  100.31 1797.89  102.04 1824.14  101.48
 1840.55  102.31 1850.39  101.77 1863.51  102.81 1909.44  102.52 1919.29  102.94
 1935.69  101.82 1971.78  102.27 1988.18   102.8 2014.43  102.82 2027.55  103.65
 2050.52   104.2 2060.36  102.52 2086.61  101.48 2106.29  102.74 2119.42  103.06
 2165.35  101.94 2175.19  102.41 2214.56  102.44 2237.52  102.79 2286.74  102.92
  2309.7  102.27 2335.95  102.54 2349.07  102.18 2391.72  101.81 2421.25  100.33
 2434.37  100.69 2440.93  100.06 2460.62  100.69 2490.14   99.75 2503.27   99.83
 2513.11  100.62 2529.51  100.76 2542.64  102.53  2549.2  102.46 2562.32  100.72
 2572.16  100.46 2601.69  102.79 2614.81  100.33 2637.78  100.28 2657.46  101.21
 2677.15  101.24 2700.11  100.73 2709.96  101.14 2723.08  103.21 2729.64  105.75
  2736.2  105.88 2746.04  102.81 2755.89  101.87 2769.01  102.25 2798.54   105.4
 2831.35  102.29 2854.31  102.97 2877.28  104.69 2883.84  105.66 2900.24  105.81
 2910.08  102.77 2926.49  103.18  2975.7  103.17 2985.54  103.56 2998.66  102.87
 3031.47  103.08 3047.88  101.61 3070.84  102.98 3097.09  103.55 3103.65  103.09
 3136.46  104.58 3149.58  105.55 3182.39  104.61 3195.51  105.13 3211.92  103.23
 3218.48  103.57  3231.6  106.01    3248  104.95 3257.85  105.53 3270.97  104.46
 3287.37  105.42  3300.5   103.5 3320.18  103.01 3336.58  105.12 3346.43  103.68
 3359.55  103.26 3389.08    99.8 3398.92   99.85 3412.04   96.97 3444.85   93.12
 3454.69   92.84 3467.82   93.57 3480.94   91.83 3500.62   85.69 3507.18    84.9
 3523.59   84.99 3530.15   86.16  3556.4   95.77 3579.36  101.44 3595.77  100.27
 3612.17   99.73 3667.94  100.02 3684.35  102.62 3710.48  102.05 3730.09  102.46
 3749.69   95.48 3762.76   91.86 3801.97   90.83  3808.5   89.86  3818.3   85.08
 3828.11   84.22 3833.11   78.33 3841.11   73.66 3851.11   72.06 3861.11   71.66
 3881.11   72.06 3911.11   74.36 3931.11   73.66 3941.11   75.66 3971.11   76.36
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 3981.11   75.96 3991.11   76.66 4021.11   77.36 4031.11   78.33 4036.11   81.56
 4043.74   84.22 4050.28   84.41 4063.35   88.53 4076.42   94.11 4086.22   93.72
 4099.29   90.49 4112.36   89.63 4128.69   89.84 4151.56   93.95  4167.9   98.11
 4174.43  100.86 4180.97  102.14 4223.44  102.61 4236.51  103.13 4259.38  103.31
 4275.72  102.76 4324.72  102.69 4331.26  103.27 4350.86   107.1 4363.93   107.7
 4393.33  105.96  4406.4  106.24 4465.38  104.05 4498.18  103.11 4557.24  102.55
 4593.33  102.41 4613.01  102.92 4635.98  102.21 4675.34  102.32 4691.75  101.97
 4721.28  102.13 4754.08  101.57 4809.86  101.67 4852.51  101.39 4878.75  101.56
 4924.68  100.98 4980.46     101 5003.42  101.34 5059.19  101.45 5095.28  102.03
 5131.37  101.92 5137.93  101.16 5147.77   98.51 5167.46   99.37 5187.14  105.16
 5210.11   104.9 5229.79   103.3 5249.48  103.08 5275.72  101.24 5282.29  101.45
 5298.69  100.45 5311.81  101.17 5321.65  100.58 5338.06  101.19  5347.9  100.96
  5364.3  101.57 5410.24  101.84 5423.36  101.47 5429.92  102.05 5459.45  101.27
 5479.13   101.8 5492.25  103.52 5521.78  103.08 5528.34  103.91 5551.31  103.29
 5564.43  103.54 5580.83   105.3 5593.96  105.96 5607.08  108.13 5639.89  107.39
 5653.01  108.55 5666.13  106.55 5685.82   106.3 5708.78  105.28 5741.59  106.93
 5751.43  102.95 5761.28  100.41 5767.84   100.7  5790.8   98.99 5800.65   100.5
 5820.33  100.42 5836.73   102.8  5843.3  105.55 5849.86  104.94  5859.7  107.32
 5872.82  108.41 5892.51  107.39 5915.47  108.22 5935.16  107.85 5951.56  108.72
 5977.81  108.13 6020.46  107.98 6027.02  107.51 6063.11  107.84 6092.63  107.58
  6099.2  107.93 6151.69  108.16 6174.65  109.14 6197.62   109.4 6233.71  108.97
 6259.95  109.08 6269.79  108.64 6338.69  108.96 6401.03  108.46 6427.27   108.5
 6479.76  108.16 6492.89  108.35 6499.45  107.17 6519.13  107.63 6528.98   107.3
 6561.78  107.96 6630.68  107.72 6663.49  107.92 6693.01   107.8 6748.79  107.92
 6768.47  107.63 6824.24  107.46 6853.77  107.76  6883.3  107.53 6896.42  107.84
  6916.1  107.55 6935.79  107.91    6985  107.92 7034.21  107.56 7057.18  108.07
 7168.72  107.56 7221.22  107.61 7270.43  108.05  7326.2  107.48  7342.6  108.11
 7368.85  107.94 7385.25  108.33  7427.9   108.1 7434.47   109.2 7467.27  108.56
 7519.77  108.08 7546.01  108.58 7588.66  108.58 7634.59  109.06 7660.84  108.64
 7677.24  109.12 7706.77  109.29 7723.17  108.47 7742.86  108.63  7752.7  109.49
 7772.38  110.23 7815.03  109.27 7851.12  109.34 7874.09  108.26  7939.7  107.75
 7995.48  108.03  8008.6  108.57 8038.13  108.54 8051.25  107.76 8097.18  107.67
 8136.55  107.02 8205.44  107.65 8225.13   106.5 8254.65  106.39 8271.06  107.57
  8280.9  107.35 8290.74  105.93 8316.98  105.87 8326.83   105.1 8333.39  105.92
 8339.95  104.18 8359.63  103.53 8402.28  104.39  8431.8  106.57 8444.93  107.13
 8481.01  106.15 8513.82  106.85 8540.06  107.09 8582.71  105.89 8595.83  104.86
  8618.8  104.09 8645.04  104.78 8658.17  106.08 8671.29  105.24 8713.94  105.39
 8733.62  104.81 8782.83  103.92 8835.32  103.54 8868.12  102.84 8881.25  103.44
 8914.05  103.75 8933.74  102.92 8943.58  103.58 8992.79  103.64 9019.03  105.67
 9038.72  106.61 9051.84  106.65 9071.52  105.08 9084.64  105.89 9107.61   106.6
 9130.57   106.3  9160.1  106.99 9189.62  106.05 9199.46  106.31 9232.27  105.16
 9258.52  103.41 9271.64  101.91 9301.16  101.96 9327.41  101.12 9356.93  101.36
 9370.06  102.46 9386.46  101.58 9402.86  101.75  9412.7  100.53 9448.79   98.82
 9461.91   97.47 9484.88   96.21    9498   96.75 9517.68   96.08 9540.65   96.36
 9576.73   95.96 9625.94   96.23 9671.87   96.02 9704.68   96.59 9714.52   95.98
 9760.45   96.23 9793.25   98.19 9809.66   98.65 9829.34   96.95 9862.15   96.81
 9878.55    96.3 9891.67   97.32 9917.92   97.79 9927.76  100.14 9934.32  104.05
 9940.88  104.37 9947.44  102.48 9976.97  102.87 9999.93   104.710019.61  104.86
10045.86   105.810065.54  104.8810075.38  103.9410101.63  105.0810127.87  105.39
10137.72  105.13 10173.8  105.2110190.21   105.610252.54  105.4910268.94  106.29
10278.78  107.4810285.34  109.2610301.75  108.8510327.99  109.6410344.39  108.62
10364.08  108.3310396.88  107.2710410.01  105.9710436.25  105.4410446.09  105.72
10475.62  105.2810514.98  106.0810531.39  107.7110544.51  106.6510574.04  106.32
10600.28  105.6110646.21  106.2110659.33  105.6910672.45  106.1210692.14  105.66
10711.82  106.3210764.31  106.4110839.76  105.6410905.38  106.0810974.27   105.6
11000.51  106.1311023.48  107.0211056.28  106.0111092.37  107.6511108.77  105.37
11128.46  105.28 11138.3  105.7311174.38     11011180.95  113.0411187.51  114.61
11213.75  114.6711230.16  111.5111259.68  108.99

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108 3320.18    .108 3336.58    .066 3762.76    .015 4063.35    .066
 4259.38    .144

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3684.35 4259.38          2304.01 1690.29 1564.64            .1       .3
Left Levee      Station= 1006.72      Elevation=  121.09
Right Levee     Station=11213.75      Elevation=  114.67
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 3684.35  102.62  4406.411259.68  106.24


CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.43    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.40    Wt. n-Val.                 0.099      0.018     0.144
  W.S. Elev (ft)            115.03    Reach Len. (ft)          2304.01    1690.29    1564.64
  Crit W.S. (ft)             97.27    Flow Area (sq ft)       31893.62   15517.83   56042.44
  E.G. Slope (ft/ft)      0.000059    Area (sq ft)            31893.62   15517.83   56042.44
  Q Total (cfs)           130000.00    Flow (cfs)              19153.60   93110.28   17736.10
  Top Width (ft)          10234.26    Top Width (ft)           2658.94     575.03    7000.30
  Vel Total (ft/s)            1.26    Avg. Vel. (ft/s)            0.60       6.00       0.32
  Max Chl Dpth (ft)          43.37    Hydr. Depth (ft)           11.99      26.99       8.01
  Conv. Total (cfs)       16946430.0    Conv. (cfs)             2496809.0   12137590.0   2312028.0
  Length Wtd. (ft)         1814.69    Wetted Per. (ft)         2664.06     587.68    7010.56
  Min Ch El (ft)             71.66    Shear (lb/sq ft)            0.04       0.10       0.03
  Alpha                      16.37    Stream Power (lb/ft s)      0.03       0.58       0.01
  Frctn Loss (ft)             0.08    Cum Volume (acre-ft)    162947.50   59054.90   192739.00
  C & E Loss (ft)             0.06    Cum SA (acres)          20760.84    2503.58   23349.48


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 161.35

INPUT
Description: RGV-04,  Begin Wall, 1-foot wall applied with 100:1 SS,Bathymetric
             elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     450
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  112.07      49  110.22   93.99  110.29  137.99  107.98  151.99  108.87
  204.98  107.62  322.96  108.34  444.95  112.54  581.93  118.75  614.93  119.42
  638.93  119.66   639.6  119.66   639.6  118.66   649.6  118.46   740.6  118.24
   743.6  118.27   767.6  117.79   773.6  117.73   783.6  117.53   789.6  117.47
   813.9  116.43   861.9  117.78  889.89  113.11  952.89  109.61 1048.87  105.57
 1146.86   100.2 1289.85   98.39 1386.84   98.45 1404.83  100.66 1457.83  100.73
 1467.83   98.73 1570.82   97.02 2066.76   97.46 2400.73   98.06 2775.69   98.17
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 2845.69   98.58 2875.68   96.24 3123.66   96.24 3215.65   96.53  3388.7   96.12
 3418.23   90.66 3431.35   90.52 3454.31   92.82 3503.52   92.21 3779.08    92.3
  3808.6   92.46 4084.16   92.78 4090.72   92.59 4235.06   92.88 4267.87    92.7
 4372.85   93.18 4389.25   92.95  4415.5   94.92 4435.18   93.77 4563.12   94.26
 4628.74   95.04 4704.19   97.29 4763.24   96.55 4792.77    95.3 4809.17   95.92
 4868.22   94.59 5068.34   94.64 5170.04   94.97 5202.84   95.84 5225.81  100.08
 5238.93  101.24 5340.63  100.69 5347.19   97.71 5393.12   97.82 5425.92   98.68
 5475.13   98.69 5488.26  100.48 5619.48  100.76 5639.16   101.5 5763.83  101.37
 5845.84  101.54 5901.61  101.08 5924.58  101.48  6072.2  101.13 6229.67  101.75
 6354.33  101.46 6400.26  101.69 6406.82  100.26 6462.59   98.66 6492.12  101.02
 6679.11  101.21 6797.21   101.6 7371.32  101.79 7509.11  102.34 7528.79  101.68
 7561.59  103.43 7653.45  103.14  7679.7  103.92 7827.32  103.62 8342.36  104.15
 8355.48  103.54 8385.01  105.61 8398.13  100.08 8407.97   93.16 8440.77   79.73
 8447.33   79.46 8617.91   79.46 8634.31   80.39 8653.99   84.69 8663.83   89.94
 8676.95   92.24 8686.79   91.47 8703.19   85.12 8719.59   83.35 8732.72   84.78
 8765.52    94.2 8804.88   96.06    8818   98.41 8850.81   95.06 8860.65   95.97
 8877.05  102.53 8903.29  100.07 8913.13  102.04 8926.25  101.65 8942.65   96.74
 8972.18   91.76 8991.86   89.79 9047.62   90.44 9060.74    91.9 9073.86   90.54
 9090.27    93.2 9109.95    89.4 9126.35   90.31 9132.91   92.74 9149.31   87.18
 9165.71   89.88 9182.11   88.34 9195.23   89.36 9221.48   88.58 9241.16   90.03
 9264.12   95.26  9283.8  102.64 9296.92  101.18 9313.32  103.02 9326.45  101.58
 9349.41  102.81 9408.45  101.98 9457.66  103.99 9477.34  102.71 9519.98  102.83
 9546.22  101.62 9585.59  103.34 9674.15   101.5 9687.28   99.24 9739.76  104.06
 9759.44  103.42  9782.4  104.29 9815.21  103.17 9831.61  104.03 9880.81  101.07
 9930.02  102.13  9998.9  102.1710021.86   101.310077.63  102.4310100.59  101.57
10130.11  102.1810146.51  101.0110208.84  101.6310284.29  100.4110343.33  101.69
 10382.7  100.9910408.94   101.510445.03  100.9410556.56  105.0710595.93  104.34
10697.62  105.7610714.02  103.9510756.67  105.3510779.63   105.310799.31  107.01
10855.08   108.310881.32  109.6310950.21  115.2210983.02  113.2311032.23  113.55
11068.31  118.1611124.08  118.88 11153.6  120.3211176.57  122.4211219.21  122.86
11252.02  119.6911265.14  119.3811304.51   115.511347.15  114.4111399.64  105.88
   11439  102.7811478.37   104.311517.73   103.211609.59   102.611639.11  101.05
11671.92  101.4711698.16  103.1911744.09  103.3711796.58  104.32 11826.1  104.01
11855.62  102.4411894.99  101.3711914.67  102.5611950.76  102.7311990.12  101.42
12059.01  101.5512081.98  100.6612124.62  102.1212173.83    10712209.91  106.07
12236.16  104.0312301.76  106.0912308.33  107.3112334.57   106.512403.46  109.34
12432.98  109.89   12515  108.2912570.76   105.912600.29  103.0712610.13  103.43
 12682.3  101.4212738.07   100.5   12784  101.3312793.84    99.112839.77   78.77
12847.77   73.6612857.77   72.0612867.77   71.6612887.77   72.0612917.77   74.36
12937.77   73.6612947.77   75.6612997.77   76.6613027.77   77.3613037.77   78.33
13066.11   78.7713082.52   81.2113098.92   91.1113115.32   99.1113125.16  101.83
13180.93  102.3213217.02  101.6713249.82  102.7213282.63  100.1613440.09  100.34
13482.74  100.03 13623.8  100.3113689.41  100.19 13758.3   101.113794.38  102.66
13810.78  105.6213866.55  105.2413876.39  105.7113892.79  103.66 13909.2  105.08
13938.72  102.9414014.17  101.8914083.06  101.3714122.43  101.52 14194.6  100.88
14230.69  101.0314296.29  102.3214378.31  100.9414466.88  101.8114539.05  103.63
14558.73  105.6214575.14  105.0114607.94  106.3614617.78  105.5114673.55  105.82
14716.19  108.1614742.44  106.04 14765.4   105.414929.42  106.6114981.91  105.25
15129.53  105.2115139.38   105.615198.42   104.815293.56  105.2515405.09  104.87
15424.77  105.08 15588.8   104.115615.04  104.7315726.58  104.4915785.62  104.82
15831.55  104.2515861.08  105.48 15890.6  105.0415949.65  105.7516011.98   105.5
 16159.6  105.8916166.16  106.3216244.89  105.5416280.97  106.6916307.22  105.28
16435.17  105.8616451.57  105.5516576.26  105.6816681.26  105.4316828.92  105.92
 16884.7  105.4417075.01   106.217321.11  106.5717376.89  106.1317458.92  106.08
17491.73  107.9217534.39  105.63 17567.2  106.5517629.54  106.0817695.17  103.49
17741.11  103.6417780.48  102.2317793.61  103.0217806.73   99.1717816.57  103.25
17832.98   103.717842.82  102.2517865.79  103.7817888.76  103.0517915.01  105.04
 17934.7  102.4317954.39  102.58 17987.2  105.5118079.07  106.1318105.32  106.65
18134.86  104.9318203.76  105.4118233.29  104.6618252.98  106.1518282.51  104.97
18328.45  105.3918364.54  107.1718397.36  105.9218443.29  105.6518522.04  106.59
18558.14  105.8718590.95   106.218600.79  107.59 18617.2  102.7518640.17  106.51
18695.95  106.2818718.92  106.9218755.01  105.8118840.32  105.8518965.01  105.11
 19037.2  106.9119096.26  106.3319158.61  106.3819204.54  107.5619260.32  107.49
19270.17  106.3119319.39  105.6219424.39  106.8219483.45  106.2219532.67  107.12
19565.48  106.2619608.14  107.44 19667.2  105.0719693.45  105.2819706.57  110.02
19732.82   109.619755.79  114.4819782.04  114.7619798.45  110.3819811.57  110.69
19913.29  108.3719972.36  107.8320001.89  108.39 20034.7  107.6120123.29  107.82
20149.54  107.2920165.95  108.0720202.04  107.4120254.54  108.4720290.64  107.86
20356.26  107.7720412.04  108.5320425.17  106.6320461.26  106.6720471.11  107.52
20579.39  106.9720602.36  107.6120697.51  107.1920730.32  107.7620766.42  106.98
20802.51  107.5720818.92  106.1920956.73  106.6121005.95  105.6921081.42  105.68
21124.07  106.6321163.45  105.2621202.82  107.2521291.42  107.2221301.26  108.06
21337.36  106.9221373.45  107.5921380.01  106.6721412.82  107.2121494.86  107.35
21514.54  106.5221583.45   106.221599.86  105.5721616.26  106.9721639.23  105.91
21649.07  107.1921668.76  105.6421695.01  105.09 21714.7  106.6921793.45     106
21842.67  106.3221852.51  107.0821888.61  106.4521983.76  107.0222055.95  106.15
22101.89   105.222164.23  105.9922242.98  105.8922311.89  106.27 22344.7  105.06
22384.07  105.0822426.73  105.8922469.39  105.97 22502.2  107.2822551.42  106.37
22610.48  107.5922685.95  107.2422708.92  110.8222725.32  107.0422790.95  106.75
22813.92  107.6122833.61   109.622859.86  110.6222866.42  112.6322879.54  121.44
22915.64  126.0522977.98  125.4723000.95   126.123037.04  124.5523056.73  125.68
23115.79  125.8523197.82  125.2823250.32  121.4223279.86  115.8723315.95  115.79
23335.64  105.0423355.32   99.9723368.45   98.0523378.29   90.3723384.86   90.22

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108   12784    .06612793.84    .01513115.32    .06613249.82    .144

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         1278413115.32           427.09  384.49  366.72             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0   12784  101.33       T
Left Levee      Station=  638.93      Elevation=  119.66
Right Levee     Station=19782.04      Elevation=  114.76
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       010556.56  105.07

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.30    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.20    Wt. n-Val.                0.108      0.017      0.140
  W.S. Elev (ft)            115.09    Reach Len. (ft)          427.09     384.49     366.72
  Crit W.S. (ft)             95.92    Flow Area (sq ft)       115193.40   11736.21   94172.36
  E.G. Slope (ft/ft)      0.000034    Area (sq ft)            115263.00   11736.21   94172.36
  Q Total (cfs)           130000.00    Flow (cfs)              42510.13   61444.85   26045.03
  Top Width (ft)          21779.94    Top Width (ft)          11626.22     331.32    9822.40
  Vel Total (ft/s)            0.59    Avg. Vel. (ft/s)            0.37       5.24       0.28
  Max Chl Dpth (ft)          43.43    Hydr. Depth (ft)            9.91      35.42       9.59
  Conv. Total (cfs)       22448390.0    Conv. (cfs)             7340647.0   10610290.0   4497455.0
  Length Wtd. (ft)          393.03    Wetted Per. (ft)        11629.28     342.65    9863.50
```

Min Ch El (ft)	71.66	Shear (lb/sq ft)	0.02	0.07	0.02	
Alpha	37.65	Stream Power (lb/ft s)	0.01	0.38	0.01	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	159055.70	58526.12	190041.20	
C & E Loss (ft)	0.00	Cum SA (acres)	20383.05	2485.99	23047.35	

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 161.3

INPUT
Description: RGV-04, End wall, 8-foot wall applied, Bathymetric elevations
translated from IBWC 2008 Cross-sections
Station Elevation Data num= 476

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	117.67	24	117.91	24.67	117.91	24.67	109.91	34.67	109.71
125.67	109.42	128.67	110.17	152.67	109.69	158.67	108.19	168.67	107.99
174.67	106.49	194.99	106.71	236.99	106.1	277.99	106.06	315.99	106.28
366.99	106.23	396.99	106.35	439.99	106.27	476.99	106.09	518.99	106.08
559.98	105.84	679.98	105.84	720.98	106.1	760.98	106.03	795.98	106.47
808.97	101.39	841.97	101.57	865.97	101.09	881.97	101.08	922.97	101.35
969.97	101.05	990.66	101.86	1007.06	101.53	1069.38	101.9	1102.19	101.46
1167.79	101.91	1184.19	101.48	1239.96	101.9	1377.73	101.65	1505.66	101.97
1525.34	101.74	1600.79	102.06	1666.39	101.85	1774.64	102.01	1882.89	101.86
1948.5	102.13	2099.39	101.89	2217.48	102.26	2233.88	102.06	2283.09	102.76
2315.89	101.59	2460.22	101.81	2670.16	101.6	2683.28	101.81	2771.85	101.69
2906.34	101.87	2978.5	101.77	3040.83	102.03	3073.63	101.82	3175.32	102.48
3349.17	102.38	3552.55	102.56	3647.68	102.43	3713.28	102.68	3729.68	102.44
3910.1	102.64	4001.95	102.4	4047.87	103.57	4060.99	102.92	4080.67	103.41
4267.65	103.25	4362.78	103.42	4553.03	103.54	4598.96	103.34	4635.04	104.18
4671.12	102.86	4680.96	103.27	4733.45	102.69	4841.7	102.95	4884.34	103.5
4956.51	103.16	4979.47	103.52	5022.11	103.12	5094.28	103.1	5153.32	103.45
5173	103.04	5235.33	103.24	5353.42	103.03	5474.79	103.25	5510.87	102.99
5533.83	103.55	5625.68	103.12	5645.36	105.9	5658.48	102.03	5668.32	100.97
5704.41	99.79	5894.66	99.68	5917.62	100.22	5934.03	99.58	5947.15	94.86
5966.83	80.99	5976.67	79.46	6150.52	79.46	6206.29	84.9	6225.97	91.3
6232.53	92.17	6252.21	91.24	6271.89	94.82	6291.57	97.2	6317.82	97.89
6340.78	97.7	6357.18	99.54	6383.42	100.54	6426.07	97.35	6465.43	98.33
6478.55	99.27	6504.79	99.16	6524.47	100.55	6576.96	102.37	6606.48	105.29
6636	105.43	6665.52	103.21	6675.37	104.43	6701.61	102.74	6718.01	99.43
6754.09	100.25	6800.02	100.25	6868.9	99.69	6908.26	99.77	6950.91	100.68
6993.55	99.02	7042.76	99.42	7072.28	101.88	7098.52	103.34	7134.6	104.51
7167.41	104.98	7213.33	104.59	7285.5	104.88	7311.74	102.88	7351.1	103.04
7370.78	102.41	7400.3	104	7423.27	103.46	7456.07	104.26	7505.28	103.27
7554.48	103.84	7574.16	101.82	7590.57	101.66	7623.37	104.75	7682.42	104.06
7688.98	104.73	7721.78	105.11	7751.31	104.18	7800.51	103.89	7813.64	104.22
7853	103.81	7862.84	104.38	7915.33	105.51	7954.69	105.55	7994.06	106.58
8013.74	105.89	8039.99	107.13	8092.47	107.69	8099.03	106.99	8135.12	107.13
8187.61	108.94	8243.37	110.42	8269.61	111.7	8286.01	113.77	8345.06	118.1
8368.02	117.6	8381.14	116.5	8430.35	116.25	8472.99	113.52	8515.63	106.9
8555	103.91	8594.36	102.48	8610.76	102.77	8640.28	101.88	8679.65	102.75
8725.57	101.34	8755.09	101.65	8778.05	101.18	8801.02	101.7	8830.54	100.9
8856.78	101.4	8922.39	100.42	8945.35	101.44	8974.87	105	9017.51	106.69
9092.96	105.9	9119.2	106.05	9145.45	107.05	9184.81	107.32	9243.85	106.95
9276.66	108.39	9316.02	108.47	9368.5	109.38	9443.95	109.09	9539.08	108.1
9558.76	101.79	9578.44	103.29	9588.28	106.9	9601.4	109.28	9667.01	109.58
9673.57	110.18	9709.65	108.27	9745.74	107.92	9758.86	105.38	9771.98	106.45
9811.34	104.34	9824.46	105.01	9834.3	103.43	9860.54	93.7	9873.67	91.2
9880.23	87.41	9899.91	78.92	9903.19	78.71	9916.19	73.66	9926.19	72.06
9936.19	71.66	9956.19	72.06	9986.19	74.3610006.19		73.6610016.19		75.66
10066.19	76.6610096.19		77.3610106.19		78.3310132.81		78.6810162.33		88.93
10168.89	92.7710178.73		101.5710195.13		100.8610247.62		100.4810306.66		101.5
10336.18	101.3510346.03		100.4710362.43		101.5810368.99		103.6810388.67		113.62
10398.51	114.7710405.07		110.3710411.63		108.8110470.68		106.110493.64		104.01
10510.04	104.1510562.52		103.1710595.33		102.9410680.61		101.6610739.66		101.59
10749.5	101.2610805.26		101.2810870.87		100.6310880.71		100.24 11015.2		100.18
11038.16	100.7211090.65		100.1711103.77		100.5411192.34		100.1511244.82		101.87
11261.22	105.32 11280.9		106.3111290.74		108.4111307.15		108.9811323.55		108.38
11382.59	108.3411395.71		106.7611435.08		105.2811477.72		105.0811503.96		105.65
11520.36	107.4811543.33		106.1511549.89		108.1811559.73		106.3511572.85		106.19
11595.81	108.0311618.77		107.0711667.98		106.5211700.78		105.2711720.46		105.49
11766.38	103.1311812.31		102.2411845.11		102.5811900.88		101.25 11963.2		101.09
11992.72	101.812009.12		103.812068.17		104.6212251.86		104.2712284.67		103.94
12402.76	103.8912448.68		104.4612491.32		103.5412524.13		104.3412550.37		101.86
12556.93	100.3512589.73		99.36 12629.1		100.4612704.54		100.8612766.87		102.61
12776.71	105.6312937.44		106.3912963.68		105.8213006.33		105.7713026.01		106.21
13071.93	105.6113183.46		106.2813212.98		105.1813242.51		105.513262.19		104.73
13314.67	105.5813337.63		105.1513383.56		105.2313419.64		106.113445.88		105.26
13586.94	105.1913629.58		105.5213767.35		105.3413800.15		106.3713836.24		105.3
13852.64	105.5513964.17		105.6814062.58		105.55 14174.1		105.6114220.03		105.87
14347.96	105.814367.64		106.4214387.32		105.3214443.09		106.1614479.17		104.8
14489.01	103.6614518.53		104.7114544.78		103.7714584.14		103.8814600.54		98.14
14613.66	95.0614633.34		94.5314659.58		96.0614682.55		101.9114702.23		105.42
14725.19	107.5914751.43		105.65 14823.6		106.7414859.68		106.0814951.53		106.53
14974.49	104.5815007.29		104.9815059.78		104.4315108.98		105.1915148.35		103.72
15158.19	104.5515190.99		105.0615200.83		103.5915210.67		10515299.24		104.79
15315.64	106.2615335.32		105.1715476.37		104.8715551.82		105.3315627.27		105.38
15686.31	106.0715781.44		106.0115886.41		105.5516040.58		105.8716296.44		105.96
16306.28	106.316355.49		105.8716371.89		106.3616460.45		106.0216519.49		106.21
16598.22	105.48 16667.1		105.8816693.34		106.6216703.18		108.07 16716.3		113.74
16739.26	114.52 16749.1		111.5816775.34		108.2616811.43		107.4516837.67		108.18
16863.91	107.5716896.71		107.9616916.39		107.3116929.51		108.1316959.03		107.09
17018.08	107.217037.76		108.0717067.28		107.6117116.48		108.6617152.56		107
17185.36	106.8917201.76		107.617237.85		107.2917293.61		108.0817310.01		106.99
17336.25	106.8817355.93		107.6317411.69		106.2717424.81		106.6917474.01		106.17
17503.54	106.617578.98		105.9917687.22		106.34 17739.7		105.9517752.82		106.83
17795.47	105.8717847.95		105.9817893.87		107.117903.71		106.2417920.11		106.97
17936.51	105.517966.03		105.4917972.59		106.1518018.51		106.818100.52		106.33
18136.6	107.3218189.08		105.9718271.08		105.1718323.56		107.1218333.41		107.93
18369.49	108.6418418.69		106.3818461.33		107.0918546.62		106.2918592.54		106.41
18648.3	105.4918704.06		105.6818759.82		105.0218792.62		105.4318864.79		105.43
18913.99	106.7118933.67		106.6118956.63		105.2918995.99		105.5519018.95		105.18
19051.76	106.5919133.76		106.34 19160		105.3319245.28		106.15 19274.8		104.82
19320.73	105.1619333.85		106.0919376.49		105.319399.45		106.419428.97		106.66
19461.77	105.6719481.45		106.319520.81		106.3919543.77		105.8519612.66		106

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19619.21  106.8419668.42  108.0619707.78  106.61 19737.3  107.11 19753.7  110.77
19763.54  110.5419773.38  107.24 19802.9   106.419838.98  107.9819858.66  107.99
19875.06  109.95 19901.3  111.1719947.22  125.0519953.79  125.6820045.63  123.82
20071.87  122.8720157.15  124.2120206.36  123.48 20265.4  123.0720275.24  119.47
20294.92  118.7620340.84  114.9320367.08  115.5520386.77  105.06   20413   98.53
20429.41   90.22

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108  9834.3    .066 9860.54    .01510178.73    .06610398.51    .144

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9834.310178.73             2822    2844    2893             .1       .3
Left Levee      Station=   24.67      Elevation=  117.91
Right Levee     Station=16739.26      Elevation=  114.52
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0  9119.2  106.05

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.28    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.20    Wt. n-Val.                 0.108      0.021      0.138
  W.S. Elev (ft)            115.08    Reach Len. (ft)         2822.00    2844.00    2893.00
  Crit W.S. (ft)             95.81    Flow Area (sq ft)      84211.00   12044.18   96376.99
  E.G. Slope (ft/ft)      0.000049    Area (sq ft)           84211.00   12044.18   96376.99
  Q Total (cfs)           130000.00    Flow (cfs)            34315.91   62524.05   33160.04
  Top Width (ft)          19814.14    Top Width (ft)         9664.79     344.43    9804.92
  Vel Total (ft/s)            0.67    Avg. Vel. (ft/s)          0.41       5.19       0.34
  Max Chl Dpth (ft)          43.42    Hydr. Depth (ft)          8.71      34.97       9.83
  Conv. Total (cfs)       18590730.0    Conv. (cfs)            4907369.0   8941291.0   4742072.0
  Length Wtd. (ft)         2853.39    Wetted Per. (ft)       9674.00     356.77    9850.30
  Min Ch El (ft)             71.66    Shear (lb/sq ft)          0.03       0.10       0.03
  Alpha                      28.62    Stream Power (lb/ft s)    0.01       0.53       0.01
  Frctn Loss (ft)             0.13    Cum Volume (acre-ft)    158077.80   58421.17   189239.10
  C & E Loss (ft)             0.05    Cum SA (acres)          20278.68    2483.01   22964.73


Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 160

INPUT
Description: New Cross-Section, Updated on left with new survey to Station
             508.98, Bathymetric elevations translated from New Cross-Section
             161.3
Station Elevation Data    num=     474
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  117.61       4  117.76      22  117.82      29  117.61      30  110.74
      31   101.6      32  101.38      43  101.35      62  100.78      72  100.19
   87.99    99.4   96.99   98.59  104.99   98.06  113.99   97.09  137.99   95.15
  139.99   95.15  157.99    96.7  168.99   98.07  181.99  100.81  201.99  105.29
  216.98  105.56  223.98  105.83  247.98  105.75  305.98  105.87  342.97  105.76
  371.97  105.77  426.97   105.9  466.96  105.75  503.96  105.45  508.96  105.49
  521.58  105.84  537.98  106.68   551.1  102.55  577.34  102.26  623.27  102.53
  656.07  102.22  698.72   102.8  715.12  106.22  724.96  105.27  741.36   97.74
   751.2   95.16   767.6   94.01  780.73   92.03  846.33   92.21  866.01   93.11
  892.26   92.46  928.34   92.79  954.58    92.4  977.55   92.76 1066.12   92.54
 1092.36   93.02 1115.32   92.75 1187.49   94.22 1230.13   93.84 1292.46   93.82
 1331.83   94.12 1492.56   94.35 1522.09   94.62 1613.94   94.52 1659.86   94.98
 1705.79   94.65 1774.67   94.94 1784.51   95.35 1797.64   98.95 1823.88   97.92
 1876.36   98.75 1961.65   98.62 2027.26   98.88 2043.66  100.32 2050.22   102.3
 2092.87  102.55 2102.71  101.91 2165.04  101.77 2227.37     102 2329.06   101.7
  2440.6  102.02 2519.33  101.92 2785.04  101.83 2890.02   101.7  2909.7  102.27
 3037.64  101.95 3073.72  102.18 3142.61  102.01 3254.15  102.01 3283.67  101.46
 3306.63  102.24 3342.72  100.88 3391.93  101.24 3447.69   100.8 3487.06  101.16
 3710.13  100.87 3723.25  101.22 3772.46  100.71  3798.7  102.53 3880.71  102.23
 3962.72  102.53 4110.34  102.33 4244.83  102.56 4595.84  102.44    4668  102.74
 4727.05  102.73 4759.86  103.35 4792.66  105.08 4904.19  104.64  4920.6  105.18
 4940.28  104.67 4973.08  105.04 4992.77  104.46 5022.29   105.2 5045.25  104.55
 5074.78  104.91 5117.42  104.61 5173.19  104.99 5192.87  104.57  5222.4  105.03
 5242.08  104.47 5304.41  104.98 5333.93  104.47 5347.05  104.96 5360.17   103.1
 5383.14  101.65 5396.26  100.07  5422.5   99.84 5576.68   99.68 5688.22   99.84
  5724.3   99.66 5878.48    99.7 5894.88   99.97 5927.69  101.69 5963.77  101.15
 6085.15  101.48 6281.97  101.27 6363.98  101.49 6462.39  101.23 6573.93  101.14
 6593.61  101.45 6685.46  101.46 6724.83  101.78 6744.51  100.11 6777.31   98.99
 6852.76   99.17 6872.45   97.95 6888.85   95.46 6905.25   91.92 6915.09   90.98
  6947.9   90.12 7000.38   92.79 7020.07   96.03 7043.03   98.88 7072.55   97.57
 7088.95  100.58 7102.08  101.66  7115.2   99.97 7121.76  101.26 7141.44  100.07
  7164.4  101.76 7174.25  101.52 7197.21   98.91 7216.89   99.73 7252.98   97.64
 7262.82   93.06 7275.94   88.78  7298.9   79.44 7318.58   78.25 7341.58    71.6
 7371.58    71.6 7401.58    73.9 7421.58    73.2 7431.58    75.2 7461.58    75.9
 7471.58    75.5 7511.58    76.9 7521.58   77.87 7564.62   78.28 7574.46   80.97
 7594.14   94.16  7617.1  102.73  7633.5  106.49 7646.63  107.23 7685.99  106.99
  7718.8  108.03 7754.88  106.77 7781.12  106.42 7804.09  105.27 7869.69  104.55
 7882.82  104.97 7932.02  104.26 8014.03  104.08 8020.59  102.46 8046.84  102.65
 8082.92  101.51 8092.76  102.67 8122.29  103.91 8155.09   102.7 8197.74   102.4
 8312.55  104.42 8342.07  103.67 8358.47  104.14 8391.27  103.28 8404.39  103.63
  8437.2  102.89 8447.04  103.66 8479.84  103.38 8601.21  103.14 8614.33   102.7
 8660.25  103.29  8702.9  102.86  8735.7  103.05 8889.87  102.41 8912.84  101.98
  8968.6  101.83 9027.65  101.36 9050.61  101.54  9116.2   100.8 9230.97  100.57
  9273.6   100.3 9329.35  100.74 9345.75  101.44 9388.38  100.57 9434.29  100.97
 9483.48  100.45 9529.39    99.6 9581.86   99.92 9621.21  102.41 9647.44  104.66
 9686.79  105.66 9735.98  105.13 9745.82  104.58 9778.62  104.99 9817.97  104.33
 9857.32  104.14 9962.26  104.4310063.91  103.9310119.66   104.310168.85  103.89
10244.28  104.2110322.98  103.8410359.05  104.2210513.18  103.9110680.42  103.91
10768.96  103.7810860.78  103.9110932.93  104.22 10985.4  103.7711060.82  104.08
11218.23  103.8911241.18   104.311316.61   104.111457.62   104.311470.73  105.62
11487.13  105.8411500.25  104.4611519.92  104.1311615.02  104.3211651.09  103.81
11680.61  104.0711782.27  103.8811870.81  103.9911883.92  104.2312015.13  103.63
12077.45  103.6812106.97  104.2612129.93  103.9812179.13  104.5512188.97  104.19
12241.45  105.0512303.76   104.612323.44  102.7512333.28  103.0612343.12  105.86
12395.61  105.2812582.58  105.7312641.62  105.4212680.97  106.1212726.89  105.65
12776.09  105.6912802.33  104.8612812.17     10612835.13  104.5512913.86  105.31
12936.82  105.0313008.99  105.4713022.11  104.9213094.27  104.92 13153.3  105.49
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13169.71  105.0813215.62     10513241.86  105.4613277.94  105.0313356.66  105.23
13376.34  106.47 13399.3  105.1513491.15  105.3113576.43  105.2713710.91  105.61
13776.51   105.513819.15   105.713937.23  105.5313947.07  106.6913973.32  105.13
14015.96  105.5914055.32  103.9614081.56  103.3414097.96  104.1714117.64  102.09
 14140.6   96.0114150.44   94.9214183.24   94.7714193.08   95.49 14206.2   98.55
14219.32  104.6514258.68  106.4114314.44  106.17 14337.4   106.514363.64  106.01
14442.36   105.4   14485  106.3314521.09  106.5814547.33  105.2614622.77  105.52
14652.29  104.8114717.89  105.6114740.85  105.3414767.09   104.114813.01  104.94
14947.49  104.1515167.26  105.3215216.46  105.0815245.98  105.5615334.54  106.08
15508.38   105.7 15554.3  105.8815596.95  105.6415642.87  106.0815731.43  105.81
15806.87  106.1215892.15  105.8716003.66     10616059.43  105.8416167.68  105.16
 16213.6  105.1216259.52  105.9516275.92  106.8416292.32  112.6816308.72  114.56
16325.12  113.4216334.96  109.7116367.75   107.616397.27  107.1916449.74  107.15
16462.86  108.4716492.37  109.0716521.88  107.8116531.72   108.216554.68  107.12
16571.07  107.4616594.03  105.3816616.98  105.5716633.38  107.8116698.97  106.77
16751.44  107.9616771.11  108.8316790.79  106.8416826.86  106.6616839.98  107.12
16849.81   106.116882.61  106.1616892.45  107.0116928.52  106.9516958.03  106.21
17007.22  106.7517043.29  106.3317059.69  106.8117148.23  106.1617171.19  106.47
17207.26  106.0117256.45  107.8217276.12  108.1817308.92   107.217335.15  107.86
17348.27  105.82 17390.9  106.3317397.46  107.0617417.13  106.5717456.48  107.09
 17469.6  106.4417499.12  106.9517561.42  106.0717567.98  105.3817607.33  105.48
17627.01  106.2517653.24  105.7217689.31  105.9317708.99  107.0317722.11  106.49
17748.34  107.7417777.86  106.89 17833.6  107.4117876.23  106.5817895.91  105.17
 17928.7  106.18 17945.1  106.0417994.29  107.0918027.08  106.67 18118.9  107.02
18223.84  106.4618282.87  105.4718322.22  105.3818338.62  106.6618358.29  105.45
18417.32  105.4818443.55  105.1318459.95  106.4318486.18  105.6918522.26  105.78
18545.21  106.4118581.28  104.9518614.08  105.2118679.66  107.4718702.62  105.83
18797.72  104.9118830.51  105.0118840.35   105.718889.54  106.3818919.05  105.64
 18958.4  105.4219010.87  105.6719037.11  106.2319063.34  105.89 19069.9  105.01
19115.81  104.8819132.21  105.8119138.76  104.79   19165  105.8519220.75  105.66
 19243.7   106.319276.49   105.919289.61   106.519325.68   106.4 19355.2  107.07
19371.59  110.7519381.43  110.4219391.27  107.07 19417.5  106.2719443.74  107.52
19466.69   107.519489.65  110.21 19512.6  110.6419535.56  113.37 19545.4   121.2
19558.51  125.1719581.47  125.0319610.98  125.7119637.22  124.0819673.29  123.78
19683.13  122.01 19719.2  122.6819801.18  122.5819847.09  123.2719866.77  122.97
19883.16  121.54   19893  118.76 19909.4  116.7419948.75  115.41 19988.1  114.94
20001.22  107.3220014.34  101.1320030.73   97.6520043.85   90.2820217.65   90.22
20224.21   92.1520230.77   97.1520253.72  108.17 20273.4  108.65

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108 7252.98    .066 7318.58    .015 7564.62     .07  7633.5    .066
 10985.4    .144

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7252.98  7617.1          4690.55 4824.53 1212.75             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  7617.1 20273.4  102.73       T
Left Levee      Station=      22      Elevation=  117.82
Right Levee     Station=16308.72      Elevation=  114.56
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0  7164.4  101.76

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            115.10    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.108      0.037      0.103
  W.S. Elev (ft)            115.07    Reach Len. (ft)         4690.55    4824.53    1212.75
  Crit W.S. (ft)             94.33    Flow Area (sq ft)       91958.81   13045.98   121723.10
  E.G. Slope (ft/ft)      0.000040    Area (sq ft)            91958.81   13045.98   126268.70
  Q Total (cfs)           130000.00    Flow (cfs)              43504.28   34915.66   51580.06
  Top Width (ft)          19804.56    Top Width (ft)           7223.61     364.12   12216.83
  Vel Total (ft/s)            0.57    Avg. Vel. (ft/s)            0.47       2.68       0.42
  Max Chl Dpth (ft)          43.47    Hydr. Depth (ft)           12.73      35.83       9.96
  Conv. Total (cfs)       20584770.0    Conv. (cfs)             6888659.0   5528700.0   8167413.0
  Length Wtd. (ft)          3059.18    Wetted Per. (ft)         7238.34     374.93   12244.27
  Min Ch El (ft)              71.60    Shear (lb/sq ft)            0.03       0.09       0.02
  Alpha                        6.30    Stream Power (lb/ft s)      0.01       0.23       0.01
  Frctn Loss (ft)              0.18    Cum Volume (acre-ft)    152371.30   57602.11   181845.70
  C & E Loss (ft)              0.00    Cum SA (acres)          19731.63    2459.88   22233.45


Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 159

INPUT
Description: New Cross-Section, Bathymetric elevations translated from New
             Cross-Section 161.3
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  117.77   13.11  117.75   19.67  107.37   72.13  105.63    91.8   94.99
  108.19    92.2  118.03   96.32   137.7   94.78  167.21   93.48  206.55   93.28
  298.35   93.59  314.75   93.45  668.84    94.3  685.23   94.12  803.26   94.49
  829.49   94.37  970.47   94.83 1049.16    94.9 1072.11   95.79 1085.23   98.53
 1108.18    99.3 1118.01  101.72  1134.4  103.67 1147.52  101.68 1154.08  102.18
 1163.91  106.72  1196.7  109.88 1203.25  108.15 1213.09  102.47 1229.48  100.62
 1245.88  100.48 1255.71   92.09 1285.22   82.59 1295.06   77.69 1295.06   78.03
 1308.06   72.98 1318.06   71.38 1348.06   71.38 1378.06   73.68 1398.06   72.98
 1408.06   74.98 1438.06   75.68 1445.87   77.69 1455.71   80.27  1472.1   86.64
 1485.21   86.64 1498.33   89.84 1508.16   90.51 1527.83   96.12 1544.23   98.88
 1570.46   98.45 1593.41   97.36 1613.08   95.63 1622.91   94.07 1662.26   91.59
 1681.93   93.63  1701.6    92.3 1711.44   93.28 1727.83   92.97 1754.06   94.69
 1780.29   94.44 1809.79   95.53 1819.63   94.79 1849.14   95.29 1858.97   96.59
  1885.2   96.38 1917.99   97.57 1954.05    97.9 1967.17  100.02    1977   98.96
 2016.34  100.78  2085.2  101.25 2098.31  101.72 2173.72  102.28 2196.67  101.96
 2232.74  102.32 2275.36  102.03 2288.48  101.34 2337.66   101.3  2439.3  101.58
 2449.13  102.13 2626.18  101.25 2658.97  102.21 2681.92  101.95 2721.26  102.66
  2731.1  101.85 2836.06  102.38 2901.66  101.96 2950.86  101.92 2986.94  101.56
 3016.46  101.89  3059.1  101.08 3150.94  101.63 3180.46  102.23  3223.1  101.58
 3282.14  102.41 3357.58  101.85 3380.54  102.84 3390.38  102.18 3423.18  102.53
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 3475.66  102.58 3639.66  102.14 3646.22  102.74 3669.18  101.81 3708.54  101.98
 3718.38  101.58 3879.11  101.85 3954.55  102.23 4010.31  101.29 4049.67  101.31
 4069.35  100.82 4095.59  101.02 4111.99  102.66 4138.23  102.38 4167.75  103.14
 4197.27  105.26 4230.07  105.81 4269.44  105.47 4282.56  104.74 4315.36  105.35
 4397.36  104.99 4430.16  105.62 4453.13  105.51 4472.81  106.18 4489.21  104.27
 4610.57  104.54 4692.58  104.26 4745.06  104.56 4758.18  103.62 4790.98  104.53
 4827.06  104.02 4882.83  104.34 4945.15  103.96 5023.87  104.45 5033.71  103.88
 5082.92  104.02 5125.56   104.5 5240.36  104.01 5289.57  103.51 5358.45  103.57
 5407.65  103.92 5479.82  103.55 5506.06  105.11  5548.7  104.67 5574.94  103.53
 5732.39  103.69 5843.91  103.42 5870.16     105 5883.28  103.84 5916.08  103.82
  5929.2   99.82 5939.04   100.6    5962   99.45 5971.84   97.05 6007.92   94.74
 6053.84   95.68 6099.77   95.54 6109.61   95.06 6129.29   96.44 6145.69    96.6
 6158.81   98.67 6165.37    97.5 6191.61   99.44 6214.57  102.47 6224.41  100.24
 6253.93  103.75 6339.22  103.07  6375.3   102.1 6404.82     103 6463.87  103.12
 6496.67  101.94 6572.13  101.86 6601.65  102.23 6739.45  101.47  6782.1  101.68
 6795.22  101.16 6880.52  100.89 6929.73  101.01 6955.98  100.48 7090.49  100.41
 7133.14  100.96 7274.21   99.52 7333.26  100.24 7346.39  102.74 7362.79  102.85
 7379.19  105.04    7412  104.92 7428.41  105.99 7510.42  105.43 7526.83  104.64
 7553.07   104.5  7582.6  105.14 7618.69  105.02 7644.94  104.33 7654.78  105.21
 7661.34   99.39 7671.18   96.13 7690.87   94.43 7700.71   94.96 7717.11    93.8
 7743.36   95.27 7759.76   97.78 7782.73  103.74 7789.29  104.63 7802.41  103.85
 7815.54   104.5 7871.31  104.19 7887.71  104.59  7923.8  104.39 7959.89  104.92
 7989.42  104.91 7995.98  104.07 8107.52  104.03 8120.65  105.09 8133.77  104.38
 8160.02  104.58 8173.14  103.88 8202.67  103.66  8301.1  104.01 8333.92  103.61
 8402.82  104.29 8409.39     104 8534.07  103.97 8550.48  104.15 8609.54  103.73
 8753.92   103.7 8799.85  103.89 8872.04  103.84  8931.1  104.19 8940.95  103.85
 8973.76  104.38 9029.54  104.43 9150.95   103.9 9269.07  102.96 9321.57   103.1
 9341.26   105.1 9357.67  104.86  9387.2  102.93 9446.26  103.71  9508.6  103.24
 9541.42  103.71 9643.13  103.35 9728.42   103.9 9741.54   103.5 9810.42   104.5
 9918.67  104.57 9958.04   105.410040.04  105.2310076.12  105.5410112.21  105.22
10131.89  105.7910181.09  105.3910210.62  105.67 10279.5  105.6410289.34  105.21
10318.87  105.5710394.31  105.3710410.71  104.9910420.55  106.03 10446.8  104.23
10505.84  104.8210587.85  104.8810604.25  105.8710637.05   104.910673.13  105.41
 10696.1  105.06 10778.1  104.7910810.91  105.3610837.15  104.7610886.35     105
 10961.8  105.0410984.76  105.5611020.84  104.8411115.97  105.31 11243.9  105.27
11316.07  105.5211417.76  105.4711466.96  105.7711555.53  105.4311575.21  106.54
11585.05  105.2711601.45  104.9711627.69  105.5511670.34  104.2811690.02  103.09
 11709.7  104.08 11726.1  102.7911739.22   98.5111755.62   95.8811794.99   95.08
11804.83   96.3911821.23  104.2311831.07  106.4511850.75  105.94   11877  107.24
11896.68  105.6811945.88  105.86 11991.8  105.5812027.89  106.4612093.49  105.99
12168.94  106.9112182.06  105.58 12208.3  106.6412231.26  106.5712241.11  105.44
12270.63  105.1512303.43  105.4812326.39  104.99 12375.6  104.75   12392  105.09
12411.68  104.4412451.04  104.27 12457.6   105.212477.29  105.2412533.05  104.43
12556.01  104.6112664.26  104.1712723.31  104.3512769.23  104.8812834.83  104.88
12956.21  105.6613061.17  105.5313113.66  105.8313212.07  105.9413241.59  105.58
13251.43  106.0513313.75  105.9913369.52   106.213513.85  106.1813602.42  105.73
13651.62  105.7713707.39  105.3513736.91  105.4713815.64  105.0713884.52  105.98
 13887.8  106.46 13904.2  113.8613927.17  114.8813937.01  113.5213946.85  109.64
13959.97  107.6313992.77  106.2914035.42  106.1814114.14     10714199.43  104.79
14238.79  104.2614261.75  104.7814274.88  104.2114291.28  105.5414347.04  106.93
14376.56  107.1214488.09  106.32 14520.9  106.4414534.02  107.03 14570.1  106.42
14638.99  106.5514661.95  106.3114707.87  107.4414747.23  107.1714763.64  106.28
14776.76  106.8114825.96  105.9414862.04  106.1814891.57  105.8914917.81  106.19
14963.73     10614986.69  106.96 15019.5  107.03 15101.5   107.715134.31   106.9
15222.87  106.3115229.43  105.4715265.52  105.3415275.36  106.7815308.16  106.84
   15318  106.0515367.21  106.4315426.25  105.6715452.49  106.8915488.58  106.95
15511.54  106.2115573.86  105.0815586.98   106.115603.39  105.7915629.63  106.41
15646.03  107.4115665.71  107.5915675.55  106.7515698.51  107.5415714.92  106.88
15790.36  106.5715872.37  106.6515898.61  106.0915934.69  106.0215980.62  105.16
 16000.3  105.5416095.43  105.2716115.11  105.9116164.31  104.7916262.72  104.35
 16282.4  105.6216351.29   105.116403.78  105.8216446.44  104.9116489.09  104.93
16525.19  106.9116561.28  105.4716597.37  104.7916643.31  104.4716659.72  105.31
 16731.9  105.3916797.53  105.0116869.72  105.7116876.28  106.5516899.25  105.37
16915.65  105.8616928.78  105.0616964.87  107.0416971.44  106.4316997.69  106.96
17014.09  110.6317023.94  110.5717037.06  107.0117066.59  106.4617073.15  107.26
17112.53  108.0517128.94  109.4417155.19  110.3617174.87   113.317191.28  117.49
17207.69  123.1617230.65  124.37 17240.5  123.8417276.59   123.817286.44  122.64
17319.25  121.05 17345.5  122.0317375.03  121.8517394.72  122.4817434.09  122.52
17460.34  122.0317473.47  121.1317509.56  121.2117529.25  119.2917535.81  117.21
17552.22  116.2917575.19  116.1717614.56  114.73 17624.4  115.4317630.97  113.81
17640.81  107.75 17660.5    99.717673.62   96.6717686.75   90.2217860.65   90.22
17867.22   91.7617873.78   97.2617893.47  108.5317903.31  109.9717913.15  109.67

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108  1196.7    .066 1295.06    .015 1445.87    .066 1544.23    .144

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1245.88 1544.23         11213.4411093.096165.786             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 1544.2317913.15   98.88       T
Left Levee      Station=       0      Elevation=  117.77
Right Levee     Station=13927.17      Elevation=  114.88

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            114.92    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.107      0.045      0.144
  W.S. Elev (ft)            114.87    Reach Len. (ft)         11213.44   11093.09    6165.79
  Crit W.S. (ft)            100.41    Flow Area (sq ft)       23148.37   10112.32   140447.50
  E.G. Slope (ft/ft)      0.000100    Area (sq ft)            23148.37   10112.32   143097.00
  Q Total (cfs)           130000.00    Flow (cfs)              22702.88   34251.53   73045.60
  Top Width (ft)          13911.91    Top Width (ft)           1230.95     298.35   12382.61
  Vel Total (ft/s)            0.75    Avg. Vel. (ft/s)            0.98       3.39       0.52
  Max Chl Dpth (ft)          43.49    Hydr. Depth (ft)           18.81      33.89      11.34
  Conv. Total (cfs)       13010520.0    Conv. (cfs)             2272125.0   3427925.0   7310472.0
  Length Wtd. (ft)          9475.15    Wetted Per. (ft)         1242.85     309.01   12396.99
  Min Ch El (ft)              71.38    Shear (lb/sq ft)            0.12       0.20       0.07
  Alpha                        5.97    Stream Power (lb/ft s)      0.11       0.69       0.04
  Frctn Loss (ft)              1.13    Cum Volume (acre-ft)    146173.90   56319.65   178096.00
  C & E Loss (ft)              0.00    Cum SA (acres)          19276.43    2423.19   21891.02


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION
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RIVER: Rio Grande
REACH: Lower Reach RS: 157.2

INPUT
Description: New Cross-Section, Bathymetric elevations translated from USIBWC
XS 115.15
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	115.77	3.28	112.9	6.56	104.54	9.84	101.68	13.12	101.41
59.05	100.79	72.17	100.42	82.01	100.81	111.53	100.6	144.33	100.91
203.38	100.82	219.78	101.19	229.62	101.94	252.58	101.2	278.82	100.91
298.51	101.29	318.19	100.84	380.51	101.28	396.91	101.63	416.6	101.34
436.28	102.67	449.4	101.88	462.52	103.54	482.2	103.05	492.04	104.41
505.16	103.13	524.85	102.68	541.25	102.85	551.09	102.34	587.17	102.57
597.01	103.02	619.97	103.09	642.94	102.6	662.62	103.18	675.74	102.8
698.7	103.4	721.66	103.01	731.5	103.62	751.19	103.19	774.15	103.61
780.71	103.21	806.95	103.79	813.51	103.3	823.35	104.06	843.03	103.4
921.76	104.02	951.28	105.29	957.84	104.76	970.97	101.51	987.37	100.08
1000.49	101.87	1023.45	100.42	1033.29	98.79	1056.25	97.28	1121.86	97.15
1134.98	97.55	1151.38	97.26	1171.06	97.63	1223.55	97.4	1246.51	97.6
1298.99	97.6	1348.2	98.1	1410.52	97.71	1430.2	98	1449.89	97.73
1508.93	97.96	1525.33	98.36	1554.85	97.85	1610.62	98.12	1646.7	98.65
1672.94	98.31	1705.75	98.67	1830.4	99.23	1863.2	99.14	1896	99.79
1915.68	99.41	1961.61	99.59	1974.73	100.2	1997.69	100	2007.53	100.47
2037.06	100.92	2050.18	100.47	2079.7	101.01	2089.54	100.48	2115.78	101.04
2122.34	100.43	2148.58	99.73	2155.14	100.16	2207.63	99.28	2256.83	99.44
2273.23	99.14	2306.03	99.63	2351.96	99.12	2384.76	99.31	2453.64	98.96
2558.61	99.28	2581.57	98.92	2657.02	99.13	2686.54	98.77	2716.06	99.08
2739.02	98.81	2824.31	98.95	2876.79	98.72	2906.31	99.1	2925.99	99.64
2948.95	101.05	2971.92	100.84	2998.16	101.12	3040.8	100.87	3103.12	100.98
3112.97	101.31	3178.57	100.89	3214.65	101.02	3244.17	101.62	3293.38	99.51
3326.18	99.29	3362.26	99.68	3388.5	99.31	3401.62	99.65	3414.75	99.32
3454.11	99.19	3509.87	99.28	3578.76	99.11	3595.16	98.86	3673.88	98.94
3746.05	98.73	3755.89	98.99	3782.13	98.54	3801.81	98.83	3824.77	98.55
3854.29	98.67	3919.9	98.28	3949.42	98.55	3969.1	98.21	4044.55	98.27
4057.67	98.75	4070.79	98.25	4103.59	98.52	4123.27	98.22	4152.79	98.67
4188.88	98.36	4270.88	98.71	4293.84	99.03	4336.49	98.81	4346.33	99.34
4375.85	98.9	4395.53	99.1	4434.89	98.92	4493.94	99.4	4539.86	99.33
4585.78	99.81	4648.11	99.44	4690.75	99.73	4700.59	100.16	4720.27	99.9
4776.04	100.04	4815.4	99.91	4867.88	100.24	4910.53	99.23	4936.77	100.09
4979.41	99.53	4995.81	99.89	5018.78	98.61	5035.18	98.98	5041.74	97
5061.42	95	5077.82	94.83	5087.66	95.54	5094.22	94.78	5130.3	95.9
5136.86	96.58	5186.07	98.78	5212.31	99.73	5228.71	99.35	5251.67	97.65
5271.35	97.31	5281.2	98.19	5291.04	98.06	5304.16	95.83	5310.72	95.65
5323.84	96.81	5346.8	95.13	5373.04	94.13	5386.16	94.17	5396	92.82
5409.12	94.24	5418.97	94.62	5445.21	93.39	5458.33	93.74	5471.45	91.74
5491.13	94.02	5500.97	97.43	5517.37	96.84	5537.05	97.05	5576.42	96.81
5586.26	98.32	5596.1	98.51	5612.5	95.74	5619.06	95.64	5638.74	96.97
5648.58	96.73	5655.14	94.44	5664.98	88.96	5671.54	86.74	5687.95	85.16
5694.51	83.52	5704.35	78.69	5710.91	76.98	5717.47	76.61	5725.47	72.9
5735.47	70	5745.47	68.9	5785.47	70.9	5815.47	70.9	5835.47	71.9
5845.47	71.9	5855.24	76.62	5868.36	86.32	5881.48	94.57	5894.6	103.59
5897.88	104.29	5914.28	105.02	5940.53	105.3	5950.37	105.81	5966.77	105.21
5996.28	105.69	6029.07	105.56	6035.63	106	6061.86	105.22	6094.66	105.29
6114.33	106.12	6150.4	105.88	6222.54	106.38	6252.05	105.72	6268.45	105.95
6284.84	104.16	6297.96	104.44	6327.47	103.84	6334.03	104.72	6363.54	104.95
6379.94	104.49	6484.87	104.1	6517.66	103.58	6570.13	103.71	6599.64	103.5
6638.99	103.52	6704.57	104.31	6743.92	104.33	6750.48	104.69	6845.57	105.02
6861.97	105.31	6940.66	105.53	6973.46	105.89	7035.76	105.86	7065.27	106.17
7098.06	105.91	7114.46	105.12	7147.25	106.04	7183.32	105.78	7248.9	105.71
7291.53	105.83	7327.6	105.57	7360.39	105.71	7376.78	106.26	7386.62	105.77
7422.69	105.74	7429.25	105.49	7468.6	105.34	7507.95	104.74	7527.62	104.81
7563.69	104.44	7603.04	105.16	7629.27	105	7678.46	105.51	7694.86	105.94
7704.69	109.05	7714.53	113.23	7721.09	114.56	7734.21	114.76	7744.04	113.6
7750.6	110.63	7767	110.43	7773.56	109.63	7780.11	107.24	7786.67	106.43
7809.63	106.69	7822.74	106.35	7832.58	106.86	7875.21	106.51	7921.11	106.84
7944.07	106.13	7980.14	106.19	8009.65	107.65	8026.05	106.35	8045.72	106.92
8055.56	106.16	8091.63	107.14	8157.21	107.03	8180.16	105.96	8219.51	106.19
8258.87	105.86	8268.7	106.37	8304.78	106.04	8324.45	106.1	8334.29	106.65
8357.25	106.1	8396.6	106.26	8422.83	106.71	8435.95	107.51	8452.34	107.62
8458.9	107.07	8485.14	106.46	8501.53	106.66	8531.05	105.27	8554	105.83
8560.56	106.39	8573.68	105.93	8649.1	106.04	8652.38	106.43	8701.57	106.05
8737.64	106.2	8747.48	105.76	8783.55	105.7	8803.23	106.71	8816.35	105.96
8845.86	106.76	8865.54	106.44	8881.93	105.73	8924.56	105.25	8937.68	105.75
8954.08	105.51	8967.19	106.75	8996.71	106.48	9016.38	107.01	9032.78	106.91
9055.74	105.67	9075.41	106.26	9124.6	106.04	9137.72	105.26	9150.83	105.47
9173.79	105.18	9180.35	105.82	9219.7	106.75	9226.26	106.19	9242.66	106.31
9262.33	105.29	9298.4	105.72	9311.52	105.14	9344.31	105.64	9354.15	106.39
9370.55	106.37	9380.39	105.83	9413.18	105.99	9432.85	105.45	9439.41	105.72
9459.09	104.91	9475.49	104.86	9498.44	105.73	9514.84	105.52	9534.51	106.37
9570.58	106.48	9586.98	105.83	9600.1	106.69	9636.17	106.29	9665.68	106.83
9705.04	106.23	9718.15	106.53	9747.67	106.01	9780.46	106.4	9793.58	105.71
9816.53	105.76	9836.21	106.43	9872.28	106.15	9882.12	105.69	9905.07	105.8
9911.63	105.46	9937.87	106.1	9967.38	105.8	9973.94	105.0210010.01		104.8
10019.85	105.310062.48		104.4110111.67		104.2810144.46		104.5810180.53		105.44
10193.65	104.8910223.17		105.0510262.52		104.6110288.75		104.9510308.43		104.31
10334.66	104.88 10344.5		104.4510377.29		104.9110393.69		104.7610413.36		105.1
10426.48	104.7110449.44		104.8710492.07		106.2810537.98		105.4610577.33		105.71
10603.56	104.7310636.36		10510646.19		104.6210701.94		104.910744.57		105.54
10767.53	106.49 10803.6		106.1710836.39		107.0510849.51		106.4110872.47		106.96
10879.02	107.5210892.14		110.4510901.98		110.48 10915.1		106.7410924.93		106.54
10957.73	107.7210980.68		108.1711013.48		109.6811033.15		109.3511042.99		111.56
11059.39	111.611079.06		114.8611095.46		116.3811102.02		118.7411111.85		123.87
11121.69	123.5311131.53		121.6611147.93		120.1911170.88		119.4411180.72		117.22
11200.4	117.1211213.51		118.1911236.47		118.7111246.31		119.89 11262.7		120.68
11279.1	120.2111302.05		120.9411311.89		120.83 11374.2		121.0511400.43		120.02
11416.83	120.5811449.62		117.2311475.86		114.9911498.81		114.4911511.93		115.21
11518.49	113.911528.33		107.811541.44		101.0811551.28		99.311557.84		96.23
11564.4	91.3711570.96		90.2211744.76		90.23 11754.6		95.5611770.99		100.57
11784.11	106.8911790.67		108.4511807.07		109.6611823.46		108.5511852.98		108.28

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.102	5596.1	.066	5717.47	.015	5855.24	.066	5894.6	.078

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5596.1 5894.6 936.61 4252.55 5284.79 .1 .3
Left Levee Station= 0 Elevation= 115.77
Right Levee Station= 7734.21 Elevation= 114.76
Blocked Obstructions num= 1

Sta L	Sta R	Elev
895.01	5590.36	98.47

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	113.79	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.07	Wt. n-Val.	0.102	0.047	0.078	
W.S. Elev (ft)	113.72	Reach Len. (ft)	936.61	4252.55	5284.79	
Crit W.S. (ft)	102.89	Flow Area (sq ft)	78199.13	9635.87	15535.75	
E.G. Slope (ft/ft)	0.000144	Area (sq ft)	78199.13	9635.87	15535.75	
Q Total (cfs)	130000.00	Flow (cfs)	79288.86	35891.68	14819.46	
Top Width (ft)	7714.59	Top Width (ft)	5593.75	298.50	1822.33	
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)	1.01	3.72	0.95	
Max Chl Dpth (ft)	44.82	Hydr. Depth (ft)	13.98	32.28	8.53	
Conv. Total (cfs)	10827340.0	Conv. (cfs)	6603749.0	2989319.0	1234272.0	
Length Wtd. (ft)	2857.00	Wetted Per. (ft)	5602.89	313.41	1824.17	
Min Ch El (ft)	68.90	Shear (lb/sq ft)	0.13	0.28	0.08	
Alpha	2.88	Stream Power (lb/ft s)	0.13	1.03	0.07	
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	133129.20	53805.09	166869.00	
C & E Loss (ft)	0.03	Cum SA (acres)	18398.01	2347.20	20885.68	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 157.15

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	99.7	3.28	100.09	6.55	100.21	13.11	101.93	22.94	105.1
29.5	107.09	36.05	108.98	45.88	112.15	55.72	115.11	58.99	115.87
62.27	116.32	85.21	116.53	88.49	113.57	91.77	105.88	95.05	101.42
98.32	101.32	114.71	101.2	121.27	101.1	131.1	100.81	140.93	100.91
144.21	100.62	150.76	100.47	163.87	100.63	173.7	100.94	180.26	101.28
193.37	100.87	199.92	100.83	209.76	100.66	216.31	100.88	222.87	100.83
235.98	100.91	242.53	100.75	265.47	100.79	275.31	100.91	281.86	100.71
288.42	100.84	294.97	100.81	304.8	101.1	311.36	100.95	317.91	100.9
331.02	100.94	337.58	101.01	347.41	100.91	360.52	101.21	370.35	101.31
376.91	101.82	386.74	101.82	393.29	101.3	399.85	101.41	409.68	101.88
412.96	101.64	422.79	101.98	432.62	102.09	435.9	102.32	449.01	102.69
458.84	102.5	468.67	102.72	475.23	102.38	478.51	102.39	485.06	102.61
491.62	102.44	501.45	102.29	508	102.38	514.56	102.33	521.11	102.51
527.67	102.44	534.22	102.72	544.06	102.55	563.72	102.35	570.28	102.68
576.83	102.61	583.39	102.64	589.94	102.81	596.5	102.75	606.33	102.78
612.88	102.65	625.99	102.52	632.55	102.75	639.1	102.56	645.66	102.6
652.21	103	662.05	102.95	668.6	103.2	675.16	103.14	681.71	103.21
688.26	102.97	691.54	103.1	701.37	102.79	711.21	102.96	724.32	103.47
734.15	103.14	740.7	103.11	747.26	103.28	753.81	103.28	766.92	103.07
776.76	103.21	783.31	103.46	793.14	103.66	799.7	103.59	802.98	103.76
812.81	103.69	816.09	103.89	819.36	103.77	822.64	103.43	829.2	103.56
848.86	103.32	855.42	103.5	861.97	103.43	868.53	103.61	878.36	103.65
884.91	103.87	894.75	103.74	901.3	103.93	907.86	103.92	917.69	103.69
920.97	103.72	927.52	104.01	934.08	103.97	940.63	104.12	947.19	103.86
960.29	104.06	966.85	104.05	973.4	104.25	979.96	104.08	983.24	103.88
989.79	103.21	993.07	103.07	996.35	103.51	999.62	104.28	1006.18	104.85
1009.46	104.99	1019.29	104.6	1022.57	104	1029.12	102.18	1035.68	101.04
1042.23	98.97	1045.51	98.1	1048.79	97.68	1052.06	97.68	1055.34	97.91
1058.62	97.76	1065.17	97.2	1068.45	97.11	1075.01	97.42	1081.56	97.37
1094.67	96.89	1107.78	96.98	1114.34	96.93	1127.45	97.01	1134	96.9
1143.83	96.84	1150.39	97.25	1153.66	97.3	1166.77	97.12	1176.61	97.25
1183.16	97.21	1192.99	97.4	1196.27	97.55	1199.55	97.48	1202.83	97.17
1212.66	97.1	1219.21	97.27	1222.49	97.25	1235.6	97.41	1242.16	97.22
1251.99	97.17	1255.27	97.32	1265.1	97.46	1271.65	97.3	1281.48	97.44
1288.04	97.41	1294.59	97.51	1307.7	97.6	1320.82	97.45	1330.66	97.54
1337.22	97.52	1343.78	97.68	1353.62	98.61	1360.18	99.15	1373.3	99.55
1383.14	99.46	1389.7	99.63	1392.98	99.58	1409.38	99.05	1412.66	99.01
1415.94	99.19	1422.5	99.06	1432.34	99.23	1442.18	99.19	1448.74	99.51
1452.02	99.56	1458.58	99.25	1468.42	99.24	1478.25	99.35	1484.81	99.11
1497.93	99.12	1507.77	99.4	1514.33	99.39	1520.89	99.56	1527.45	99.45
1534.01	99.45	1547.13	99.55	1553.69	99.39	1560.25	99.43	1566.81	99.25
1576.65	99.25	1583.21	99.38	1589.77	99.34	1596.33	99.44	1602.89	99.39
1609.45	99.47	1616.01	99.35	1629.13	99.44	1642.25	99.74	1648.81	99.68
1655.37	99.5	1675.05	99.34	1678.33	99.44	1704.57	99.29	1711.12	99.31
1720.96	99.21	1730.8	99.34	1737.36	99.31	1740.64	99.19	1750.48	99.19
1757.04	99.39	1763.6	99.27	1770.16	99.3	1776.72	99.18	1796.4	99.32
1802.96	99.24	1809.52	99.28	1816.08	99.2	1822.64	99.35	1832.48	99.35
1839.04	99.25	1845.6	99.4	1855.44	99.34	1865.28	99.36	1875.12	99.22
1894.8	99.3	1904.64	99.28	1911.2	99.19	1917.76	99.31	1934.16	99.15
1950.55	99.2	1953.83	99.13	1960.39	99.19	1970.23	99.18	1986.63	98.96
1996.47	99.1	2003.03	99.11	2012.87	99.23	2019.43	99.13	2029.27	99.17
2035.83	99.08	2052.23	99.13	2058.79	99.1	2065.35	99.22	2068.63	99.1
2075.19	99.22	2085.03	99.09	2091.59	99.19	2101.43	99.22	2114.55	99.01
2130.95	99.11	2144.07	99	2150.63	99.12	2163.74	98.94	2173.58	99.02
2189.98	98.75	2206.38	98.67	2212.94	98.78	2219.5	98.75	2229.34	98.53
2242.46	98.49	2249.02	98.52	2255.58	98.4	2258.86	98.46	2268.7	98.36
2275.26	98.41	2281.82	98.24	2298.22	98.16	2308.06	98.89	2314.62	98.52
2324.46	98.07	2331.02	97.91	2340.86	98.17	2350.7	98.11	2357.26	98.48
2360.54	98.46	2367.1	98.13	2376.94	98.38	2386.78	97.95	2393.33	97.82
2409.73	97.87	2419.57	97.75	2429.41	97.73	2435.97	97.96	2442.53	97.75
2449.09	97.67	2458.93	97.74	2468.77	97.65	2475.33	97.83	2481.89	97.63
2491.73	97.66	2508.13	97.55	2514.69	97.62	2521.25	97.49	2531.09	97.49
2537.65	97.6	2540.93	97.46	2547.49	97.57	2557.33	97.6	2563.89	97.55
2570.45	97.63	2580.29	97.57	2590.13	97.87	2596.69	97.79	2603.25	97.96
2609.81	97.88	2613.09	97.71	2619.65	97.56	2622.93	97.71	2632.77	97.73
2649.16	97.64	2662.28	97.71	2675.4	97.72	2678.68	97.77	2698.36	97.71
2704.92	97.61	2714.76	97.68	2718.04	97.78	2724.6	97.64	2731.16	97.67
2737.72	97.84	2744.28	98.12	2747.56	98.14	2754.12	97.92	2757.4	98.05
2763.96	99.2	2770.52	100.02	2777.08	100.71	2780.36	100.7	2783.64	99.72
2786.92	97.73	2790.2	96	2793.48	94.82	2800.04	91.95	2803.32	90.74
2806.6	90	2809.88	89.06	2813.16	87.73	2819.72	83.87	2823	81.82
2826.28	79.03	2829.56	76.69	2832.84	76.05	2840.84	73.64	2850.84	70.74
2860.84	69.64	2900.84	71.64	2930.84	71.64	2950.84	72.64	2960.84	72.64
2970.84	72.14	2980.84	72.64	2990.84	71.64	3000.84	72.14	3020.84	72.14
3026.35	76.05	3029.63	76.07	3032.91	76.33	3036.19	77.15	3039.47	78.68
3042.75	79.46	3049.31	80.35	3052.59	80.68	3055.87	80.38	3059.15	79.46
3065.7	77.12	3068.98	76.76	3072.26	77.02	3075.53	78.12	3078.81	80.23
3082.09	81.89	3085.36	83.27	3088.64	83.64	3095.19	83.95	3101.74	84.98
3105.02	85.78	3108.3	86.87	3111.57	87.64	3114.85	88.15	3121.4	88.53

```
 3124.68   88.56 3127.96    88.8 3134.51    89.7 3137.79   89.87 3144.34   89.52
 3147.61   89.67 3154.17    91.1 3157.44   91.67    3164   92.54 3173.83   94.54
 3183.66   95.92 3186.93   96.19 3196.76   96.51 3209.87   96.55 3222.97   96.39
 3226.25   96.41  3232.8    96.7 3236.08   96.27 3242.63   95.73 3249.19   95.02
 3252.46   94.95 3262.29   95.16 3265.57   95.12 3272.12   95.37 3278.67   95.51
  3288.5   95.07 3295.06   95.02 3304.89   94.81 3311.44   94.87 3317.99   94.75
 3340.93   95.23 3363.86    95.3 3373.69   95.83 3383.52   96.02 3393.35   96.09
 3403.18   96.36 3406.46   96.72 3409.73   97.93 3413.01   98.88 3416.29   99.15
 3426.11   99.22 3435.94   99.36 3445.77   99.78 3449.05   99.52  3455.6    99.3
 3458.88    99.3 3462.16   99.79 3465.43  100.73 3468.71  102.15 3478.54  106.89
 3481.82  108.68 3488.37  110.92 3491.64  111.56 3494.92  111.61  3498.2  111.47
 3508.03  111.47  3511.3  111.08 3514.58     110 3521.13  106.64 3527.69  102.68
 3530.96  101.73 3534.24  101.43 3540.79  101.65 3547.34  101.64 3557.17  101.42

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .102 2698.36    .102  2724.6    .066 2829.56    .015 3075.53    .066
 3196.76    .078

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      2777.08 3183.66          2369.53    2114 2067.51             .1       .3
Left Levee      Station=   85.21      Elevation=  116.53
Right Levee     Station= 3494.92      Elevation=  111.61
Blocked Obstructions     num=       1
   Sta L    Sta R    Elev
       0 2777.08  100.71

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            113.21    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.39    Wt. n-Val.                 0.101      0.040      0.077
  W.S. Elev (ft)            112.83    Reach Len. (ft)          2369.53    2114.00    2067.51
  Crit W.S. (ft)             93.60    Flow Area (sq ft)       30925.54   13526.58    5242.20
  E.G. Slope (ft/ft)      0.000263    Area (sq ft)            30925.54   13526.58    5242.20
  Q Total (cfs)           130000.00    Flow (cfs)              37627.88   83123.02    9249.12
  Top Width (ft)           3468.36    Top Width (ft)           2688.27     406.58     373.51
  Vel Total (ft/s)            2.62    Avg. Vel. (ft/s)            1.22       6.15       1.76
  Max Chl Dpth (ft)          43.19    Hydr. Depth (ft)           11.50      33.27      14.03
  Conv. Total (cfs)       8009047.0    Conv. (cfs)              2318180.0  5121047.0   569820.1
  Length Wtd. (ft)         2152.91    Wetted Per. (ft)         2696.09     418.75     390.19
  Min Ch El (ft)             69.64    Shear (lb/sq ft)            0.19       0.53       0.22
  Alpha                       3.62    Stream Power (lb/ft s)      0.23       3.26       0.39
  Frctn Loss (ft)             0.48    Cum Volume (acre-ft)    131956.10   52674.48   165608.60
  C & E Loss (ft)             0.05    Cum SA (acres)           18308.97    2312.78   20752.48


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.93

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14       3  107.74    37.9   94.74      40   93.74    42.3   93.04
      50   90.64      70   89.74      88   90.64     120   90.14     148   68.74
     157   69.24     159    68.6     169   65.38     175   64.34     185   63.94
   188.2   63.94   192.6   63.34     195   62.74     205   62.34     225   62.34
     235   62.24     245   62.04     255   62.04     265   62.34     275   62.04
     285   62.34     295   62.24     305   62.24     315   61.64     325   60.14
     335   59.14     345   59.14     355   59.64     365   58.64     375   57.14
     385   58.84     395   60.94     405   63.64     411   65.38     418   68.14
     420   68.45     425   69.24     432   74.04     468   94.74   488.8   96.74
   493.2   97.14     510   98.74   527.9  102.74     535  108.14     541  108.14

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .14      50     .14      88    .066     159    .015     420    .066
     468     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          120     468              86      86       86             .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=     541      Elevation=  108.14

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            112.68    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.88    Wt. n-Val.                 0.100      0.033      0.140
  W.S. Elev (ft)            111.80    Reach Len. (ft)            5.00       5.00       5.00
  Crit W.S. (ft)             80.83    Flow Area (sq ft)        2119.55   15882.94     897.50
  E.G. Slope (ft/ft)      0.000190    Area (sq ft)             2119.55   15882.94     897.50
  Q Total (cfs)           125000.00    Flow (cfs)               3008.52  121328.80     662.72
  Top Width (ft)            541.00    Top Width (ft)            120.00     348.00      73.00
  Vel Total (ft/s)            6.61    Avg. Vel. (ft/s)            1.42       7.64       0.74
  Max Chl Dpth (ft)          54.66    Hydr. Depth (ft)           17.66      45.64      12.29
  Conv. Total (cfs)       9071268.0    Conv. (cfs)              218328.4  8804846.0    48093.9
  Length Wtd. (ft)            5.00    Wetted Per. (ft)           126.77     365.04      79.11
  Min Ch El (ft)             57.14    Shear (lb/sq ft)            0.20       0.52       0.13
  Alpha                       1.30    Stream Power (lb/ft s)      0.28       3.94       0.10
  Frctn Loss (ft)                     Cum Volume (acre-ft)    131057.30   51960.84   165462.90
  C & E Loss (ft)                     Cum SA (acres)           18232.59    2294.47   20741.89


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

BRIDGE


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.915

INPUT
Description: Reynosa SB
MARCH 2007 - DECK WIDTH CHANGED FROM 76 FT
56 FT (PER
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           1964 AS-BUILTS)
Distance from Upstream XS =       5
Deck/Roadway Width        =      56
Weir Coefficient          =    3.05
Upstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0  113.74   59.64       3  113.74  107.74       3  113.74  109.64
    37.1  114.54  110.44    37.1  114.54  107.74   187.4  116.04  109.24
   337.8  116.04  109.24     488  114.54  107.74     488  114.54  110.44
   521.9  113.84  109.74     535  113.84  109.74     535  113.84  108.14
     541  113.84   59.64

Upstream Bridge Cross Section Data
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14       3  107.74    37.9   94.74      40   93.74    42.3   93.04
      50   90.64      70   89.74      88   90.64     120   90.14     148   68.74
     157   69.24     159    68.6     169   65.38     175   64.34     185   63.94
   188.2   63.94   192.6   63.34     195   62.74     205   62.34     225   62.34
     235   62.24     245   62.04     255   62.04     265   62.34     275   62.04
     285   62.34     295   62.24     305   62.24     315   61.64     325   60.14
     335   59.14     345   59.14     355   59.64     365   58.64     375   57.14
     385   58.84     395   60.94     405   63.64     411   65.38     418   68.14
     420   68.45     425   69.24     432   74.04     468   94.74   488.8   96.74
   493.2   97.14     510   98.74   527.9  102.74     535  108.14     541  108.14

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .14      50     .14      88    .066     159    .015     420    .066
     468     .14

Bank Sta: Left   Right    Coeff Contr.   Expan.
          120     468            .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=     541      Elevation=  108.14

Downstream  Deck/Roadway Coordinates
    num=      13
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0  113.74   59.64       3  113.74  107.74       3  113.74  109.64
    37.1  114.54  110.44    37.1  114.54  107.74   187.4  116.04  109.24
   337.8  116.04  109.24     488  114.54  107.74     488  114.54  110.44
   521.9  113.84  109.74     535  113.84  109.74     535  113.84  108.14
     541  113.84   59.64

Downstream Bridge Cross Section Data
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14       3  107.74    37.9   94.74      40   93.74    42.3   93.04
      50   90.64      70   89.74      88   90.64     120   90.14     148   68.74
     157   69.24     159    68.6     169   65.38     175   64.34     185   63.94
   188.2   63.94   192.6   63.34     195   62.74     205   62.34     225   62.34
     235   62.24     245   62.04     255   62.04     265   62.34     275   62.04
     285   62.34     295   62.24     305   62.24     315   61.64     325   60.14
     335   59.14     345   59.14     355   59.64     365   58.64     375   57.14
     385   58.84     395   60.94     405   63.64     411   65.38     418   68.14
     420   68.45     425   69.24     432   74.04     468   94.74   488.8   96.74
   493.2   97.14     510   98.74   527.9  102.74     535  108.14     541  108.14

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      50     .06      88    .066     159    .015     420    .066
     468     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          120     468            .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=     541      Elevation=  108.14

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =   116.4
Energy head used in spillway design        =
Spillway height used in design             =
Weir crest shape                           = Broad Crested

Number of Abutments =  1

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
     510    98.8     535   108.2
Downstream     num=       2
     Sta    Elev     Sta    Elev
     510    98.8     535   108.2

Number of Piers =  4

Pier Data
Pier Station     Upstream=    37.1    Downstream=    37.1
Upstream     num=       2
    Width   Elev    Width   Elev
     4.5      55     4.5   110.5
Downstream     num=       2
    Width   Elev    Width   Elev
     4.5      55     4.5   110.5

Pier Data
Pier Station     Upstream=   187.4    Downstream=   187.4
Upstream     num=       2
    Width   Elev    Width   Elev
     4.5      55     4.5   109.3
Downstream     num=       2
    Width   Elev    Width   Elev
     4.5      55     4.5   109.3

Pier Data
Pier Station     Upstream=   337.8    Downstream=   337.8
Upstream     num=       2
    Width   Elev    Width   Elev
```

```
     4.5      55     4.5   109.3
Downstream     num=        2
    Width   Elev    Width   Elev
     4.5      55     4.5   109.3

Pier Data
Pier Station     Upstream=     488    Downstream=     488
Upstream     num=        2
    Width   Elev    Width   Elev
     4.5      55     4.5   110.5
Downstream     num=        2
    Width   Elev    Width   Elev
     4.5      55     4.5   110.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =.8006408
           Max Low Cord                =   109.6

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.9

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14       3  107.74    37.9   94.74      40   93.74    42.3   93.04
      50   90.64      70   89.74      88   90.64     120   90.14     148   68.74
     157   69.24     159    68.6     169   65.38     175   64.34     185   63.94
   188.2   63.94   192.6   63.34     195   62.74     205   62.34     225   62.34
     235   62.24     245   62.04     255   62.04     265   62.34     275   62.04
     285   62.34     295   62.24     305   62.24     315   61.64     325   60.14
     335   59.14     345   59.14     355   59.64     365   58.64     375   57.14
     385   58.84     395   60.94     405   63.64     411   65.38     418   68.14
     420   68.45     425   69.24     432   74.04     468   94.74   488.8   96.74
   493.2   97.14     510   98.74   527.9  102.74     535  108.14     541  108.14

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      50     .06      88    .066     159    .015     420    .066
     468     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          120     468           198.66  198.52  198.75            .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=     541      Elevation=  108.14

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            112.18    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.85    Wt. n-Val.                0.062      0.033     0.060
  W.S. Elev (ft)            111.33    Reach Len. (ft)          198.66     198.52     198.75
  Crit W.S. (ft)             80.83    Flow Area (sq ft)       2063.38   15720.07     863.33
  E.G. Slope (ft/ft)      0.000189    Area (sq ft)            2063.38   15720.07     863.33
  Q Total (cfs)           125000.00    Flow (cfs)              4625.38   118923.50    1451.10
  Top Width (ft)            541.00    Top Width (ft)           120.00     348.00      73.00
  Vel Total (ft/s)            6.70    Avg. Vel. (ft/s)           2.24       7.57       1.68
  Max Chl Dpth (ft)          54.19    Hydr. Depth (ft)          17.19      45.17      11.83
  Conv. Total (cfs)       9097102.0    Conv. (cfs)             336620.8   8654875.0   105606.5
  Length Wtd. (ft)          198.53    Wetted Per. (ft)         126.30     365.04      78.65
  Min Ch El (ft)             57.14    Shear (lb/sq ft)           0.19       0.51       0.13
  Alpha                       1.22    Stream Power (lb/ft s)     0.43       3.84       0.22
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)    131053.80   51931.86   165461.60
  C & E Loss (ft)             0.07    Cum SA (acres)          18232.54    2294.35   20741.86


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.87

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14      35  108.14      48  100.44    72.3   98.94    77.3   98.64
      87   98.04   173.3   84.54     175   84.54   178.3   84.44     270   81.54
   274.3   71.44   279.3   70.64     285   68.35     288   67.14     302   65.29
     305   65.04     315   63.54     325   63.04     335   63.04     345   62.74
     355   61.84     365   61.84     375   61.04   375.3   61.04   380.3   61.14
     385   61.34     395   61.64     405   61.84     415   62.34     435   62.34
     445   62.14     455   61.34     465   61.84     475   61.64   481.3   61.64
     485   61.04     495   61.04     505   61.94     515   62.34     525   63.14
     535   62.84     545   62.64     555   61.04     565   62.34     575   65.29
   577.3   66.34   582.3   68.74     600   87.04   678.1   94.04   683.1   94.44
     695   95.54     759   98.54   765.8   99.74   770.8  100.54     813  107.84
   819.9  108.14
```

```
Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06     270    .066     285    .015   582.3    .066     600     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          270     600               91      91      91             .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=   819.9      Elevation=  108.14

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            112.09    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.71    Wt. n-Val.                0.060      0.025      0.060
  W.S. Elev (ft)            111.38    Reach Len. (ft)           25.00      25.00      25.00
  Crit W.S. (ft)             80.12    Flow Area (sq ft)        5149.76   15685.08    3291.68
  E.G. Slope (ft/ft)      0.000088    Area (sq ft)             5149.76   15685.08    3291.68
  Q Total (cfs)           125000.00    Flow (cfs)               8425.84   111980.60    4593.52
  Top Width (ft)            819.90    Top Width (ft)            270.00     330.00     219.90
  Vel Total (ft/s)            5.18    Avg. Vel. (ft/s)            1.64       7.14       1.40
  Max Chl Dpth (ft)          50.34    Hydr. Depth (ft)           19.07      47.53      14.97
  Conv. Total (cfs)       13293440.0    Conv. (cfs)              896067.6   11908860.0   488509.6
  Length Wtd. (ft)           25.00    Wetted Per. (ft)          276.52     347.13     224.39
  Min Ch El (ft)             61.04    Shear (lb/sq ft)            0.10       0.25       0.08
  Alpha                       1.71    Stream Power (lb/ft s)      0.17       1.78       0.11
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)    131037.40   51860.30   165452.10
  C & E Loss (ft)             0.01    Cum SA (acres)           18231.66    2292.80   20741.19


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

BRIDGE


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.855

INPUT
Description: Reynosa NB

MARCH 2007 - PIER DIAMETERS AND HEIGHTS
             CHANGED TO REFLECT 1986 AS-BUILT PLANS
DIAMETER CHANGED FROM 8.2
             & 5 FT TO 16.42 & 8 FT
PIER HEIGHTS BASED ON ELEVATIONS ON
             AS-BUILTS
Distance from Upstream XS =      25
Deck/Roadway Width        =      56
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      14
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0  117.05   59.64       3  117.05   59.64       3  117.05  109.84
    74.8  119.54  112.34   175.8  122.04  114.84   276.8  124.04  116.84
   377.8  124.84  117.64   478.8  124.14  116.94   579.8  123.34  116.14
   680.6  121.94  114.74   768.3  119.14  111.94   816.9  117.54  110.34
   816.9  117.54   59.64   819.9  117.44   59.64

Upstream Bridge Cross Section Data
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14      35  108.14      48  100.44    72.3   98.94    77.3   98.64
      87   98.04   173.3   84.54     175   84.54   178.3   84.44     270   81.54
   274.3   71.44   279.3   70.64     285   68.35     288   67.14     302   65.29
     305   65.04     315   63.54     325   63.04     335   63.04     345   62.74
     355   61.84     365   61.84     375   61.04   375.3   61.04   380.3   61.14
     385   61.34     395   61.64     405   61.84     415   62.34     435   62.34
     445   62.14     455   61.34     465   61.84     475   61.64   481.3   61.64
     485   61.04     495   61.04     505   61.94     515   62.34     525   63.14
     535   62.84     545   62.64     555   61.04     565   62.34     575   65.29
   577.3   66.34   582.3   68.74     600   87.04   678.1   94.04   683.1   94.44
     695   95.54     759   98.54   765.8   99.74   770.8  100.54     813  107.84
   819.9  108.14

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06     270    .066     285    .015   582.3    .066     600     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          270     600           .2       .5
Left Levee      Station=       0      Elevation=  108.14
Right Levee     Station=   819.9      Elevation=  108.14

Downstream  Deck/Roadway Coordinates
    num=      14
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0  117.05   59.64       3  117.05   59.64       3  117.05  109.84
    74.8  119.54  112.34   175.8  122.04  114.84   276.8  124.04  116.84
   377.8  124.84  117.64   478.8  124.14  116.94   579.8  123.34  116.14
   680.6  121.94  114.74   768.3  119.14  111.94   816.9  117.54  110.34
   816.9  117.54   59.64   819.9  117.44   59.64

Downstream Bridge Cross Section Data
Station Elevation Data    num=      57
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.14      35  108.14      48  100.44    72.3   98.94    77.3   98.64
      87   98.04   173.3   84.54     175   84.54   178.3   84.44     267   81.63
     270   81.54   274.3   71.44   279.3   70.64     285   68.35     288   67.14
     302   65.29     305   65.04     315   63.54     325   63.04     335   63.04
     345   62.74     355   61.84     365   61.84     375   61.04   375.3   61.04
   380.3   61.14     385   61.34     395   61.64     405   61.84     415   62.34
     435   62.34     445   62.14     455   61.34     465   61.84     475   61.64
   481.3   61.64     485   61.04     495   61.04     505   61.94     515   62.34
     525   63.14     535   62.84     545   62.64     555   61.04     565   62.34
     575   65.29   577.3   66.34   582.3   68.74     600   87.04   678.1   94.04
   683.1   94.44     695   95.54     759   98.54   765.8   99.74   770.8  100.54
     813  107.84   819.9  108.14

Manning's n Values        num=       6
```

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     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .14     267     .14     270    .066     285    .015   582.3    .066
     600     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
          270     600             .2       .5
Left Levee      Station=      35      Elevation=  108.14
Right Levee     Station=   819.9      Elevation=  108.14

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   124.9
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  8

Pier Data
Pier Station     Upstream=    74.8    Downstream=    74.8
Upstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   89.63       8   89.63       8   112.5
Downstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   89.63       8   89.63       8   112.5

Pier Data
Pier Station     Upstream=   175.8    Downstream=   175.8
Upstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   89.22       8   89.22       8     115
Downstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   89.22       8   89.22       8     115

Pier Data
Pier Station     Upstream=   276.8    Downstream=   276.8
Upstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   71.28       8   71.28       8     117
Downstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   71.28       8   71.28       8     117

Pier Data
Pier Station     Upstream=   377.8    Downstream=   377.8
Upstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  72.175       8  72.175       8   117.7
Downstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  72.175       8  72.175       8   117.7

Pier Data
Pier Station     Upstream=   478.8    Downstream=   478.8
Upstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  73.167       8  73.167       8   117.1
Downstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  73.167       8  73.167       8   117.1

Pier Data
Pier Station     Upstream=   579.8    Downstream=   579.8
Upstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  72.175       8  72.175       8   116.3
Downstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42  72.175       8  72.175       8   116.3

Pier Data
Pier Station     Upstream=   680.6    Downstream=   680.6
Upstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   71.78       8   71.78       8   114.9
Downstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42   71.78       8   71.78       8   114.9

Pier Data
Pier Station     Upstream=   768.3    Downstream=   768.3
Upstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42    89.8       8    89.8       8   112.1
Downstream     num=        4
    Width   Elev    Width   Elev    Width   Elev    Width   Elev
   16.42      60   16.42    89.8       8    89.8       8   112.1

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.84
```

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108.14	35	108.14	48	100.44	72.3	98.94	77.3	98.64
87	98.04	173.3	84.54	175	84.54	178.3	84.44	267	81.63
270	81.54	274.3	71.44	279.3	70.64	285	68.35	288	67.14
302	65.29	305	65.04	315	63.54	325	63.04	335	63.04
345	62.74	355	61.84	365	61.84	375	61.04	375.3	61.04
380.3	61.14	385	61.34	395	61.64	405	61.84	415	62.34
435	62.34	445	62.14	455	61.34	465	61.84	475	61.64
481.3	61.64	485	61.04	495	61.04	505	61.94	515	62.34
525	63.14	535	62.84	545	62.64	555	61.04	565	62.34
575	65.29	577.3	66.34	582.3	68.74	600	87.04	678.1	94.04
683.1	94.44	695	95.54	759	98.54	765.8	99.74	770.8	100.54
813	107.84	819.9	108.14						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.14	267	.14	270	.066	285	.015	582.3	.066
600	.04								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
270	600	490.49	510	528.74	.2	.5

Left Levee Station= 35 Elevation= 108.14
Right Levee Station= 819.9 Elevation= 108.14

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	112.03	Element	0.140	0.025	0.040
Vel Head (ft)	0.76	Wt. n-Val.	490.49	510.00	528.74
W.S. Elev (ft)	111.26	Reach Len. (ft)	5119.29	15647.57	3266.69
Crit W.S. (ft)	80.12	Flow Area (sq ft)	5119.29	15647.57	3266.69
E.G. Slope (ft/ft)	0.000093	Area (sq ft)	3674.39	114348.30	6977.28
Q Total (cfs)	125000.00	Flow (cfs)	270.00	330.00	219.90
Top Width (ft)	819.90	Top Width (ft)	0.72	7.31	2.14
Vel Total (ft/s)	5.20	Avg. Vel. (ft/s)	18.96	47.42	14.86
Max Chl Dpth (ft)	50.22	Hydr. Depth (ft)	381147.0	11861430.0	723758.4
Conv. Total (cfs)	12966340.0	Conv. (cfs)	276.40	347.13	224.28
Length Wtd. (ft)	510.58	Wetted Per. (ft)	0.11	0.26	0.08
Min Ch El (ft)	61.04	Shear (lb/sq ft)	1.82	Stream Power (lb/ft s)	0.08	1.91	0.18
Alpha					
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	131027.30	51830.43	165445.70
C & E Loss (ft)	0.09	Cum SA (acres)	18231.20	2292.17	20740.82

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 156.7

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 415

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108.46	3.28	108.74	6.56	108.89	9.84	108.92	13.12	108.94
16.4	109	19.68	109.03	22.96	108.99	26.24	109.07	29.52	109.36
32.8	109.51	36.08	109.57	39.36	109.59	42.64	109.58	45.92	109.49
49.2	109.32	52.48	108.99	55.76	108.73	59.04	108.4	62.32	108
65.6	107.43	68.88	106.57	72.16	105.71	75.44	105.18	78.72	104.7
82	104.19	85.28	103.56	88.56	102.89	91.84	102.14	95.12	101.33
98.4	100.29	101.68	99.27	104.96	98.41	108.24	97.65	111.52	96.71
114.8	95.68	118.08	94.26	121.36	92.44	124.64	90.22	127.92	88.44
131.2	87.47	134.48	86.27	137.76	85.33	141.04	84.35	144.32	84.01
147.6	85.06	150.88	85.23	154.16	85.03	157.44	84.82	160.72	84.58
164	84.32	167.28	84.07	170.56	83.42	173.84	82.37	177.12	81.56
180.4	81.37	183.68	81.33	285.37	81.33	288.65	81.69	291.93	82.44
295.21	83.1	298.49	83.44	301.77	83.22	305.05	82.99	308.33	82.76
311.61	82.57	314.89	82.51	318.17	82.47	321.45	82.39	324.73	82.24
328.01	82.2	331.29	83.09	334.57	84.41	337.85	85.64	341.13	86.96
344.41	88.26	347.69	89.13	350.97	89.88	354.25	91.01	357.53	92.47
360.81	93.99	364.09	95.3	367.37	96.54	370.65	97.85	373.93	99.14
377.21	100.54	380.49	101.74	383.77	102.98	387.05	104.37	390.33	105.49
393.61	106.21	396.89	106.56	400.17	106.73	403.45	106.84	406.73	106.91
410.01	107	413.29	107.03	416.57	107.05	419.85	107.11	423.13	107.19
426.41	107.18	429.69	107.22	439.53	107.31	446.09	107.41	449.37	107.47
452.65	107.46	455.93	107.58	459.21	107.67	462.49	107.92	465.77	108.6
472.33	110.4	475.61	111.35	478.89	112.42	482.17	113.43	485.45	114.46
488.73	115.29	492.01	115.69	495.28	115.75	498.55	115.76	501.82	115.81
505.09	115.78	508.35	115.72	511.62	115.49	514.89	108.5	518.16	105.17
521.43	105.16	524.7	105.18	527.96	105.11	531.23	105.01	534.5	104.98
537.77	104.92	541.04	104.82	544.31	104.78	547.57	104.72	550.84	104.69
554.11	104.63	557.38	104.51	560.65	104.42	563.92	104.41	567.18	104.4
570.45	104.34	573.72	104.38	576.99	104.55	580.26	104.72	583.53	105.17
586.79	105.64	590.06	105.96	593.33	105.91	596.6	105.7	599.87	105.83
603.14	106.06	606.4	105.87	609.67	105.36	612.94	104.8	616.21	104.48
619.48	104.18	622.75	103.71	626.01	103.19	629.28	102.67	632.55	102.35
635.82	102.16	639.09	102.03	642.36	101.81	645.62	101.46	648.89	101.08
652.16	100.87	655.43	100.7	658.7	100.33	661.97	99.94	665.23	99.66
668.5	99.5	671.77	99.25	675.04	99.07	678.31	98.9	681.58	98.8
684.84	98.66	688.11	98.55	691.38	98.52	694.65	98.39	697.92	98.35
701.19	98.3	704.45	98.24	707.72	98.36	710.99	98.44	714.26	98.08
717.53	97.61	720.8	97.41	724.06	97.45	727.33	97.42	730.6	97.41
733.87	97.36	737.14	97.13	740.41	96.59	743.67	96.24	746.94	95.75
750.21	95.31	753.48	94.94	756.75	94.57	760.02	94.16	763.28	93.67
766.55	93.38	769.82	93.25	773.09	93.07	776.36	92.89	779.63	92.68
782.89	92.7	786.16	92.66	789.43	92.48	792.7	92.25	795.97	92.01
799.24	91.82	802.5	91.72	805.77	91.86	809.04	92.15	812.31	92.1
815.58	91.67	818.85	91.28	822.11	91.11	825.38	91.09	828.65	91.22
831.92	91.46	835.19	91.92	838.46	92.52	841.72	93.19	844.99	94.11
848.26	94.55	851.53	94.68	854.8	94.53	858.07	94.14	861.33	93.92
864.6	93.77	867.87	93.5	871.14	93.22	874.41	92.9	877.68	92.69
880.94	92.7	884.21	92.5	887.48	91.34	890.75	89.2	894.02	87.44
897.29	86.41	900.55	85.61	903.82	84.88	907.09	84.13	910.36	83.77

913.63	83.4	916.9	82.84	920.16	82.17	923.43	81.81	926.7	81.17
929.97	79.48	933.24	76.91	936.51	75.91	956.51	75.91	976.51	76.11
996.51	76.11	1016.51	75	1036.51	75.06	1056.51	75.15	1076.51	75.09
1096.51	75.23	1116.51	75.4	1136.51	75.77	1156.51	75.41	1162.61	75.91
1165.89	76	1169.17	77.21	1172.45	79.64	1175.73	81.42	1179.01	82.97
1182.29	83.37	1185.57	83.78	1188.85	84.27	1192.13	85.17	1195.41	86.26
1198.69	87.18	1201.97	87.64	1205.24	87.5	1208.52	87.33	1211.8	87.23
1215.08	87.08	1218.36	86.85	1221.64	86.6	1224.92	86.39	1228.2	86.35
1231.48	86.65	1234.76	87.02	1238.04	87.16	1241.32	87.31	1244.6	87.43
1247.88	87.51	1251.16	87.71	1254.44	87.91	1257.72	88.1	1261	88.35
1264.28	88.55	1267.56	88.75	1270.84	89.01	1274.12	89.45	1277.4	90.16
1280.68	90.71	1283.96	91.45	1287.24	92.33	1290.52	92.97	1293.8	93.22
1297.08	93.52	1300.35	93.88	1303.63	94.52	1306.91	95.32	1310.19	96.25
1313.47	97.48	1316.75	98.54	1320.03	98.77	1323.31	98.8	1326.59	98.77
1329.87	98.75	1333.15	98.54	1336.43	98.22	1339.71	97.98	1342.99	97.98
1346.27	97.97	1349.55	97.89	1352.83	97.89	1356.11	97.82	1359.39	97.76
1362.67	97.73	1365.95	97.61	1369.23	97.55	1372.51	97.5	1375.79	97.42
1379.07	97.37	1382.35	97.32	1385.63	97.24	1388.91	97.17	1392.19	97.11
1395.46	97.05	1398.74	97.05	1402.02	97.06	1405.3	97.09	1408.58	97.15
1411.86	97.14	1415.14	97.11	1418.42	97.55	1421.7	98.44	1424.98	99.11
1428.25	99.7	1431.52	100.15	1434.78	100.61	1438.05	100.99	1441.32	101.33
1444.59	101.4	1447.85	101.6	1451.12	101.96	1454.39	102.52	1457.66	103.08
1460.92	103.51	1464.19	103.87	1467.46	104.17	1470.72	104.33	1473.99	104.55
1477.26	104.89	1480.53	105.28	1483.79	105.5	1487.06	105.5	1490.33	105.52
1493.6	105.56	1496.86	105.58	1500.13	105.57	1503.4	105.58	1506.67	105.61
1509.93	105.64	1513.2	105.64	1516.47	105.63	1519.73	105.57	1523	105.55
1526.27	105.5	1529.54	105.46	1532.8	105.35	1536.07	105.26	1539.34	105.21
1542.61	105.12	1545.87	105.07	1549.14	104.96	1552.41	104.93	1555.68	104.88
1558.94	104.87	1562.21	104.89	1565.48	104.89	1568.74	104.87	1572.01	104.76
1575.28	104.76	1578.55	104.73	1581.81	104.7	1585.08	104.65	1588.35	104.63
1591.62	104.65	1594.88	104.66	1598.15	104.77	1601.42	105.08	1604.69	105.83
1607.95	107.46	1611.22	108.51	1614.49	108.72	1617.76	108.46	1621.02	108.1
1624.29	107.16	1627.56	105.84	1630.82	105.09	1634.09	104.98	1640.63	104.98
1643.89	104.95	1647.16	104.85	1650.43	104.82	1653.7	104.76	1656.96	104.63

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	505.09	.085	884.21	.07	929.97	.025	1179.01	.07
1424.98	.085	1614.49	.06						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
884.21 1201.97 520.54 510.48 507.59 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	884.21	92.5	T
1201.97	1656.96	87.64	T

Left Levee Station= 505.09 Elevation= 115.78
Right Levee Station= 1614.49 Elevation= 108.72

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	111.84	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.19	Wt. n-Val.	0.085	0.037	0.071	
W.S. Elev (ft)	110.65	Reach Len. (ft)	520.54	510.48	507.59	
Crit W.S. (ft)	95.13	Flow Area (sq ft)	4414.35	10449.54	5140.06	
E.G. Slope (ft/ft)	0.000570	Area (sq ft)	4451.47	10449.54	5168.03	
Q Total (cfs)	125000.00	Flow (cfs)	9539.46	101003.10	14457.46	
Top Width (ft)	1143.08	Top Width (ft)	370.33	317.76	454.99	
Vel Total (ft/s)	6.25	Avg. Vel. (ft/s)	2.16	9.67	2.81	
Max Chl Dpth (ft)	35.65	Hydr. Depth (ft)	11.92	32.89	11.30	
Conv. Total (cfs)	5237542.0	Conv. (cfs)	399706.4	4232063.0	605772.4	
Length Wtd. (ft)	510.79	Wetted Per. (ft)	374.47	323.57	464.12	
Min Ch El (ft)	75.00	Shear (lb/sq ft)	0.42	1.15	0.39	
Alpha	1.97	Stream Power (lb/ft s)	0.91	11.10	1.11	
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	130973.40	51677.66	165394.50	
C & E Loss (ft)	0.19	Cum SA (acres)	18227.59	2288.38	20736.72	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 156.6

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	105.88	3.28	105.78	6.55	105.78	9.83	106.15	13.11	106.22
19.66	105.78	26.21	105.29	29.49	105	32.77	105.04	39.32	105.24
42.59	105.3	45.87	105.42	49.15	105.65	52.42	106	62.25	108.56
68.81	110.2	75.36	111.92	81.91	113.55	85.19	114.32	88.47	114.99
91.74	115.41	95.02	115.62	101.57	115.62	108.12	115.68	111.4	115.66
114.68	115.14	117.95	111.73	121.23	106.51	124.51	105.08	131.06	105.1
137.61	105.09	140.89	105.05	147.44	104.81	150.72	104.65	157.27	104.06
163.83	103.87	170.38	103.91	176.93	104.2	180.21	104.42	183.48	104.44
190.04	104.72	193.31	104.57	196.59	104.36	199.87	104.27	206.42	104.45
209.7	104.39	212.97	104.27	226.08	104.1	229.35	104.18	235.91	104.16
242.46	104.2	245.74	104.17	252.29	104.2	255.57	104.18	262.12	103.96
265.4	104.09	275.23	104.06	281.78	104.1	285.06	104.01	288.33	103.81
291.61	103.85	298.16	104.03	301.44	104.05	304.71	104.12	307.99	104.07
317.82	104.09	321.1	104.05	327.65	104.08	330.93	104.01	334.2	103.79
340.76	103.74	347.31	103.8	350.59	103.72	357.14	103.41	360.42	103.38
363.69	103.43	370.24	103.42	373.52	103.33	376.8	103.15	380.07	103.21
383.35	103.49	386.63	103.67	389.9	103.74	393.18	103.69	399.73	103.85
406.29	103.56	409.56	103.5	412.84	103.5	416.12	103.42	419.39	103.27
425.95	103.38	429.22	103.28	432.5	103.24	435.77	103.4	442.33	103.56
445.6	103.77	448.88	103.84	452.16	103.74	455.43	103.52	458.71	103.44
465.26	103.57	468.54	103.39	471.82	103.3	475.09	103.31	481.65	103.14
488.2	103.15	494.75	102.96	498.03	103.01	501.3	103.13	504.58	103.14
507.86	103.03	511.13	103.01	520.96	103.28	527.52	103.33	530.79	103.18
534.07	103.17	540.62	103.34	543.9	103.28	547.18	103.32	553.73	103.29
557.01	103.22	566.83	103.29	570.11	103.29	573.39	103.38	576.66	103.41
579.94	103.33	586.49	103.27	589.77	103.16	596.32	103.11	602.88	103.14

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  606.15   103.1  609.43     103  615.98  102.93  622.53   102.9  629.09  102.63
  632.36  102.61  635.64  102.74  638.92  102.33  642.19   101.7  645.47  101.42
  648.75  101.62  652.02  102.56   655.3  103.35  658.58  103.64  661.85  103.69
  668.41  103.98  671.68  104.44  674.96  104.84  678.23  105.37  681.51  106.42
  684.79  107.07  688.06  106.87  691.34  106.45  697.89  104.99  701.17  104.09
  704.45  103.71  707.72  103.97     711   104.6  714.28  104.83  717.55  104.71
  720.83  104.68  724.11  104.75  727.38  104.89  730.66  105.13  733.94   105.3
  737.21  104.91  740.49  103.81  743.76  102.42  750.32   99.32  753.59   98.46
  756.87   98.17  760.15   98.02  763.42   97.99   766.7   99.56  769.98  101.84
  773.25  103.84  776.53  105.23  779.81  105.75  783.08  105.88  786.36  105.49
  789.64  104.66  792.91  104.18  796.19  104.36  799.46   105.3  802.74   106.1
  806.02  106.26  809.29   106.1  819.12  105.33   822.4  105.35  825.68  105.68
  828.95   105.4  832.23  104.83  835.51   103.8  838.78  102.62  842.06  101.66
  845.34  100.22  848.61   99.03  851.89   97.59  855.16   95.86  858.44   94.22
  861.72   92.96  864.99   91.92  868.27    91.1  871.55   90.36  874.82   89.81
   878.1    89.5  881.38   89.28  891.21   89.08  894.48   89.25  897.76   89.58
  901.04   89.84  904.31   89.92  907.59   89.91  914.14   89.82  917.42    89.8
  920.69   89.89  923.97   89.91  927.25   89.87  930.52   89.98   933.8   90.19
  940.35   90.49  943.63   90.16  946.91   89.01  950.18   87.13  953.46    85.4
  956.74    84.2  960.01   83.23  963.29   82.48  966.57   81.88  973.12   81.11
  976.39   81.05  979.67   81.07  982.95   81.02   989.5   80.63  992.78   80.82
  996.05   81.06  999.33   80.89 1002.61   80.25 1005.88   78.83 1009.16   76.74
 1012.44   75.86 1019.44   63.93 1029.44   58.88 1039.44   58.38 1059.44   58.78
 1069.44   59.18 1079.44   59.18 1089.44   58.88 1099.44   59.18 1109.44   58.88
 1119.44   59.08 1129.44   58.98 1139.44   58.78 1149.44   58.88 1159.44   58.88
 1179.44   59.88 1189.44   60.78 1199.44   60.18 1209.44   59.88 1219.44   60.18
 1229.44   60.38 1238.67   75.86 1241.95   76.07 1245.23   77.79 1248.51   80.03
 1251.79   81.72 1255.07   83.02 1258.35    83.9  1264.9    84.7 1268.18   85.14
 1271.46   85.91 1274.74   86.52 1278.02   86.96  1281.3   87.55 1287.86      89
 1291.14   89.59 1294.41   90.11 1300.97   92.36 1304.25   93.04 1307.53   93.24
 1314.09   93.01 1317.37   93.11 1320.65   93.33 1323.92   93.48 1330.48   93.56
 1333.76   93.57 1337.04    93.7 1340.32   93.67  1343.6   93.84 1346.88   94.07
 1350.16   94.51 1353.43   95.02 1356.71    95.4 1359.99   95.67 1363.27   96.06
 1366.55   96.22 1369.83   96.49 1373.11   96.55 1376.39   96.53 1379.67   96.59
 1382.95   96.73 1392.78      97 1396.06   96.98 1402.62   96.67  1405.9   96.66
 1412.46   96.92 1415.73   97.13 1419.01   97.27 1425.57   97.46 1438.69   97.51
 1441.97   97.44 1445.24   97.25 1448.52   97.14 1455.08   97.31  1468.2   97.31
 1471.48   97.41 1474.75   97.42 1478.03    97.3 1481.31   97.27 1484.59   97.35
 1491.15   97.39 1497.71   97.56 1500.99    97.6 1504.27   97.54 1507.54   97.21
 1510.82   96.64 1517.38   95.41 1520.66   94.95 1523.94   94.95 1527.22   95.47
  1530.5   95.69 1540.33   95.78 1546.89   95.93 1550.17   95.97 1556.73   95.93
 1560.01   96.11 1566.56   97.15 1569.84   97.16 1573.12   96.83  1576.4   96.76
 1579.68   96.78 1582.96   96.89 1596.08   96.99 1609.19   96.83 1615.75   96.67
 1619.03   96.64 1622.31   96.98 1625.59   97.39 1632.14   98.13 1635.42    98.1
  1638.7   97.79 1641.98   97.83 1645.26   97.78 1648.54   97.85  1655.1   97.92
 1658.37   98.02 1664.93   98.01 1674.77   98.14 1684.61   98.31 1687.88   98.46
 1694.44   98.55 1704.28   98.82 1707.56   98.88 1710.84   98.88 1714.12   99.07
  1717.4  100.07 1720.67  100.52 1723.95  100.47 1730.51  100.24 1733.79  100.25
 1737.07  100.44 1743.63  100.73 1746.91  101.06 1750.18  101.46 1760.02  102.16
  1763.3  102.58 1769.86  103.89 1773.14   104.7 1776.42  105.42 1779.69   106.5
 1782.97  107.68 1786.25  108.57 1789.53  108.96 1792.81  109.18 1799.37  109.16
 1805.93   109.2 1809.21  109.06 1812.48  108.52 1819.04  106.53 1822.32  105.73
  1825.6  105.12 1828.88  104.81 1838.72  104.21 1841.99  103.97 1845.27  103.56
 1848.55  103.32 1855.11  102.56 1858.39  102.48 1861.67   102.5 1868.23   102.6
  1871.5  102.57 1874.78   102.6 1878.06  102.51 1884.62  102.21 1891.18  102.04
 1894.46  101.86 1897.74  101.75 1901.01  101.78 1904.29  102.16 1907.57  102.33
 1914.13  102.15 1923.97  101.93 1927.25  101.82 1930.53  101.57  1933.8  101.21
 1937.08  100.94 1940.36  100.93 1946.92   101.2 1953.48  101.35 1956.76  101.51
 1963.31  101.61 1969.87  101.57 1973.15  101.46 1976.43  101.51 1982.99  101.84
 1989.55  102.04 1992.82  102.01 2005.94  102.17 2019.06  102.13 2022.34     102
 2028.89  101.83 2038.73  101.77 2042.01  101.71 2045.29  101.71 2048.57  101.77
 2055.12  101.74  2058.4  101.68 2064.96  101.63 2068.24  101.77 2071.52   101.8
 2078.08  101.64 2091.19  101.67 2094.47  101.62 2101.03  101.39 2104.31  101.24
 2107.59  101.18 2114.14  101.42 2117.42  101.36  2120.7  101.24 2127.26  101.16
 2133.82  101.12 2143.65  101.14 2146.93  101.22 2150.21  101.18 2153.49  101.05
 2156.77  101.05 2160.05   101.2 2169.89  101.23 2173.16  101.21    2183  100.77

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .076  825.68    .076  861.72    .066 1012.44    .015 1238.67    .066
 1497.71     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       940.35 1294.41          2582.86    2000 4032.36             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  940.35   90.49       T
Left Levee      Station=   111.4      Elevation=  115.66
Right Levee     Station= 1805.93      Elevation=   109.2
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0  783.08  105.88

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            111.49    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.56    Wt. n-Val.                0.071      0.037      0.062
  W.S. Elev (ft)            110.93    Reach Len. (ft)         2582.86    2000.00    4032.36
  Crit W.S. (ft)             82.38    Flow Area (sq ft)       5547.24   15048.59    9992.52
  E.G. Slope (ft/ft)      0.000204    Area (sq ft)            5598.62   15048.59    9992.52
  Q Total (cfs)           125000.00    Flow (cfs)              7227.85   100438.60   17333.55
  Top Width (ft)           2064.55    Top Width (ft)           821.90     354.06     888.59
  Vel Total (ft/s)            4.09    Avg. Vel. (ft/s)           1.30       6.67       1.73
  Max Chl Dpth (ft)          52.55    Hydr. Depth (ft)           6.75      42.50      11.25
  Conv. Total (cfs)       8741361.0    Conv. (cfs)             505449.9   7023761.0   1212151.0
  Length Wtd. (ft)         2352.17    Wetted Per. (ft)         828.05     376.27     901.82
  Min Ch El (ft)             58.38    Shear (lb/sq ft)           0.09       0.51       0.14
  Alpha                       2.17    Stream Power (lb/ft s)     0.11       3.41       0.25
  Frctn Loss (ft)             0.53    Cum Volume (acre-ft)    130913.40   51528.25   165306.10
  C & E Loss (ft)             0.12    Cum SA (acres)          18220.47    2284.44   20728.89


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 156.15
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INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  103.48   13.12  103.55   29.51  103.96   45.91     104   52.47  103.87
   75.42  104.15   85.26  104.52   95.09  104.54   124.6  104.86  137.72  105.22
  144.28  105.19  160.67  105.63  173.79  105.88  183.63  105.96  196.74  106.42
  216.42  106.85  229.54  107.26  242.65  107.31  249.21  107.43  262.33  107.37
  275.44  106.93  285.28  107.27  291.84  106.92   298.4   106.8  314.79  106.94
  321.35  107.17  324.63  107.55  327.91  108.39  337.74  111.92   344.3  113.98
  347.58  114.75  350.86  114.96  363.98   115.1  367.26  113.07  370.54   106.8
  373.81  103.48  383.65   103.4  393.49  103.71  400.05  103.49  409.88  103.81
  416.44   103.7  419.72  103.46  426.28   102.4  429.56  102.37   439.4  102.95
  449.23  102.79  459.07  102.98  475.47  102.55  491.86  102.36  498.42  102.46
  504.98  102.35  514.81  102.59  521.37  102.39  534.49  102.17  557.44  102.52
  570.56  102.17  593.51  102.63  596.79  102.82  606.63   102.9  613.19  102.75
  619.74  102.41  629.58   102.8  645.98  102.73  649.26  102.55  659.09  102.77
  665.65  102.48  678.77  102.69  698.44  102.75     705  102.58  711.56  102.73
  718.12   102.5  731.23  102.45  741.07  102.88  750.91  102.59  760.75  102.59
  764.02  102.41  770.58  102.73   783.7  102.83  786.98  103.06  796.82  102.52
  803.37   102.3  809.93  102.59  819.77  102.82  829.61  102.56     846  102.28
  852.56  102.49  868.96  102.63  878.79  102.25  882.07  102.25  891.91  102.65
  895.19  102.62   908.3   101.8  918.14  102.09  927.98  102.51  931.26  102.32
  937.82  101.32  944.37  100.66  947.65   100.1  954.21   99.49  964.05   98.27
  973.89   97.23     987   96.09  993.56   95.35 1000.12   94.35 1006.68   93.14
 1009.96    92.9 1019.79   93.64 1042.75   93.79 1059.14   93.74 1062.42   93.86
 1072.26   93.65 1088.65   93.75 1101.77   93.73 1111.61   93.61    1128   93.83
  1144.4   93.65 1150.96    93.8 1157.51   93.77 1170.63   93.89 1177.19   93.75
 1190.31   93.88 1200.14    93.8  1206.7    93.9 1232.93   93.93 1249.33   93.84
 1255.89   93.95    1269    93.8 1272.28   93.93 1282.12   93.83 1291.96   94.03
 1305.07   93.77 1314.91    93.8 1321.47   93.68  1347.7   93.82 1354.26   93.69
 1367.38    93.8 1373.93   93.65 1403.45   93.73 1413.28    93.7 1419.84   93.84
 1436.24   93.63 1446.07   93.78 1462.47   93.68 1469.03   93.87 1478.86   93.68
 1485.42   93.83 1495.26    93.6 1511.66   93.67 1518.21   93.54 1528.05   93.69
 1544.45    93.6    1551   93.71 1564.12   93.59 1580.52   93.87 1590.35   93.77
 1610.03   93.98 1619.87   93.94  1629.7   94.03 1649.38   93.81 1662.49   93.88
 1669.05   93.77 1678.89   93.88 1685.45    93.7 1692.01   93.78 1698.56   93.67
 1714.96   93.84 1721.52   93.67 1734.63   93.83 1744.47    93.8 1751.03   93.98
 1764.14   93.72 1773.98   93.99  1787.1   93.77 1793.66   93.87 1806.77   93.74
 1842.84   93.74 1855.96   93.57 1862.52   93.73  1865.8   93.63 1882.19    93.8
 1895.31   93.71 1901.87    93.9 1914.98   93.86  1928.1   93.72 1944.49   93.71
 1951.05   93.87 1960.89    93.9 1967.45   93.72 1974.01   93.78 1983.84   93.64
 1987.12   93.76 2010.08   93.86 2016.63   93.79 2023.19      94 2029.75   93.85
 2055.98   94.49 2062.54   94.76 2072.38   94.72 2098.61   95.15 2108.45    95.7
 2115.01    96.3 2124.84   96.98  2131.4   97.08 2137.96   96.88 2151.08   96.89
 2167.47   97.37 2180.59   97.67 2187.15   97.62  2193.7   97.22 2203.54   97.06
  2210.1   97.27 2219.94   97.09 2233.05   97.08 2249.45   96.97 2259.28    96.8
 2275.68   96.88 2295.35   96.79 2301.91   96.91 2311.75   96.71 2321.59   96.76
 2328.14   96.93 2341.26   97.08  2351.1   96.97 2357.66   96.64 2367.49   96.96
 2377.33   96.76 2383.89   96.95    2397   96.88 2403.56   96.99 2410.12   96.87
 2429.79   97.03 2436.35    96.9 2456.03   97.05 2465.86   96.92  2475.7    97.2
 2488.82   97.03 2518.33   97.21 2521.61   97.12 2534.72   97.16 2541.28   97.44
 2551.12   97.29 2560.96    97.5 2564.24   97.38 2577.35   97.35 2587.19   97.48
  2600.3   97.39 2603.58   97.27  2616.7   97.46 2623.26    97.4 2626.54   97.56
 2639.65   97.46 2649.49   97.69 2665.89   97.63 2672.44   97.43 2688.84   97.77
 2698.68   97.36 2708.51    97.5 2718.35   97.48 2728.19   97.87 2738.02   97.75
 2751.14   97.84 2760.98   97.67 2767.54   97.85 2780.65   97.83 2790.49   98.05
    2820   98.14 2833.12   98.31 2839.68   98.14 2846.23   98.36 2856.07   98.43
 2862.63   98.25 2885.58   98.06 2908.54   98.24 2915.09   98.36 2924.93   98.29
 2934.77   98.51 2947.88   98.55 2954.44   98.38    2961   98.41 2970.84   98.17
 2990.51   98.29 2993.79   98.06 3000.35   98.04 3006.91   97.67 3020.02   98.11
 3033.14   98.18 3042.98   97.81 3052.81   97.69 3069.21   97.99 3079.05   97.92
 3095.45   98.02 3102.01   97.77 3118.42   97.58 3131.54   97.83 3144.66   98.27
 3154.51   98.25 3161.07   98.46 3174.19   98.06 3184.03   97.95 3193.88   97.63
 3200.44   97.65 3203.72   97.86 3220.12   97.95 3229.96   97.82 3243.09   98.02
 3249.65   97.69 3266.05   97.53 3279.18   97.66 3289.02   97.56 3298.86   97.86
  3308.7   97.82 3318.55   97.61 3334.95   97.73 3338.23   97.89 3344.79   97.74
 3351.35   97.95 3357.92   98.45 3364.48   97.93 3374.32    97.9 3384.16   97.72
    3394   97.81 3403.85   97.72 3416.97   97.86 3433.37   97.66 3449.78   97.75
 3459.62   98.24 3466.18   98.37 3482.59   97.83 3495.71   97.82 3502.27   98.21
 3512.11    97.9 3535.08   97.81 3544.92   97.96 3554.76   97.81 3561.33   98.06
 3574.45   98.14 3587.57   97.76 3603.98   98.15  3617.1   98.22 3630.22   97.94
 3636.78   97.95 3640.06   98.18 3649.91   98.06 3656.47   97.82 3663.03   97.94
 3672.87   97.89 3676.15   98.11 3682.72   98.02 3689.28   98.18  3702.4   97.93
 3708.96   98.33 3715.52   98.46 3725.37   98.13 3731.93   98.66 3735.21   98.72
 3751.61   98.62 3761.45   98.42  3771.3   98.48  3787.7  100.75 3800.82  100.98
 3807.39  100.71 3817.23  100.59 3823.79  101.07 3833.63  100.23 3840.19   99.08
 3846.76  100.37 3853.32  101.44  3856.6  102.15 3866.44   99.54 3869.72   99.28
 3876.28   99.29 3886.13   99.78 3892.69  100.49 3895.97  101.02 3899.25  100.72
 3902.53   99.08 3912.37   94.82 3915.65   93.02 3922.21   88.88 3925.49   87.28
 3938.62    83.6 3945.18   80.97 3948.46    78.9 3955.02   75.73  3958.3   75.66
  3961.3   67.45  3976.3   67.33  4002.3   67.33  4015.3   67.83  4029.3   67.93
  4043.3   68.33  4057.3   68.83  4072.3   69.13  4086.3   68.03  4100.3   68.33
  4114.3   68.83  4128.3   67.93  4141.3   70.03  4148.3   70.25 4151.45   75.66
 4154.72      76 4157.99   77.74 4161.27   79.84 4164.54   81.54 4167.81   82.87
 4171.08    83.6 4174.36   83.26 4177.63   82.31 4184.17   80.03 4187.45   79.47
 4193.99   79.21 4200.54   79.51 4203.81   79.94 4210.35   81.34 4220.17   83.82
 4226.72   84.84 4236.53   86.01 4246.35   87.51 4249.62    87.8 4262.71   88.25
 4282.35    89.4 4292.16   90.18 4308.53   90.25 4315.07   90.17 4328.16   90.27
 4331.43   90.42 4341.25   91.33 4351.07   91.63 4360.89   91.34 4367.43   89.93
  4370.7   89.67 4377.25   89.88 4419.77   89.84 4436.09   89.86 4458.95   89.63
 4465.48   91.11 4472.01   91.44 4488.34    93.2 4498.13   94.37 4520.99   96.86
 4530.78   97.18 4537.31   97.94 4543.84   98.93 4560.17  101.18  4566.7  101.77
  4576.5  102.17 4605.88  103.01 4609.15  103.28    4632  105.55 4645.06  106.53
 4654.86   107.6 4664.65  108.44 4677.71  108.65 4680.98  108.35 4684.24  107.23
 4687.51  105.75 4690.77  104.91 4700.57  103.54  4707.1  103.37  4716.9  102.61

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  363.98    .066 3895.97     .07  3958.3    .025 4154.72     .07
 4351.07    .066 4677.71     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3895.97 4351.07             2250 2000.04    2300             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3895.97  101.02       T
 4351.07  4716.9   91.63       T
Left Levee      Station=  363.98      Elevation=   115.1
Right Levee     Station= 4677.71      Elevation=  108.65

CROSS SECTION OUTPUT  Profile #Design Flow
```

E.G. Elev (ft)	110.84	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.17	Wt. n-Val.	0.066	0.053	0.066	
W.S. Elev (ft)	110.67	Reach Len. (ft)	2250.00	2000.04	2300.00	
Crit W.S. (ft)	91.61	Flow Area (sq ft)	33086.29	14498.92	4516.33	
E.G. Slope (ft/ft)	0.000254	Area (sq ft)	46888.53	14498.92	4700.51	
Q Total (cfs)	125000.00	Flow (cfs)	52738.62	63472.34	8789.04	
Top Width (ft)	4348.38	Top Width (ft)	3527.45	455.10	365.83	
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)	1.59	4.38	1.95	
Max Chl Dpth (ft)	43.34	Hydr. Depth (ft)	9.38	31.86	12.35	
Conv. Total (cfs)	7843034.0	Conv. (cfs)	3309046.0	3982526.0	551461.8	
Length Wtd. (ft)	2149.46	Wetted Per. (ft)	3533.81	473.19	375.87	
Min Ch El (ft)	67.33	Shear (lb/sq ft)	0.15	0.49	0.19	
Alpha	1.92	Stream Power (lb/ft s)	0.24	2.13	0.37	
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	129357.30	50849.94	164626.10	
C & E Loss (ft)	0.01	Cum SA (acres)	18091.52	2265.86	20670.83	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 155.7

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	114.87	13.12	115.01	16.4	113.63	19.67	107.13	22.95	103.65
26.23	103.26	39.35	103.28	49.19	102.62	55.75	103.36	81.98	102.99
95.1	103.01	108.21	102.46	121.33	102.34	127.89	102.58	147.56	102.29
200.03	102.24	209.87	102.03	226.26	102.4	239.38	102.12	252.5	102.44
259.06	102.25	278.73	102.23	288.57	102.09	298.41	102.23	311.52	102.09
341.03	102.32	347.59	102.12	367.27	102.4	380.39	102.12	400.06	102.22
409.9	101.89	416.46	102.1	439.41	102.11	449.25	102.4	468.92	102.05
478.76	102.34	485.32	102.07	498.44	102.31	508.27	101.96	534.51	102.04
544.34	101.6	560.74	101.41	570.58	99.81	583.69	98.85	596.81	97.18
606.65	96.17	629.6	95.01	649.28	95.18	659.12	94.83	682.07	94.98
688.63	94.42	701.75	94.44	718.14	94.21	731.26	94.22	744.37	93.87
773.89	94.01	790.28	93.74	813.24	93.89	826.35	93.83	849.31	94.13
862.43	94.03	875.54	94.34	882.1	94.08	901.78	94.14	908.33	94.33
931.29	94.18	941.13	93.94	950.96	94.19	967.36	94.03	980.48	94.2
1006.71	93.86	1032.94	93.99	1046.06	93.69	1059.18	93.94	1095.25	93.68
1118.2	93.72	1128.04	93.92	1134.6	93.75	1160.83	93.76	1167.39	93.49
1187.07	93.42	1210.02	93.48	1223.14	93.4	1278.88	93.6	1298.56	93.4
1331.35	93.44	1347.75	93.3	1380.54	93.36	1400.21	93.2	1423.17	93.45
1433.01	93.19	1446.12	93.33	1452.68	93.17	1462.52	93.83	1472.36	93.86
1478.92	92.23	1492.03	93.85	1505.15	94.05	1518.27	93.66	1531.38	93.76
1554.34	93.68	1564.17	93.86	1574.01	93.7	1593.69	93.81	1606.8	93.72
1613.36	93.88	1646.16	93.74	1655.99	93.92	1675.67	94	1682.23	93.8
1698.62	93.7	1715.02	93.85	1721.58	93.69	1744.53	93.74	1760.93	93.93
1797	94	1810.12	94.24	1823.23	93.95	1836.35	93.94	1856.02	94.15
1878.98	94.01	1905.21	94.22	1918.33	94.11	1947.84	94.48	1970.8	94.29
2013.43	94.41	2033.1	94.73	2042.94	94.59	2049.5	94.76	2069.17	94.53
2082.29	94.67	2105.24	94.6	2115.08	94.7	2138.04	94.6	2154.43	95.1
2170.83	94.65	2203.62	94.97	2216.74	94.84	2226.58	94.96	2246.25	94.8
2272.48	95.41	2279.04	94.88	2292.16	95.57	2305.28	95.28	2328.23	95.28
2338.07	94.76	2354.47	94.57	2357.74	94.74	2387.26	94.58	2393.82	94.78
2416.77	94.6	2439.73	94.62	2459.4	94.24	2475.8	94.84	2498.75	95.2
2508.59	95.08	2534.82	95.13	2547.94	95.29	2597.13	95.47	2616.8	95.45
2639.76	95.64	2652.87	95.46	2669.27	95.73	2675.83	95.61	2688.95	95.75
2702.06	95.66	2711.9	95.88	2721.74	95.71	2744.69	95.84	2761.09	96.19
2790.6	95.91	2810.28	96.1	2813.56	96	2856.19	96.34	2866.02	96.1
2892.26	96.23	2915.21	96.03	2928.33	96.17	2938.17	96.08	2964.4	96.37
2970.96	96.14	2980.8	96.24	2997.19	96	3039.82	95.76	3072.61	95.93
3105.41	95.81	3128.36	95.96	3148.04	95.98	3190.67	95.83	3220.18	95.92
3256.25	96.16	3272.65	95.94	3292.32	96.06	3315.28	95.97	3331.67	96.08
3348.07	95.92	3380.86	96.17	3403.82	96.14	3413.65	96.35	3420.21	96.12
3436.61	96.1	3446.45	96.25	3466.12	96.17	3495.63	96.95	3521.87	96.49
3548.1	96.33	3571.06	96.43	3580.89	96.28	3633.36	96.13	3646.48	96.47
3662.87	96.69	3695.67	96.74	3715.34	97.02	3728.46	97.49	3738.3	98.8
3744.85	99.38	3751.41	99.52	3757.97	98	3761.25	97.66	3767.81	97.8
3777.65	96.84	3787.48	96.61	3794.04	96.75	3800.6	96.51	3807.16	96.65
3823.56	96.32	3843.23	96.64	3849.79	96.95	3869.46	96.12	3882.58	96.05
3905.54	95.22	3918.65	95.74	3931.77	95.84	3944.89	95.46	3958	94.7
3980.96	94.08	4013.75	93.69	4020.31	92.77	4033.43	92.26	4053.1	91.01
4062.94	89.91	4072.78	90.03	4089.17	88.87	4102.29	89.34	4105.57	89.22
4112.13	88.01	4118.69	87.45	4128.52	87.24	4141.64	87.9	4154.76	89.44
4161.31	90.46	4164.59	90.34	4177.71	87.63	4187.55	85.06	4197.39	83.74
4203.94	81.89	4213.78	75.66	4217.06	75.5	4220	70.94	4230	70.94
4240	71.24	4260	70.64	4270	70.64	4290	69.64	4300	69.64
4310	69.14	4340	69.14	4350	68.64	4360	68.64	4370	69.64
4380	70.94	4384.29	75.5	4387.56	75.81	4394.12	78.87	4403.95	83.01
4410.51	84.81	4413.78	86.82	4423.62	94.92	4430.17	99.66	4433.45	100.52
4462.95	100.08	4469.51	99.78	4492.45	100.1	4502.28	100.42	4515.4	100.53
4531.78	100.38	4548.17	99.93	4564.56	100.18	4580.95	99.82	4594.06	100.03
4633.39	99.84	4643.23	99.9	4653.06	99.54	4672.73	99.33	4689.11	98.48
4695.67	98.62	4702.23	98.1	4718.61	97.8	4728.45	97.97	4738.28	97.75
4761.22	97.55	4774.34	97.21	4790.72	97.28	4810.39	97	4830.06	96.95
4843.17	96.54	4859.56	96.5	4872.67	96.76	4912	96.25	4941.5	96.17
4961.17	95.93	4974.28	96.03	4997.22	95.82	5003.78	96.01	5033.28	95.54
5072.61	95.53	5082.44	95.31	5108.66	95.32	5121.78	95.45	5128.33	95.31
5174.22	95.39	5180.77	95.28	5210.27	95.41	5279.11	95.39	5305.33	95.51
5351.22	95.18	5361.05	95.36	5380.72	95.28	5403.66	95.44	5410.22	95.66
5416.77	95.42	5429.88	95.35	5452.83	95.56	5459.38	95.44	5482.33	95.43
5488.88	95.54	5501.99	95.36	5538.05	95.46	5544.6	95.62	5557.71	95.39
5583.94	95.35	5606.88	95.54	5613.44	95.33	5626.55	95.69	5642.94	95.51
5656.05	95.89	5665.88	95.42	5678.99	95.45	5731.43	95.38	5803.54	95.41
5846.15	95.36	5885.49	95.51	5924.82	95.52	5937.93	95.44	5977.26	95.49
5980.54	95.43	6029.71	95.5	6039.54	95.38	6069.04	95.49	6124.76	95.44
6137.87	95.68	6144.43	95.52	6154.26	95.72	6170.65	95.4	6180.48	95.49
6229.65	95.43	6259.15	95.53	6308.32	95.5	6321.43	95.38	6350.93	95.55
6416.48	95.45	6429.59	95.66	6468.92	95.41	6488.59	95.61	6498.42	95.54
6508.26	95.93	6531.2	95.99	6541.03	95.61	6554.15	95.49	6586.92	95.52
6609.87	95.72	6616.42	95.47	6632.81	95.44	6649.2	95.64	6678.7	95.47
6688.53	95.66	6695.09	95.47	6704.92	95.64	6721.31	95.65	6744.25	95.47
6780.31	95.5	6799.98	96.01	6806.53	96.47	6813.09	96.29	6822.92	95.47
6839.31	96.16	6865.53	98.17	6872.09	99.05	6881.92	99.71	6895.03	101.87

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 6901.59  102.73 6908.14  102.72 6924.53  103.34 6940.92  103.05 6990.08   103.2
 6996.64  103.02 7006.47  103.15 7013.03  102.88 7019.58  103.17 7049.08  103.37
 7065.47  102.62 7085.14  102.47 7094.97  102.13 7124.47  101.89 7137.58  102.33
 7147.42  103.98 7153.97  104.27 7170.36  104.09 7176.92  102.84 7183.47  102.39
 7212.97  102.78 7226.08  103.73 7232.64   104.6 7239.19  104.59 7249.03  103.79
  7281.8  103.35 7288.36  103.87 7317.86   103.8 7327.69     104 7357.19  103.91
 7367.02  103.57 7383.41  103.71 7386.69  104.01 7396.52  106.91  7399.8  108.57
 7406.36  113.12 7409.63  114.62 7412.91  115.18 7426.02  115.45 7455.52  115.62
 7475.19  116.27 7485.02  116.46 7504.69  115.99 7527.63  116.19 7540.74  116.42
 7557.13  117.16  7576.8  116.66 7586.63  116.75 7593.19  117.61 7603.02  117.06
 7616.13  117.12 7622.69  116.15  7635.8  115.19 7642.35  114.98 7645.63   114.2
 7671.85  110.22 7678.41  108.45 7681.69  108.09 7688.24  106.59 7707.91  106.59

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .092 3751.41    .066 4213.78    .015 4403.95    .066 4433.45     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4161.31 4433.45          2226.15    2050 2058.78             .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 4161.31   90.46       T
Left Levee      Station=   13.12      Elevation=  115.01
Right Levee     Station= 7593.19      Elevation=  117.61
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 3744.85   99.38 4433.45 7707.91  100.52

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            110.46    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                 0.086      0.035     0.060
  W.S. Elev (ft)            110.31    Reach Len. (ft)          2226.15    2050.00    2058.78
  Crit W.S. (ft)             95.25    Flow Area (sq ft)       45825.86    9357.08   27633.08
  E.G. Slope (ft/ft)      0.000128    Area (sq ft)            45995.61    9357.08   27633.08
  Q Total (cfs)           125000.00     Flow (cfs)             45096.40   45686.62   34216.98
  Top Width (ft)           7384.24    Top Width (ft)           4143.24     272.14    2968.86
  Vel Total (ft/s)            1.51    Avg. Vel. (ft/s)            0.98       4.88       1.24
  Max Chl Dpth (ft)          41.67    Hydr. Depth (ft)           11.06      34.38       9.31
  Conv. Total (cfs)       11056980.0     Conv. (cfs)             3989038.0   4041246.0   3026691.0
  Length Wtd. (ft)         2114.41    Wetted Per. (ft)         4147.92     286.45    2970.90
  Min Ch El (ft)             68.64    Shear (lb/sq ft)            0.09       0.26       0.07
  Alpha                       4.16    Stream Power (lb/ft s)      0.09       1.27       0.09
  Frctn Loss (ft)             0.19    Cum Volume (acre-ft)    126958.40   50302.27   163772.50
  C & E Loss (ft)             0.01    Cum SA (acres)           17893.42    2249.17   20582.79


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 155.36

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  114.01    3.28  114.44    16.4  114.47   19.68  114.15   26.23  102.74
   29.51  101.89   45.91  101.62   55.75  104.12   59.03  104.26   68.86  103.15
    78.7  101.56    95.1   98.23  101.65   97.36  121.33   95.77  134.45   95.42
  150.84   95.46  163.96   94.89  177.08   94.95  193.47   95.32  203.31   94.97
  216.43   95.39  226.26   94.93   252.5   95.53  265.61   95.28  272.17   95.61
  291.85   95.36  318.08   96.03  324.64   95.87  350.87   96.06  396.78   96.72
  403.34   96.54  416.46   96.93  439.41    96.8  445.97   97.14  459.09   97.07
  485.32   97.24  501.72   97.13  518.11   97.85  524.67   97.62  531.23   98.03
   550.9   97.62  564.02   98.01  570.58   97.86  586.98   98.25  603.37   99.82
  619.77  103.12  632.88  104.62  636.16  104.56     646  103.27  652.56  102.78
  672.23  100.67  688.63  100.06  737.82   99.83  773.89   99.96  836.19   99.63
  842.75   99.85  852.59    99.6  878.82   99.61  905.06  100.06  921.45    99.5
  928.01   99.94  954.24   99.52  973.92   99.71  983.76   99.53 1009.99    99.7
 1026.38  100.07 1032.94   99.78 1059.18   99.79 1088.69   99.48 1098.53   99.72
 1111.64   99.58  1134.6   99.98 1147.72    99.5 1154.27   99.72 1183.79   99.72
 1206.74   99.96 1219.86  100.41 1239.53  100.44 1252.65  101.51 1259.21  102.65
 1275.61  104.64 1282.16   103.8 1288.72  101.92 1298.56  101.91 1311.68  100.69
 1328.07  100.22 1347.75   99.24 1360.86   98.98  1370.7   99.41 1380.54   98.99
 1400.22   99.36 1406.77   99.14 1436.29   99.79 1446.12   99.74 1452.68    99.3
 1475.64   99.15 1518.27   99.47 1528.11   99.84 1557.62   99.29 1590.41   99.69
 1600.25   99.34 1613.36   99.56 1646.16   99.42 1665.83    99.8 1672.39  100.36
 1682.23  100.55 1688.79   99.84 1698.62   100.1 1708.46   99.55 1728.14   99.78
 1741.25    99.7 1754.37  100.25 1760.93   99.59 1770.77  100.13 1783.88   99.81
 1790.44  100.07 1810.12   99.76 1819.96   99.88 1823.23  100.38 1846.19  100.31
 1852.75   99.47 1869.14    99.6  1875.7   99.22 1898.66   99.65 1921.61   98.94
 1934.73   99.02 1941.29    98.7 1964.24   98.98  1987.2    99.5 2010.15   99.31
 2033.11   99.41  2049.5   99.82 2072.46   99.42 2088.85   99.86 2105.25    99.6
 2131.48   99.66 2170.83   99.37  2190.5   98.97 2210.18   98.29 2226.57   98.07
 2233.13   97.65 2259.37   96.98 2275.76   96.15 2295.44   95.72 2318.39   95.55
 2324.95   95.24 2357.74    94.8 2383.97    94.7 2397.09   94.89 2452.83   94.86
 2469.23   95.14 2531.53   94.85 2590.56   95.17 2672.54   95.22 2692.21   95.44
 2705.33   95.21    2725   95.27 2757.79   95.57 2790.59   95.59 2797.14   95.36
 2810.26   95.58 2849.61   95.74 2869.29   95.96 2892.24   96.76 2905.36    96.3
 2911.91   95.29 2921.75   94.41 2941.43    93.2 2954.54   92.79 2964.38    92.2
  2977.5   91.99 2997.17   91.97 3013.57   92.26 3043.08   92.11 3066.03   92.14
 3098.83   92.35  3118.5   92.31 3141.45   92.57 3151.29    92.4 3177.52   92.59
 3187.36   92.84 3210.32   93.03 3223.43   92.78 3239.83   92.99 3249.67   92.78
 3262.78   93.05 3298.85   92.95 3334.92   93.54 3380.83   93.35 3400.51   93.75
 3410.34   93.59  3433.3   93.77 3446.41   93.63 3492.32   94.04 3538.23   94.17
 3554.63   94.35 3567.74   94.22 3597.26   94.53 3620.21   94.96 3630.05   94.68
 3646.44   95.29 3656.28   95.01 3675.95   95.59 3689.07   95.45 3698.91    95.7
 3712.02   95.48 3757.93   95.77 3761.21   96.12 3777.61   96.55 3784.17   95.69
    3794   96.28  3810.4    95.2 3813.68   94.69 3830.07   94.04 3843.19   94.11
 3856.31   93.51 3869.42   93.75 3875.98   94.44 3885.82   94.07 3892.38   92.94
 3898.94   93.16 3928.45   93.31 3938.29   92.14 3944.84   89.28  3951.4   85.26
 3964.52   82.25 3977.64   75.58 3980.91   75.43 3984.91   69.65 4004.91   70.15
 4017.91   70.45 4029.91   70.55 4042.91   70.55 4055.91   70.35 4069.91   70.05
 4083.91   70.45 4108.91   70.65 4130.91   70.15 4184.23   75.43 4190.79   75.85
 4197.35    78.8 4210.46   83.54  4220.3   85.84 4230.14   88.63 4239.98      93
  4253.1   98.38 4305.57   99.66 4325.25   99.86 4344.92   99.55  4364.6   99.71
 4384.28   99.56 4394.11  100.11 4400.67   99.58 4430.19   98.86 4440.03   98.94
 4449.87   99.48 4462.98   99.33 4472.82   99.59 4479.38   98.93 4495.78   98.03
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 4502.34   98.24 4531.85   97.79 4551.53   98.05 4558.09   98.53 4574.48   97.96
 4590.88   98.06 4600.72   98.38 4640.07   98.65 4649.91   98.48 4656.47   99.26
 4679.43   98.35 4705.66   98.08 4712.22   98.23  4731.9   97.72 4745.02   98.17
 4761.41   97.52 4767.97   97.64 4781.09   96.93 4797.49   96.56 4836.84   96.36
 4866.36   95.84 4915.55   95.74  4938.5   95.53 4974.58   95.43 5004.09   95.49
 5010.65   95.31 5069.68   95.08 5076.24   95.42 5086.08   95.14 5109.04   94.94
 5125.43   95.04 5148.39   94.82 5161.51   95.01 5174.63   94.91 5184.46   95.23
  5194.3   94.88 5213.98   95.19 5223.82   94.86 5246.77   95.18 5253.33   94.96
 5289.41   95.14 5318.92   94.91    5355    94.8 5381.23    95.1 5420.58   94.77
 5453.38   95.23 5463.22   96.54  5466.5   96.58 5486.17   95.66 5496.01   95.91
 5502.57   95.52 5518.97   95.81 5528.81   95.42    5578   95.33 5607.51   95.55
 5630.47    95.5 5679.66   96.08 5696.06   96.17 5751.81   97.45 5758.37   97.87
 5768.21   97.89  5784.6   98.35    5801    98.1 5814.12   98.44 5823.96   98.31
 5856.75   98.38 5892.83   98.66 5899.39   98.53 5938.74   98.36 5974.81   98.54
 6020.73   98.32 6033.84   98.01 6046.96   98.36 6069.92   98.01 6083.04   98.02
 6109.27   97.71 6158.46   97.36 6187.98   97.45 6220.77   97.06 6230.61   97.15
  6279.8   96.74  6312.6   96.71 6358.51   96.49 6388.03   96.57 6466.73   97.33
 6486.41   98.17 6492.97   98.89 6506.09   99.06 6545.44   98.99 6591.35   99.23
 6614.31  100.07 6630.71  101.94 6643.82  104.08 6653.66  104.41 6673.34  102.87
 6689.74  103.08 6712.69  102.67 6722.53  103.54 6732.37  103.23 6748.77  103.85
 6771.72  104.49 6781.56  105.68  6791.4  106.11 6814.36  105.89 6830.75   103.7
 6847.15  104.53 6870.11  104.24 6879.94  104.95 6889.78  103.33 6896.34  103.55
 6906.18  105.36 6909.46  105.23 6916.02  103.62 6925.86  102.79 6942.25  102.48
 6952.09  102.69 6971.77   102.5 6994.73  102.61 7004.56  102.86 7020.96  102.83
 7060.31  102.19 7086.55  102.65 7122.62  102.82 7148.86  102.59 7165.26  102.74
 7188.21  102.21 7201.33  102.27 7221.01  102.84  7253.8  102.66 7263.64  102.98
 7273.48  102.79  7286.6     103 7299.72  103.59 7309.55  103.63 7316.11  103.26
 7348.91  103.23 7355.47  103.36 7371.86  102.59  7381.7   103.2 7388.26   102.7
 7421.06  102.79 7434.17  102.59 7444.01  103.38 7453.85  103.63 7460.41  103.16
 7473.53  103.49  7509.6  103.54 7519.44  103.69 7532.56  103.33 7545.67  102.54
 7552.23  102.73 7568.63  102.56 7575.19  102.16 7598.15  101.93 7617.82  101.94
 7634.22  102.65 7644.06  103.68 7650.62   103.7 7660.46  102.53 7689.97  102.18
 7712.93  102.92 7729.32  102.52 7752.28  102.49  7765.4   102.8 7775.24  102.46
 7801.47  102.59 7808.03  102.42 7817.87  103.41 7827.71  102.96 7840.83  103.09
 7847.38  103.68  7860.5  102.96 7873.62  102.82 7890.02  103.21 7899.86  102.98
 7912.97  103.38 7926.09  103.11 7935.93  102.28 7949.05  102.43 7968.72  102.18
 7981.84  102.34 7991.68  103.21 8001.52  103.46  8021.2  106.27 8024.48  107.19
 8031.03  111.51 8037.59  111.84 8060.55  110.86 8073.67  110.76 8080.23  108.39
 8090.06  103.78 8103.18  103.19 8113.02   99.19 8119.58   98.39 8303.24   98.39
 8306.52   98.42 8313.07   99.83 8319.63  103.02 8329.47  104.34 8368.82  104.79

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3777.61     .07 3980.91    .025 4230.14     .07 4325.25    .066
 7644.06     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3777.61 4325.25         1101.32 1093.11 1083.33             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3777.61   96.55       T
 4325.25 8368.82   99.86       T
Left Levee      Station=    16.4      Elevation=  114.47
Right Levee     Station= 8037.59      Elevation=  111.84

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            110.26    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.11    Wt. n-Val.                 0.066      0.030      0.066
  W.S. Elev (ft)            110.15    Reach Len. (ft)          1101.32    1093.11    1083.33
  Crit W.S. (ft)             92.56    Flow Area (sq ft)       45004.66   14137.17   33518.57
  E.G. Slope (ft/ft)      0.000067    Area (sq ft)            48619.07   14137.17   40042.80
  Q Total (cfs)           125000.00    Flow (cfs)              43266.16   54725.21   27008.64
  Top Width (ft)           8006.98    Top Width (ft)           3755.63     547.64    3703.71
  Vel Total (ft/s)            1.35    Avg. Vel. (ft/s)            0.96       3.87       0.81
  Max Chl Dpth (ft)          40.50    Hydr. Depth (ft)           11.98      25.81       9.05
  Conv. Total (cfs)       15308150.0    Conv. (cfs)             5298600.0  6701936.0  3307619.0
  Length Wtd. (ft)         1093.83    Wetted Per. (ft)         3763.39     559.15    3707.38
  Min Ch El (ft)             69.65    Shear (lb/sq ft)            0.05       0.11       0.04
  Alpha                       3.86    Stream Power (lb/ft s)      0.05       0.41       0.03
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)    124540.80   49749.43   162173.20
  C & E Loss (ft)             0.02    Cum SA (acres)          17691.58    2229.88   20425.11


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 155.2

INPUT
Description: RGV-04, Begin Wall, 8-foot wall applied,  Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     410
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  107.92   13.99   111.5   41.99  113.37   65.99   113.8   89.99  114.04
   90.66  114.04   90.66  106.04  100.66  105.84  191.66  104.76  194.66  105.51
  218.66  105.03  224.66  103.53  234.66  103.33  240.66  101.83  252.96  101.73
  325.94  101.74  428.93  102.03  436.92   102.4  503.91  101.37  517.91   99.15
  524.91   95.42   547.9   92.64   578.9   94.69  624.89   94.83  664.88   94.17
  698.88   94.96  756.87      95  807.86    94.6  844.85   94.75  893.84   96.67
  934.83   97.84 1088.81   97.86  1139.8   98.12 1357.76   98.79  1358.2   98.93
 1364.76   98.67 1387.73   98.67 1417.25   99.05 1423.81   98.79 1433.65   98.95
 1450.06   98.75  1476.3   98.99 1486.15    98.8 1518.95   99.34 1528.79   98.84
  1545.2   98.86 1581.29   99.11 1607.53   98.78 1623.93   98.81 1633.78   99.12
 1640.34    98.9 1660.02   98.99 1689.55   98.89 1709.23   99.13 1722.35   98.93
  1748.6   99.07    1765   98.99 1781.41   99.18 1797.81   99.01 1840.46   99.07
 1847.02   99.25 1863.42   99.09 1879.83   99.25 1906.07   99.15 1919.19   99.88
 1929.04    99.2 1942.16   99.49 1948.72    99.2 1965.12   99.31 1974.97   99.07
 1984.81   99.46 2001.21   99.53 2007.77   99.29 2034.02    99.1 2066.83   99.23
 2083.23   99.41 2099.63   99.15 2106.19    99.3 2152.12   99.15 2198.05   99.39
 2217.74   99.23 2273.51   99.37 2293.19   99.74 2303.03   99.72    2326  100.19
 2358.81  100.32 2378.49   99.88 2385.05  100.01 2394.89    99.7  2427.7   99.74
 2447.38   99.96 2467.07   99.95 2480.19  100.24 2490.03   99.79 2522.84   99.84
 2542.52   99.68 2565.49   99.86 2585.17  100.38  2598.3  100.15  2614.7  100.34
 2621.26  100.01 2640.95  100.21 2657.35   99.83 2696.72   99.85 2729.52  100.02
 2749.21   99.91 2762.33   99.61 2778.73     100  2785.3    99.9 2798.42  100.33
 2804.98   99.82 2837.79  100.18 2844.35   99.85 2870.59    99.6 2900.12  100.08
 2909.96   99.69 2923.08  100.65 2949.33   97.07 2955.89   96.49 2972.29   94.39
 3001.82   92.54 3014.94   92.34  3021.5   91.83 3031.35   92.11 3047.75   91.72
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3123.21	91.61	3126.49	91.78	3182.26	91.86	3198.66	92.31	3211.78	91.97
3247.87	92.3	3264.27	92.05	3290.52	92.28	3346.29	92.23	3382.38	92.51
3392.22	92.38	3415.19	92.61	3474.24	92.55	3533.29	92.69	3559.54	92.94
3608.75	93.16	3625.15	93.51	3634.99	93.31	3654.68	93.53	3690.76	94.31
3700.61	93.8	3710.45	94.49	3713.73	94.14	3723.57	91.96	3730.13	91.23
3743.25	90.33	3749.82	90.55	3762.94	90.08	3779.34	90.15	3785.9	90.4
3812.15	91.91	3825.27	92.04	3835.11	92.79	3838.39	92.46	3844.96	89.31
3851.52	84.68	3858.08	82.89	3864.64	82.13	3867.92	81.15	3877.76	75.65
3881.04	75.39	3929.04	70.85	3953.04	71.45	3966.04	71.75	3978.04	71.85
3991.04	71.85	4004.04	71.65	4018.04	71.35	4032.04	71.75	4057.04	71.95
4071.04	71.63	4074.6	75.39	4081.17	76.1	4087.73	79.54	4097.57	84.06
4104.13	88.55	4117.25	95.92	4123.81	98.68	4127.09	99.5	4133.66	99.94
4150.06	99	4192.71	99.46	4215.67	99.39	4225.51	99.01	4251.76	99
4278	99.28	4310.81	99.16	4320.65	99.33	4337.05	98.81	4360.02	98.61
4373.14	99.18	4382.98	99.12	4392.82	97.87	4405.94	97.17	4412.51	97.5
4422.35	97.18	4445.31	97.41	4487.96	97.11	4530.61	96.7	4583.1	96.56
4589.66	96.37	4606.06	96.48	4622.46	96.08	4632.3	96.17	4638.87	95.89
4661.83	95.96	4688.07	95.79	4697.92	95.46	4720.88	95.68	4743.84	95.37
4766.81	95.32	4773.37	94.97	4789.77	94.65	4825.86	94.67	4842.26	94.52
4871.79	94.46	4875.07	94.34	4914.44	94.11	4930.84	94.43	4940.68	94.08
4960.36	93.88	4973.49	94.15	4993.17	93.84	5009.57	94.04	5039.1	93.82
5065.34	93.92	5091.59	93.89	5124.39	94.08	5144.08	93.83	5153.92	94.14
5163.76	93.98	5183.44	94.13	5199.85	93.91	5275.3	94.05	5321.23	94.22
5331.07	94.49	5347.47	94.58	5367.16	95.19	5377	94.63	5390.12	94.24
5406.52	94.37	5416.36	94.14	5436.05	94.08	5475.42	94.49	5521.34	95.18
5557.43	95.5	5616.48	95.73	5623.04	95.33	5636.16	95.77	5668.97	95.58
5695.21	95.73	5721.46	95.53	5777.23	95.72	5800.19	96.07	5829.72	97.12
5849.4	98.99	5862.52	99.72	5888.77	100.64	5895.33	100.53	5915.01	101.02
5928.14	101.78	5941.26	101.47	5947.82	100.72	5957.66	102.42	5964.22	102.98
5974.06	103.22	5983.91	103.11	5993.75	103.58	6006.87	103.66	6013.43	103.34
6019.99	104.04	6033.11	103.31	6042.96	104.03	6056.08	103.79	6062.64	103.23
6075.76	103.34	6088.88	102.96	6141.37	102.94	6157.78	102.81	6187.3	102.88
6252.91	102.67	6298.84	102.72	6308.68	102.57	6334.93	102.6	6341.49	102.46
6371.01	102.43	6387.42	102.21	6443.19	102.26	6485.84	102.46	6498.96	102.32
6538.32	102.5	6580.97	102.27	6597.38	102.43	6623.62	102.46	6630.18	102.33
6662.99	102.21	6689.23	102.28	6708.91	102.12	6728.6	102.19	6777.81	102.04
6784.37	102.14	6840.14	101.88	6856.54	101.98	6909.03	101.94	6915.59	102.2
6925.43	103.24	6931.99	103.58	6958.24	104.29	6964.8	104.68	7000.89	103.73
7010.73	102.63	7027.13	101.23	7036.97	101.5	7046.82	100.35	7063.22	99.73
7076.34	100.03	7082.9	100.85	7118.99	102.3	7132.11	102.44	7145.23	101.78
7155.07	101.92	7161.64	102.59	7174.76	102.68	7194.44	103.14	7214.12	102.89
7246.93	103	7256.77	102.49	7263.33	102.56	7283.02	101.96	7299.42	101.66
7312.54	101.74	7335.51	101.61	7378.15	101.59	7388	102.04	7401.12	102.03
7417.52	101.26	7440.49	101.04	7453.61	101.46	7486.41	101.18	7509.38	101.27
7535.62	101.65	7542.18	102.21	7568.43	102.47	7584.83	102.28	7604.51	103.61
7611.08	103.69	7614.36	103.04	7627.48	102.34	7640.6	102.76	7660.28	103.04
7673.41	102.88	7679.97	102	7693.09	101.57	7709.49	101.49	7716.05	102.09
7725.9	101.92	7739.02	102.63	7745.58	103.75	7755.42	104.03	7761.98	103.32
7771.82	102.82	7798.07	102.3	7807.91	103.08	7824.31	101.67	7837.44	101.38
7844	101.68	7850.56	100.99	7863.68	100.6	7870.24	101.78	7886.65	101.92
7903.05	101.32	7926.01	101.47	7945.7	101.22	7952.26	100.49	7965.38	100.48
7978.5	101.33	7994.9	101.75	8001.47	102.21	8030.99	102.42	8037.55	102.8
8044.11	102.62	8057.24	102.79	8083.48	103.62	8090.04	104.02	8093.32	104.87
8109.73	111.18	8113.01	111.88	8122.85	112.19	8142.53	110.25	8149.09	110.19
8168.78	109.38	8175.34	109.8	8185.18	105.63	8195.02	104.89	8198.3	104.22
8208.14	98.96	8214.71	98.23	8424.68	98.23	8427.96	99.4	8434.52	103.59
8441.09	104.87	8450.93	105.57	8480.46	105.74	8487.02	106.4	8496.86	106.07

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	3710.45	.07	3877.76	.025	4117.25	.07	4133.66	.066
8109.73	.06								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

3710.45	4133.66	959.6	956.88	939.12	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	3710.45	94.49	T
4133.66	8496.86	99.94	T

Left Levee Station= 90.66 Elevation= 114.04
Right Levee Station= 8122.85 Elevation= 112.19

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	110.15	Element	0.066	0.047	0.066
Vel Head (ft)	0.06	Wt. n-Val.	959.60	956.88	939.12
W.S. Elev (ft)	110.09	Reach Len. (ft)	43124.75	12217.13	35044.33
Crit W.S. (ft)	97.30	Flow Area (sq ft)	44629.75	12217.13	42213.55
E.G. Slope (ft/ft)	0.000109	Area (sq ft)	52813.45	37038.87	35147.68
Q Total (cfs)	125000.00	Flow (cfs)	3619.79	423.21	3973.24
Top Width (ft)	8016.24	Top Width (ft)	1.22	3.03	1.00
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)	11.91	28.87	8.82
Max Chl Dpth (ft)	39.24	Hydr. Depth (ft)	5058177.0	3547376.0	3366248.0
Conv. Total (cfs)	11971800.0	Conv. (cfs)	3626.63	435.42	3976.51
Length Wtd. (ft)	953.58	Wetted Per. (ft)	0.08	0.19	0.06
Min Ch El (ft)	70.85	Shear (lb/sq ft)	0.10	0.58	0.06
Alpha	1.90	Stream Power (lb/ft s)	123362.00	49418.76	161150.30
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	17598.34	2217.70	20329.65
C & E Loss (ft)	0.02	Cum SA (acres)			

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 155.01

INPUT
Description: RGV-04, 6-foot wall applied, Bathymetric elevations translated
from IBWC 2008 Cross-sections
Station Elevation Data num= 466

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	109.09	9	113.65	20	114.75	44	114.99	44.67	114.99
44.67	108.99	54.67	108.79	145.67	108.65	148.67	109.4	172.67	108.92
178.67	107.42	188.67	107.22	194.67	105.72	274.95	105.72	279.95	105.51
357.94	105.51	359.94	105.7	433.92	105.72	435.92	105.51	1153.81	105.51
1160.8	107.63	1168.8	109.11	1182.8	110.87	1201.8	111.66	1222.79	111.76
1250.79	112.25	1316.78	111.92	1338.78	111.91	1357.77	111.58	1400.77	107.77
1453.76	104.64	1494.75	102.6	1501.38	103.8	1514.5	103.59	1534.17	102.5

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 1540.72  101.89 1553.83  101.21 1589.89  100.23 1599.73   99.84 1612.84  100.16
 1635.79   99.56 1645.62      99 1665.29   98.54 1675.13   97.91 1704.63   97.36
 1721.02   96.85 1734.13   96.98 1780.03   96.84  1829.2   96.95 1842.31   97.27
 1865.26   97.08 1881.65   97.09 1888.21   96.85 1907.88   97.19 1937.38   96.81
 1940.66      97 1970.16   96.99    1980   97.15 2002.94   96.88    2039   97.37
 2048.84   97.37 2055.39   96.98 2075.06    97.1 2091.45   96.86 2101.29   97.16
 2117.68      97 2137.35   97.32  2143.9   97.26 2166.85   97.87 2183.24   98.09
 2209.46   98.18  2219.3   97.97 2229.13   98.17 2245.52   98.19 2255.36   98.77
 2271.75   98.54  2278.3   98.92 2284.86   98.72 2304.53   98.63  2324.2   99.04
 2340.59   98.76 2356.98   98.95 2363.53   99.35 2376.65   98.89 2393.04   99.05
 2419.26   98.85 2435.65   99.12 2442.21   98.88 2448.76   99.34  2458.6   98.88
 2481.54   98.83 2491.38   99.18 2514.32   99.21 2533.99   98.97 2540.55   99.39
 2547.11    99.2 2566.77   99.31 2583.16   98.86    2593    99.9 2606.11   99.13
  2622.5   98.71 2635.61   99.02 2648.73   98.69 2658.56   98.91 2665.12    98.7
 2688.06   98.62 2724.12   99.02 2760.18   98.66 2796.24   98.71 2806.07   98.94
 2838.85   98.41 2845.41   98.77 2874.91   98.45 2917.53   98.51  2937.2   98.36
 2943.75   98.55 2960.14   98.51 2976.53   98.84 2992.92   98.53 2999.48   98.77
 3025.71    98.4  3042.1   98.57 3058.49   98.45 3078.15   98.83 3084.71   98.61
 3097.82   98.87 3104.38   98.57 3120.77   98.55 3133.88   98.85 3150.27   98.38
 3166.66   98.61 3189.61   98.73    3206   98.65 3212.56   98.91  3235.5   98.93
 3242.06   98.45 3255.17   98.52 3271.56   98.91  3281.4   98.87 3294.51   98.46
 3320.73   98.73 3330.57   98.46 3337.12    98.7 3350.24   98.41  3369.9   98.97
 3379.74   98.54 3386.29   98.69 3438.74    98.4 3455.13   98.53  3474.8   98.27
 3501.03   98.64 3507.58   98.43 3537.09    98.3 3546.92   98.58 3560.03   98.16
  3579.7   97.95 3596.09   98.88 3625.59   97.74 3641.98   97.81 3645.26   98.04
  3655.1   97.76 3674.77   95.57  3684.6   95.27 3700.95    94.2 3717.27   94.26
 3733.58   93.97 3766.22   93.75 3769.49   93.96 3789.07   93.83 3815.18   94.31
  3831.5   94.46 3857.61   94.27 3873.93    94.3 3886.98   94.55 3900.04   95.06
 3922.88   95.09 3945.73   96.06 3962.05   96.07 3978.37   95.59 3991.42   94.71
 4007.74   92.62 4033.85   89.76 4053.43   88.26 4069.75   87.56 4095.86   86.86
 4105.65   87.29 4112.18   87.04 4125.23   85.56 4131.76   83.64 4138.29    81.1
 4144.82   76.04 4148.08   75.36 4148.08   79.52 4152.08   77.74 4161.08   76.28
 4171.08   69.98 4181.08   69.28 4191.08   69.98 4201.08   70.28 4211.08   71.08
 4221.08   71.08 4231.08   70.68 4251.08   71.28 4271.08   71.38 4301.08   72.98
 4311.08   73.28 4321.08   72.68 4328.11   75.36 4331.39   75.57 4337.95   79.44
 4344.51   82.13 4354.34    83.6  4360.9    85.2 4374.02   89.33 4390.41    93.9
 4396.97   94.58 4406.81   92.65 4416.65   91.73 4429.76   91.61 4442.88   92.46
    4456    92.6 4469.11   93.34 4475.67   94.21 4482.23   94.28 4488.79   94.84
 4498.63   96.27 4511.74   97.59 4528.14   98.01 4551.09   98.09 4557.65   98.28
 4574.05   98.29 4583.88   97.86 4590.44   98.28 4626.51   97.77 4639.63   97.22
 4649.47   96.49 4672.42   95.97 4711.77   95.45 4724.89   95.49 4747.84   95.18
 4764.24   95.35 4787.19   94.94 4803.59   94.81 4819.98   94.89 4836.38   94.59
 4875.73   94.39 4888.85   94.21 4898.68   94.36 4938.03   93.97 4951.15   94.12
 4977.38   93.72  4990.5   93.77 5010.17   93.57 5016.73   93.83 5026.57   93.56
 5046.25    93.8  5052.8   93.45  5085.6   93.24 5098.71   93.56 5111.83   93.23
 5144.62    93.2 5157.74      93 5183.97   93.09 5190.53   92.93 5220.04   93.02
 5233.16    92.8 5272.51    92.8 5279.07   92.65 5295.46   92.83 5334.81   92.48
  5367.6   92.31 5380.72   92.54 5393.84   92.34 5403.67   92.49 5416.79   92.36
 5426.63   92.53 5443.02   92.41 5469.26   92.61 5479.09   92.43 5495.49   92.65
 5508.61   92.53 5518.44   92.81 5534.84   92.66 5551.24   93.31 5570.91   92.42
 5580.75   92.35 5587.31   92.63 5600.42   92.45 5610.26    92.6  5620.1   92.32
 5636.49   92.56 5669.29   92.31 5702.08    92.6 5721.75   92.87 5747.99   93.53
 5757.82   93.39 5780.78   93.67 5790.61   94.28 5803.73   94.09 5829.96   94.13
 5836.52   94.45 5849.64   94.48 5862.76   94.99 5872.59   95.07 5882.43   95.95
 5888.99   96.86 5905.38  101.18 5911.94  102.08  5918.5  102.38  5934.9  101.99
 5941.46  102.32 5951.29  102.21 5957.85  102.56 5964.41  102.39 5980.81  102.73
 5990.64  104.58  5997.2  103.59 6003.76  104.63 6007.04  104.28  6013.6  102.14
 6016.88  101.71 6033.27  102.92 6039.83  102.72 6046.39  103.22 6056.23  103.49
 6072.62   102.6 6079.18  102.73 6108.69   102.4 6115.25  102.55 6128.37  102.35
  6154.6  102.48 6177.55   102.2 6184.11  102.33  6216.9  102.04 6223.46  100.59
 6226.74  100.38  6233.3  102.77 6236.58  102.81 6246.42  101.78 6275.93   101.9
 6298.88  101.89 6321.84  101.71 6344.79   101.8 6367.75  101.69 6380.86  101.76
 6420.21  101.62 6462.84  101.65  6564.5  101.38 6584.17   101.5  6610.4  101.29
 6633.36  101.24 6653.03  101.01 6698.94  101.02 6751.41  101.25 6757.97  101.08
 6780.92  101.11 6797.32  100.91 6803.87  101.04 6820.27   100.8 6849.78  100.97
 6859.62  100.86 6895.69  101.03 6915.37  100.83 6951.44  100.84 6964.55   100.7
 7007.18  100.83 7017.02  100.76 7053.09  100.86 7079.32  100.81 7092.44  100.92
 7144.91  100.74 7151.46  100.81 7210.49  100.53 7223.61  100.73 7266.24  100.99
 7292.47  101.76 7302.31  101.03 7315.42  100.78 7331.82  100.86 7338.38  100.69
 7351.49  100.94 7374.45  100.79 7384.29   101.1 7407.24  100.74 7420.36  100.98
 7459.71  100.95 7466.26  101.14 7518.73  101.28 7535.13  101.14 7600.71   101.2
 7610.55  100.82 7620.38  101.22 7640.06  101.18 7653.18  100.95 7669.57  101.12
 7685.97  100.99 7692.53  101.18 7725.32  101.05 7748.27  100.85  7774.5  100.86
 7787.62   100.7 7797.46  100.86 7820.41  100.69 7849.93  100.77 7866.32  100.57
 7899.11  100.48 7918.79  100.68  7931.9  100.36 7941.74  100.66 7958.14  101.74
 7971.25  101.73 7984.37  101.43 7990.93  101.91  8010.6  101.01 8023.72  101.68
 8046.68  102.45 8053.23  102.36 8069.63  101.18 8082.75  101.35 8099.14  102.23
  8105.7  103.28 8112.26  103.36 8118.82  102.37 8135.21  102.07 8151.61  102.39
 8158.17  102.81 8171.28  103.18 8177.84     103 8194.24  103.12 8220.47  102.46
 8230.31  101.79 8240.15  101.85 8256.54  102.93 8269.66  102.48 8282.78  102.56
 8289.34  102.23 8318.85  102.41 8328.69  102.29 8341.81  101.69 8354.92   101.5
 8384.44  101.53 8394.27  102.02 8420.51  102.06 8436.91  102.34 8456.58     103
 8463.14  103.88 8476.26  107.41 8482.82  110.03 8489.37  110.94 8495.93  111.02
 8515.61  110.43 8525.45  110.34 8538.56  107.95 8545.12  105.18 8558.24  104.19
 8571.36   98.78 8574.64    98.1 8761.56    98.1 8771.39   99.03 8781.23  102.52
 8791.07  106.66 8797.63  107.35 8827.14  107.86 8843.54  107.66  8850.1  107.35
 8866.49  107.13

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .092 3945.73    .066 4152.08    .015 4331.39    .066 4557.65    .099

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3945.73 4551.09          1629.91    1325  767.57             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 3945.73   96.06       T
Left Levee      Station=   44.67      Elevation=  114.99
Right Levee     Station= 8495.93      Elevation=  111.02
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   16.39 1203.07  111.67 4626.51 5888.99   98.09

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            110.03    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.30    Wt. n-Val.                0.092      0.022     0.099
  W.S. Elev (ft)            109.73    Reach Len. (ft)         1629.91    1325.00    767.57
  Crit W.S. (ft)             95.38    Flow Area (sq ft)       28726.43   14829.90  36871.45
  E.G. Slope (ft/ft)      0.000085    Area (sq ft)            29162.29   14829.90  36871.45
  Q Total (cfs)           125000.00    Flow (cfs)              21391.12   80905.76  22703.12
  Top Width (ft)           7103.42    Top Width (ft)           2567.08     605.36   3930.98
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Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)	0.74	5.46	0.62		
Max Chl Dpth (ft)	40.45	Hydr. Depth (ft)	11.19	24.50	9.38		
Conv. Total (cfs)	13559920.0	Conv. (cfs)	2320495.0	8776602.0	2462819.0		
Length Wtd. (ft)	1180.47	Wetted Per. (ft)	2568.29	619.28	3934.75		
Min Ch El (ft)	69.28	Shear (lb/sq ft)	0.06	0.13	0.05		
Alpha	8.04	Stream Power (lb/ft s)	0.04	0.69	0.03		
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	122549.20	49121.69	160297.80		
C & E Loss (ft)	0.03	Cum SA (acres)	17530.20	2206.40	20244.44		

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 154.81

INPUT
Description: RGV-04, 6-foot wall applied with 5:1 SS, Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 455

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	101.13	11.99	100.62	39.99	100.63	80.98	100.42	95.98	100.14
100.98	98.77	104.98	98.48	123.97	98.9	140.97	94.77	148.97	95.24
158.97	98.68	183.96	100.37	201.96	102.71	218.96	108.24	227.96	112.71
238.95	114.16	262.95	114.4	263.62	114.4	263.62	108.4	273.62	108.2
364.62	107.99	367.62	108.59	391.62	108.11	397.62	106.91	407.62	106.71
413.62	105.51	805.86	105.51	811.86	111.26	816.86	113.21	826.86	113.68
835.86	113.37	859.85	111.18	866.85	109.94	873.85	105.95	875.85	105.51
1262.78	105.51	4430.18	106.46	4436.74	106.85	4446.58	110.7	4449.86	111.24
4476.09	113.7	4482.65	114.1	4492.49	115.15	4518.72	115.73	4525.28	115.67
4528.56	115.27	4531.84	113.76	4541.67	107.97	4548.23	105.5	4561.35	102.21
4584.3	100.37	4590.86	100	4600.7	100.14	4613.82	99.84	4636.77	100.17
4643.33	99.88	4649.89	100.45	4659.72	102.34	4669.56	102.52	4682.68	101.89
4702.35	101.62	4708.91	102.04	4725.31	101.65	4748.26	102.01	4754.82	101.85
4764.66	101.97	4774.5	101.64	4781.05	101.88	4800.73	102.04	4810.57	101.98
4817.12	102.27	4823.68	102.19	4833.52	102.52	4856.48	102.94	4879.43	102.81
4899.1	103.12	4908.94	103.02	4915.5	103.25	4925.34	103	4931.9	103.22
4951.57	102.41	4971.25	102.56	4981.08	102.05	4990.92	102.46	5000.76	101.98
5007.32	102.61	5013.88	102.28	5026.99	102.33	5036.83	102.55	5049.95	101.63
5056.5	100.95	5066.34	101.08	5076.18	100.54	5099.13	100.19	5105.69	100.43
5125.37	102.28	5138.48	102.69	5141.76	103.02	5148.32	104.81	5158.16	108.55
5164.72	111.79	5171.28	113.56	5181.11	112.73	5184.39	112.19	5194.23	108.76
5200.79	105.29	5210.63	102.1	5217.18	99.39	5227.02	97.1	5236.86	95.52
5246.7	93.33	5256.53	92.19	5263.09	91.73	5276.21	89.16	5282.77	88.68
5299.16	88.6	5305.72	89.08	5315.56	90.79	5322.12	91.47	5328.68	92.53
5341.79	96.06	5348.33	96.65	5354.85	96.27	5361.37	96.29	5374.41	94
5380.94	92.67	5387.46	91.88	5397.24	91.36	5410.28	91.56	5426.58	92.89
5439.62	92.96	5449.4	91.95	5455.92	90.75	5475.48	89.7	5482	89.07
5498.3	88.98	5508.08	90.29	5521.13	93.36	5530.91	94.22	5543.95	96.62
5556.99	99.81	5563.51	100.85	5573.29	98.85	5579.81	96.47	5583.07	95.76
5589.59	95.29	5592.85	95.56	5599.37	96.91	5609.15	99.84	5615.67	100.89
5631.97	101.59	5638.5	100.4	5645.02	97.79	5651.54	96.05	5664.58	94.01
5674.36	93.21	5697.18	92.53	5703.7	91.53	5710.22	89.23	5716.74	87.52
5723.26	86.32	5729.78	86.03	5736.3	84.14	5749.34	81.36	5755.87	80.71
5762.41	79.07	5768.94	76.31	5772.21	75.51	5778.74	75.27	5821.74	68.86
5826.74	69.05	5838.74	69.15	5866.74	68.55	5880.74	68.65	5892.74	67.49
5893.74	67.35	5920.74	66.95	5933.74	67.65	5946.74	67.45	5948.63	75.27
5951.9	75.58	5955.16	76.98	5961.7	80.99	5974.77	86.56	5984.57	91.47
5987.83	92.4	6004.17	93.55	6020.51	93.91	6027.04	94.36	6040.11	96.1
6046.64	96.69	6059.71	98.44	6069.51	98.41	6089.11	96.16	6095.65	96.14
6108.72	95.45	6121.79	95.55	6131.59	95.04	6138.12	94.96	6160.99	93.21
6167.52	93.48	6183.86	93.51	6190.39	93.15	6203.46	93.07	6219.8	93.36
6236.13	92.86	6255.74	93.03	6262.27	92.46	6281.87	92.32	6304.74	92.58
6337.41	92.21	6360.37	92.22	6373.49	92.06	6389.88	92.19	6396.44	92
6406.28	92.15	6432.51	91.97	6448.91	92.09	6478.42	92.02	6488.26	92.28
6494.82	92	6511.22	92.02	6517.78	91.86	6550.57	92.08	6573.53	92.41
6586.64	93.32	6596.48	93.3	6606.32	92.93	6619.44	92.76	6645.67	92.91
6655.51	92.72	6671.91	92.84	6691.58	92.56	6714.54	92.74	6727.66	92.58
6750.61	92.65	6757.17	92.39	6767.01	92.38	6780.13	92.1	6796.52	92.1
6812.92	92.53	6819.48	92.89	6845.71	93.47	6858.83	93.93	6868.67	95.47
6878.51	96.02	6888.35	95.94	6898.18	95.41	6917.86	94.88	6937.54	95.2
6947.37	95.55	6953.93	96.36	6967.05	99.68	6973.61	101.54	6976.89	101.67
6986.73	100.93	7009.68	101.13	7019.52	100.61	7032.64	101.51	7052.31	101.44
7058.87	102	7071.99	103.97	7081.83	104.19	7091.67	104.74	7098.23	103.81
7104.78	103.55	7111.34	102.87	7124.46	102.3	7144.14	102.46	7150.7	102.12
7163.81	102.33	7180.21	102.39	7193.33	102.23	7199.89	102.67	7209.72	102.43
7235.96	102.47	7255.64	102.02	7262.19	101.5	7268.75	100.6	7272.03	101.17
7278.59	103.67	7288.43	102.22	7291.71	102	7311.38	101.86	7324.5	102.13
7331.06	101.94	7347.46	101.91	7357.3	102.07	7363.85	101.81	7393.37	101.9
7429.44	101.75	7475.35	101.67	7488.47	101.52	7547.5	101.48	7570.45	101.37
7586.85	101.4	7603.25	101.24	7649.16	101.24	7662.27	101.1	7698.35	101.22
7704.91	101.03	7727.86	100.94	7770.49	101.1	7773.77	100.98	7809.84	100.96
7842.64	100.79	7852.48	100.92	7875.43	100.82	7885.27	100.94	7898.39	100.77
7908.23	100.83	7944.3	100.72	7950.86	100.88	7970.53	100.94	8000.05	100.87
8023	100.94	8065.63	100.81	8104.99	100.86	8111.55	101.09	8118.1	100.84
8134.5	100.76	8150.9	100.83	8164.02	100.73	8193.53	100.88	8200.09	100.73
8226.32	100.66	8259.12	100.75	8298.47	101.21	8311.58	101.58	8324.7	100.81
8347.66	101.32	8367.33	100.69	8377.17	101.35	8390.29	101.18	8400.13	101.61
8409.96	101.02	8419.8	101.19	8439.48	100.69	8452.59	100.79	8459.15	101.18
8472.27	101.23	8478.83	101.06	8491.95	101.21	8501.78	101.59	8508.34	100.88
8514.9	101.07	8521.46	100.79	8534.58	100.6	8564.09	100.72	8577.21	100.49
8583.77	100.63	8596.88	100.4	8619.84	100.71	8626.4	100.61	8649.35	100.66
8662.47	100.88	8672.31	100.45	8682.15	100.64	8691.98	100.47	8714.94	100.89
8724.78	100.79	8741.17	100.88	8747.73	100.7	8760.85	100.84	8773.97	100.57
8800.2	100.53	8806.76	100.79	8816.6	100.73	8826.43	100.41	8846.11	100.76
8865.79	100.9	8875.62	100.56	8888.74	100.38	8914.98	100.46	8928.09	101.02
8931.37	100.83	8947.77	100.96	8967.44	100.95	8974	100.8	8987.12	100.88
9010.08	100.57	9036.31	100.77	9042.87	100.7	9059.26	101.34	9075.66	101.27
9085.5	101.84	9098.62	101.52	9115.01	101.6	9121.57	101.38	9141.25	101.34
9154.36	100.81	9164.2	101.45	9170.76	101.27	9177.32	101.76	9183.88	101.79
9190.44	102.79	9200.27	102.91	9206.83	102.06	9216.67	101.78	9246.18	102.13
9252.74	101.96	9262.58	102.46	9272.42	102.05	9282.26	101.95	9298.65	102.52
9315.05	102.01	9321.61	102.15	9328.17	101.25	9334.73	101.09	9344.56	101.5
9364.24	101.49	9374.08	101.36	9400.31	101.4	9410.15	101.14	9426.55	101.05
9442.94	101.67	9456.06	102.69	9465.9	102.41	9485.57	102.84	9501.97	102.81
9518.37	103.26	9528.2	103.87	9531.48	104.33	9538.04	106.38	9544.6	109.47
9554.44	111.18	9561	111.04	9570.83	111.36	9583.95	110.8	9603.63	110.79
9616.75	109.88	9620.02	108.79	9626.58	105.69	9633.14	104.91	9642.98	104.56

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 9646.26   103.9  9656.1   98.62 9659.38   98.27 9669.21    98.1 9856.13    98.1
 9862.69   98.32 9865.97    99.2 9872.53  103.13 9879.09  106.11 9882.37  106.94
 9898.76   107.8 9928.28  108.16  9941.4  107.54 9974.19   107.1 9977.47  106.77
 9993.86  104.02 9997.14  102.53 10003.7   98.1310006.98   96.4410010.26   95.59

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4518.72     .12 5631.97     .07 5768.94    .025 5955.16     .07
 6059.71    .066 8947.77     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5631.97 6059.71          1120.03 1324.83 1829.96             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5631.97  101.59       T
 6059.7110010.26   98.44       T
Left Levee      Station=  263.62      Elevation=   114.4
Right Levee     Station= 9570.83      Elevation=  111.36
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  826.86 4476.09   113.7

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            109.82    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.19    Wt. n-Val.                 0.109      0.053      0.065
  W.S. Elev (ft)            109.63    Reach Len. (ft)          1120.03    1324.83    1829.96
  Crit W.S. (ft)             94.22    Flow Area (sq ft)        9836.00   12013.29   31473.09
  E.G. Slope (ft/ft)      0.000354    Area (sq ft)            13312.26   12013.29   36152.53
  Q Total (cfs)           125000.00    Flow (cfs)              8865.43   57466.02   58668.56
  Top Width (ft)           5521.79    Top Width (ft)          1608.25     427.74    3485.80
  Vel Total (ft/s)            2.34    Avg. Vel. (ft/s)           0.90       4.78       1.86
  Max Chl Dpth (ft)          42.68    Hydr. Depth (ft)           6.12      28.09       9.03
  Conv. Total (cfs)       6643023.0    Conv. (cfs)             471145.8   3053985.0   3117893.0
  Length Wtd. (ft)         1454.07    Wetted Per. (ft)        1621.65     441.95    3489.97
  Min Ch El (ft)             66.95    Shear (lb/sq ft)           0.13       0.60       0.20
  Alpha                       2.22    Stream Power (lb/ft s)     0.12       2.87       0.37
  Frctn Loss (ft)             0.68    Cum Volume (acre-ft)    121754.50   48713.44   159654.50
  C & E Loss (ft)             0.02    Cum SA (acres)           17452.08    2190.69   20179.10


Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 154.6

INPUT
Description: RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     472
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   96.93    5.93    95.3   10.87   94.67   13.84   94.45   19.77   95.26
   22.74   95.74   30.65   97.78   31.64   97.92   35.59   98.11   44.49   98.42
   58.34  100.02   59.33  100.18   68.23   102.1   69.22  102.35   78.12   104.9
   83.06  106.63   84.05  107.03   94.05  112.04   96.05  112.81  100.05  113.31
  105.05  113.79  109.05  113.82  133.05  114.06  133.72  114.06  133.72  108.06
  143.72  107.86  234.72  107.09  237.72  107.39  261.72  106.91  267.72  106.31
  277.72  106.11  283.72  105.51 1108.94  105.51 1113.81  113.53 1123.65  113.37
 1136.77  112.85 1166.28  110.63 1176.12  109.69  1179.4  109.16 1185.96  107.44
 1189.24  106.98  1195.8  106.73 1205.64  106.74 1215.47  106.46 4950.84  106.46
 4954.12   106.8 4960.68  108.92 4963.96  109.62  4973.8  110.18 4980.36  111.14
  4990.2  112.24 5000.04  113.02 5009.88  114.05    5023  114.18 5029.55  114.77
 5039.38  115.24 5042.66  114.93 5055.77  109.25 5062.32   107.3 5072.15  103.49
 5075.43  102.67 5085.26  101.37 5091.81   100.9 5104.92  100.41 5124.58  100.73
 5134.41   99.45 5140.97   98.93 5147.52   97.89 5157.35   97.12 5167.18   97.45
 5170.46   98.13 5180.29  100.96 5190.12  101.58 5199.95  100.98 5216.34  100.29
 5229.45   100.4 5249.11   100.2 5258.94   99.63 5268.77   99.72 5281.88   99.16
 5298.26   99.47  5321.2  101.33 5327.75  101.62 5337.59  101.32 5344.14  100.74
 5367.08  100.66 5373.63   99.89 5383.46   97.54 5393.29   96.33 5403.12   95.68
 5412.96   95.98 5426.06   94.83 5432.62   94.59 5442.45   94.76 5452.28    94.6
 5462.11   94.02 5471.94   94.22  5478.5   94.79 5488.33    96.2 5494.88   97.78
 5501.43    99.7 5514.54  101.15  5521.1  102.69 5537.48  108.68 5553.87  113.22
 5560.42  114.02 5566.97  113.13 5573.53  111.49 5580.08  108.71 5593.19   103.7
 5599.74  102.17 5609.57  101.94 5619.41  100.87 5639.07   99.54 5678.39  101.28
 5684.95   101.2 5698.05  100.05 5704.61   99.07 5717.72   97.96 5730.82   97.71
 5740.65    98.4 5747.21   99.38 5757.04   99.97 5770.15   99.19 5783.25   99.31
 5786.53   99.16 5793.09   98.05 5799.64   97.53 5806.19   97.88 5812.75   97.79
 5825.86   96.61 5842.24   96.05 5855.35   96.33  5861.9   96.19 5875.01   95.34
 5888.12   95.33 5894.67   95.64  5904.5   96.86 5917.61   97.52 5927.44   96.89
    5934   95.92 5940.55   95.94 5950.38   97.07 5973.32   96.51 5999.54   96.17
 6022.48    96.2 6051.97   97.36 6071.63   97.55 6081.46   97.82 6088.02   98.87
 6094.57    99.4 6110.95  100.18 6117.51  100.03 6124.06  100.28 6133.89   99.86
 6143.72   99.07 6153.55   97.95 6166.66   96.72 6179.77   96.39 6183.05   96.53
 6192.88   97.92 6199.43   98.43 6205.99   98.28 6215.82   97.08 6222.37   97.12
 6228.92   96.62 6238.76   94.12 6242.03   93.66 6251.86   92.95 6258.42   92.95
 6271.53   93.59 6278.08   93.08 6287.91   90.93 6294.46   90.31 6304.29   90.21
  6317.4   90.46 6327.23   90.34 6340.34   91.11 6343.62   91.77  6346.9   91.78
    6360   89.64 6369.83   88.73 6392.77   88.11  6402.6   86.43 6405.88   86.11
 6415.71   86.22 6425.54   86.96  6432.1   87.98 6438.65   87.99 6448.48   87.69
 6458.31   88.29 6464.87   88.34  6474.7   87.91  6487.8   88.59 6494.36   88.35
 6497.64   87.58 6507.47   84.51 6520.57    80.2 6527.13   76.57 6530.41   75.26
 6533.68    75.1 6538.68   68.77 6541.68    67.1 6551.68   64.26 6561.68   63.56
 6571.68   63.46 6591.68   62.66 6601.68   62.66 6611.68   62.46 6621.68   61.76
 6631.68   61.46 6651.68   60.46 6671.68   59.06 6681.16    75.1 6684.44   75.16
    6691   76.46 6694.28   77.65 6700.83   79.28 6707.39   81.83 6710.67   83.41
 6717.23   85.71 6727.07   87.26 6733.63   88.93 6743.47   90.22  6753.3   91.27
 6759.86   92.95 6766.42   97.94  6769.7  100.13 6776.26  103.23 6779.54  104.17
 6782.82  104.25 6795.94  103.71 6805.77     103 6815.61  102.91 6828.73   105.2
 6838.57  104.04 6851.69  102.76  6864.8  102.07 6877.92  102.56 6884.48  101.87
 6891.04  101.52  6897.6  101.71 6907.44   101.6 6923.83  102.96 6930.39   102.3
 6940.23   102.2 6946.79  102.48 6956.63  101.84 6966.47  101.45 6979.58  101.26
 6989.42  101.68 7005.82  101.53 7015.66  102.95 7022.21  102.38 7025.49   100.8
 7028.77   99.85 7035.33  101.07 7038.61  101.36 7045.17  102.63 7051.73  103.17
 7055.01  103.81 7068.13  103.55 7081.24   103.8 7097.64  102.55  7104.2  102.56
 7114.04     102 7136.99  102.09 7156.67  101.82 7163.23  101.97 7173.07  101.78
 7189.46  102.08 7209.14  101.89  7215.7  102.07 7225.54  101.68 7255.05  101.82
 7261.61  102.35 7268.17  102.04 7281.29  102.66 7291.12  102.35 7297.68  102.75
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 7314.08  103.11 7320.64  102.91 7333.76  101.97  7343.6  102.25 7353.43  101.91
 7363.27  101.82 7376.39  102.36 7392.79  102.32 7396.07  102.44 7412.46  101.83
 7425.58   101.9 7458.37  101.74 7481.33  101.94 7497.73  102.04 7507.57  102.47
 7510.85  102.18 7520.68  102.14 7527.24  101.91  7533.8  102.16 7546.92  101.79
 7553.48  102.41 7560.04   106.7 7563.32  108.12  7566.6  108.78 7573.15  108.61
 7576.43  107.04 7586.27   99.38 7589.55   97.87 7592.83   97.68 7599.39   99.03
 7602.67    99.2 7615.79  101.21 7622.35   101.3 7632.18  101.93 7651.86  102.28
 7658.42  102.51 7671.54   102.2 7691.21  102.64 7701.05  102.65 7714.17  102.24
 7724.01   102.3 7737.12  101.35 7746.96   101.2  7756.8  101.26 7779.76  102.32
 7796.15   102.1 7802.71  101.87 7812.55  102.08 7819.11  101.83 7828.95  102.56
 7838.79  102.07 7848.62  102.76 7861.74  100.87 7871.58  100.34 7904.37  100.42
 7914.21  100.62 7920.77  100.44 7950.29  100.36 7969.96  100.38 7992.92  100.18
 8006.04  100.25 8012.59   100.1 8019.15  100.27 8028.99  101.81 8035.55  101.74
 8042.11  101.23 8048.67  101.72 8058.51  104.51 8068.34  105.15 8078.18  106.09
 8088.02  106.36 8094.58  106.11 8101.14  106.32 8114.26   106.4 8120.81  106.22
 8133.93  106.16 8147.05  106.34 8156.89   105.5 8173.29  105.53 8179.84  105.71
 8192.96  105.65  8219.2  105.87 8242.15  105.75 8261.83  106.29 8278.23  106.03
 8284.79  105.75  8297.9  105.93 8307.74   105.8  8330.7  105.77 8340.53  105.58
 8360.21  106.06 8370.05   104.5 8383.17  104.66 8396.29  104.66 8402.84  105.12
  8409.4  107.54 8412.68  108.44 8415.96  108.58  8442.2  108.52 8445.48  108.22
 8452.03  105.75 8461.87   104.3 8468.43   102.8 8478.27  102.29 8504.51   102.5
 8511.06   102.4 8530.74  102.55  8537.3  102.46 8547.14  103.03  8553.7  103.09
 8563.53  105.84 8566.81  105.91 8573.37  105.41 8616.01  105.54 8622.56  103.17
 8625.84  102.87  8648.8  102.54 8661.92  102.66 8684.87  101.85 8691.43   101.9
 8720.95  101.45 8730.78  100.99 8747.18  100.76 8770.14  101.07 8779.98  102.35
 8783.25  102.55 8796.37  102.69 8806.21  101.43 8816.05  101.88 8842.28  101.91
 8858.68  101.41 8865.24     101 8881.64  101.13  8888.2  102.06 8894.75  101.36
 8901.31   101.4 8917.71  100.54 8927.55  100.97  8950.5  101.32 8957.06  102.22
 8963.62  102.35 8970.18  101.73 8980.02  101.11 8986.58  100.96 9016.09  101.87
 9042.33  101.66 9058.73  101.77 9065.28  102.38 9075.12  102.34 9101.36  102.65
 9114.48  102.49 9127.59  102.85 9140.71  102.61 9150.55  102.88 9160.39  102.43
 9170.22  102.36 9180.06     102  9189.9   102.3  9206.3  102.06 9219.41  102.55
 9278.44  102.77 9291.56  102.88 9294.84  103.62 9304.67  108.86 9311.23  110.19
 9314.51  109.32 9321.07   109.8 9327.63  110.68 9340.75  110.86 9357.14  110.08
 9376.82  109.42  9380.1  108.32 9386.66  105.39 9389.94  105.14 9399.77  105.06
 9403.05  104.71 9409.61  101.97 9412.89   99.32 9416.17   98.23 9419.45    98.1
  9616.2    98.1 9626.04   98.55 9629.32   99.03 9639.16  103.95 9642.44  105.23
 9652.27  106.47 9662.11  106.76 9671.95  106.83 9688.34  107.15  9694.9  107.55
 9701.46  107.12 9717.86  106.96

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .168 5560.42    .168 5566.97    .066 6520.57    .015 6710.67    .066
  6769.7    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6133.89 6779.54          1291.37    1665 1771.03             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6133.89   99.86       T
 6779.54 9717.86  104.17       T
Left Levee      Station=  133.72      Elevation=  114.06
Right Levee     Station= 9340.61      Elevation=  110.86
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1136.77    5000  112.85

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            109.11    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.41    Wt. n-Val.                 0.096      0.053     0.067
  W.S. Elev (ft)            108.70    Reach Len. (ft)          1291.37    1665.00    1771.03
  Crit W.S. (ft)             92.52    Flow Area (sq ft)       11364.99   15907.67   10487.22
  E.G. Slope (ft/ft)      0.000653    Area (sq ft)            13049.72   15907.67   14983.76
  Q Total (cfs)           125000.00    Flow (cfs)              15917.04   93739.10   15343.85
  Top Width (ft)           5177.83    Top Width (ft)           2010.87     645.65    2521.31
  Vel Total (ft/s)            3.31    Avg. Vel. (ft/s)            1.40       5.89       1.46
  Max Chl Dpth (ft)          49.64    Hydr. Depth (ft)            5.65      24.64       4.16
  Conv. Total (cfs)       4891742.0    Conv. (cfs)              622896.4   3668380.0   600465.4
  Length Wtd. (ft)         1637.51    Wetted Per. (ft)         2020.02     668.58    2533.64
  Min Ch El (ft)             59.06    Shear (lb/sq ft)            0.23       0.97       0.17
  Alpha                       2.42    Stream Power (lb/ft s)      0.32       5.72       0.25
  Frctn Loss (ft)             1.02    Cum Volume (acre-ft)    121415.60   48288.84   158580.30
  C & E Loss (ft)             0.00    Cum SA (acres)          17405.55    2174.36   20052.92


Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
         the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 154.23

INPUT
Description: RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     476
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   97.77    6.93   98.14   10.88   97.29   13.85   96.35   17.81    94.9
   24.73   94.44   29.68   94.78   35.62    95.6   45.51   98.16   56.39   99.24
   59.36   99.69   72.22  100.98   76.18  101.99   89.05  105.75   91.05  106.58
  100.05  111.31  103.05  112.98  104.05  113.32  108.05  113.86  113.05  114.18
  137.05  114.42  137.72  114.42  137.72  108.42  147.72  108.22  238.72  107.09
  241.72  107.39  265.72  106.91  271.72  106.31  281.72  106.11  287.72  105.51
 1012.99  105.51 1013.99  105.52 1126.98  105.52 1314.67  106.46 1317.95  106.74
 1321.23  108.35 1334.35  113.09 1337.63  113.74 1344.19  113.95 1376.99  112.78
 1393.39   111.9 1403.22  111.11 1409.78  110.87  1439.3  108.26 1449.14  106.59
  1455.7  106.46 2173.96  106.46 2177.24  107.58  2183.8  111.71 2187.08     113
 2196.92  114.38 2203.48  114.77  2216.6  114.97 2226.44  114.88 2242.84     115
 2252.68  114.68 2262.52  112.88  2265.8  111.83 2272.36  107.69 2275.64  106.52
 2278.92  106.46 4987.52  106.46 4993.96  107.03 5003.61  110.12 5013.27  111.46
 5029.37  113.09 5045.47  114.51 5055.13  114.25 5064.79  114.73 5068.01  114.54
 5071.23   113.3 5077.67  108.31 5084.21  105.14 5090.76  101.65 5094.04  100.47
 5097.31   99.95 5107.13    99.4 5113.68   99.33  5123.5    98.9 5143.15   95.97
  5149.7   94.83 5159.52   94.31 5169.34   94.61 5172.62   94.96 5179.17    97.2
 5185.71   98.47 5192.26   98.88 5218.46   99.71    5225   99.57 5241.38  100.46
 5247.92  100.31 5257.75   99.58 5267.57    98.2 5277.39   96.43 5287.21   94.17
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 5293.76   93.91 5303.59   93.89 5313.41   93.11 5326.51    92.9 5336.33   93.15
 5346.15   94.15 5349.42   95.19 5355.97   98.37 5362.52     101 5369.07  103.18
 5385.44     109 5391.99  111.68 5395.26  112.67 5401.81  112.99 5405.09  112.16
 5414.91  106.54 5424.73  102.53  5441.1  100.06 5447.65  100.29  5454.2   99.79
 5473.84  100.28 5480.39  100.71 5490.22  100.31 5496.76   99.72 5503.31    99.5
 5513.14   99.57 5522.96   99.95 5545.88  100.43  5555.7   99.78 5565.52   99.66
 5572.07   99.14 5578.62   98.04 5588.44   97.71 5601.54   97.64 5617.91   98.25
 5624.46   99.24 5631.01   99.76 5637.56    99.7  5644.1   99.06 5650.65   98.97
 5667.02   97.24 5673.57   97.14 5686.67   97.45 5699.77   97.01 5703.04   96.71
 5716.14   96.67 5729.23   97.45 5742.33   97.78  5745.6   97.53 5752.15   97.64
 5765.25    98.6 5775.07   99.12 5781.62   98.81 5794.72   99.24 5804.54   98.02
 5814.36   95.61 5820.91   94.72 5830.73   94.19 5843.83   94.39 5853.65   95.29
  5873.3   94.77 5879.85   94.07  5886.4   93.94 5896.22   95.16 5915.86    96.3
 5922.41   96.83 5932.23   97.12 5945.33   98.48 5955.15   98.84 5964.98  100.37
  5974.8  100.57 5981.35  100.91  5987.9  100.87 5994.44   100.5 6010.82   99.27
 6033.73   97.23 6043.56   96.06 6053.38   95.62  6063.2   95.65 6073.03   95.22
 6082.85    96.5  6089.4   96.92 6099.22   96.56 6105.77   95.54 6112.32   93.95
 6125.41    91.5 6135.24   91.36 6145.06   92.16 6154.88   91.69 6161.43   91.61
 6167.98   92.39 6174.53   93.58 6181.07   94.07 6184.35   93.82 6197.45    89.8
 6203.99   87.97 6210.54   87.32 6220.36   87.32 6233.46   86.73 6243.28    87.2
 6253.11   87.47 6259.66    88.7  6279.3   88.77 6285.85   88.07 6295.67   86.31
 6302.22   84.15 6305.49   83.54 6312.04   83.22 6315.32   82.73 6321.87    80.8
 6328.41   77.39 6338.24   73.63 6344.78   73.13 6358.23   68.69 6385.23   50.72
 6413.23   50.53 6426.23   49.43 6438.23   49.83 6449.23   49.23 6460.73   49.13
 6471.23   49.23 6482.23   48.83 6493.73   48.83 6504.23   51.33 6560.91   73.13
 6567.46   73.44 6583.86   77.11 6590.42   78.42  6593.7   79.47 6600.25    82.2
 6606.81   83.21 6610.09    82.9 6613.37   84.06 6619.93   91.14 6623.21   93.61
 6629.76   97.69 6633.04   99.38 6636.32   99.81 6659.28   99.49 6678.95   99.64
 6692.06    99.6 6715.02    99.7 6757.64   99.67 6770.76  100.42 6777.32  100.36
 6787.16  102.12 6790.44  101.04 6793.71   100.9 6800.27  101.72 6813.39  101.62
 6823.23  101.18 6833.06  101.11 6839.62  101.37 6846.18  101.25 6852.74  101.47
 6885.53   101.5 6892.09   101.4 6908.48  101.56 6918.32  101.38 6960.95  101.47
 6970.79   101.3  7000.3  101.44 7023.25  101.46 7039.65  101.29 7049.49  101.43
 7085.56  101.31 7101.95  101.41 7124.91   101.4 7131.47  101.27 7203.61  101.32
 7213.45  101.27 7239.68  101.34 7249.52  101.24 7262.63  101.39 7308.54  101.44
 7318.38  101.33 7321.66   101.5  7331.5  101.27 7347.89  101.33  7377.4  101.13
 7416.75  100.96 7426.59  101.07 7439.71  100.85 7459.38  100.94 7462.66  100.81
 7521.69     101 7531.52  100.87 7538.08  101.39  7551.2  100.53 7561.04  100.12
 7567.59   99.59 7580.71   99.43 7593.83   99.61 7603.66   99.42 7616.78   100.7
 7623.34  100.47  7629.9  101.31 7636.46  103.13 7643.01  105.81 7646.29  106.43
 7669.25  106.45 7672.53  105.96 7682.36  103.23 7685.64  103.15 8033.23  103.15
 8046.35  103.46 8052.91  104.54 8059.47   105.2 8062.75  106.48 8066.02  106.73
  8069.3  105.87 8075.86  105.58 8082.42  103.85  8085.7  103.39 8098.82  102.78
 8377.55  102.78  8416.9  102.86 8420.18  103.65 8426.74  105.88  8433.3  106.03
 8439.86  105.15 8446.42  105.86 8456.25  106.27 8462.81  106.01 8475.93  103.83
 8479.21  103.56 8485.77  102.39 8495.61  101.64 8505.44  101.32 8515.28  101.46
 8521.84  101.17 8531.68  100.38  8544.8  100.66 8548.08   100.5 8574.31  100.76
 8587.43  101.43 8603.82  101.35 8613.66  102.08 8630.06  102.25  8639.9   102.6
 8646.45  102.22 8656.29  102.39 8662.85  103.26 8669.41  102.74 8692.36  102.72
 8698.92  102.92 8705.48  102.24 8725.16  102.16 8738.27  102.31 8748.11  101.94
 8754.67  102.16 8761.23  102.71 8771.07  102.47 8780.91  102.62 8794.02   103.2
 8803.86  103.31 8810.42  104.08 8823.54  104.98 8830.09  105.74 8843.21   106.5
 8862.89  105.47 8872.73  103.86 8889.12  102.82 8902.24  103.16 8905.52  103.04
 8925.19  103.26 8935.03  103.62 8941.59  103.65 8961.27  104.08 8964.55  104.65
 8974.38  104.83  8987.5  104.75 8994.06  104.18 9000.62  104.62 9013.74  104.97
 9030.13  104.86 9036.69  105.13 9056.37  104.71  9066.2  104.79 9072.76  105.08
 9085.88  104.76 9095.72  104.86 9102.28  105.52 9108.83  104.91 9118.67  104.53
 9128.51     105 9135.07  105.76 9144.91  105.48  9161.3   106.1 9167.86  105.93
 9187.54  106.77  9194.1  106.54 9200.66  106.83 9203.93  106.45 9213.77  106.59
 9236.73  106.57 9249.84  106.89  9256.4  106.75 9269.52  106.98 9292.48  106.87
 9331.83  107.17 9354.78  107.18 9364.62   107.3  9384.3  106.96 9403.97   107.1
 9436.76   107.1 9443.32  106.84 9449.88  107.03 9485.95  106.61 9489.23  106.18
 9495.79  104.28 9505.63  100.49 9512.19   98.83 9518.75   98.52 9522.03   99.07
  9541.7  105.33 9548.26  106.57 9554.82  106.78 9571.22   106.6 9584.33  106.69
 9600.73  106.24 9607.29  105.24 9620.41  100.23 9623.68   99.79 9633.52   100.3
 9646.64  100.21 9656.48  100.88 9659.76  100.65 9679.43  100.78 9692.55   99.48
 9702.39  100.13 9712.23    99.9  9715.5  100.16 9725.34  100.29  9731.9  101.18
 9741.74  101.32 9751.58  100.55 9758.14  100.44 9794.21   101.4 9823.72  101.65
 9830.28  101.84 9863.07  101.94 9876.19  101.55 9889.31  101.42 9895.87  100.61
 9908.98  100.17 9928.66  100.57 9935.22  100.82 9941.78  100.62 9948.33  100.76
 9971.29  100.77 9987.69   99.92 9994.25    99.9 10000.8  100.3110010.64   99.73
10027.04 100.0510036.88  101.4110049.99  101.610056.55  101.9210066.39  102.08
10076.23 103.0410089.34  105.5510099.18  108.52 10112.3  110.3810122.14  109.91
 10128.7 109.2810151.65  108.8310161.49  105.2410168.05  104.2910181.17  103.88
10184.44 102.9810194.28   98.4310197.56    98.110374.64   98.1110387.76   98.95
10391.04  100.06 10397.6  104.1110400.88  105.0510410.72  105.4110423.83  106.62
10440.23  107.02

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5401.81     .12 5981.35     .07 6328.41    .025 6504.23     .07
 6659.28    .066 9505.63     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5981.35 6659.28          1440.02 1665.03 1862.69             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5981.35  100.91       T
 6659.2810440.23   99.49       T
Left Levee      Station=  137.72      Elevation=  114.42
Right Levee     Station= 10112.3      Elevation=  110.38
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1337.63 5029.37  113.74 6659.28 8843.21   106.5

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            108.09    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.40    Wt. n-Val.                 0.089      0.060     0.062
  W.S. Elev (ft)            107.69    Reach Len. (ft)          1440.02    1665.03   1862.69
  Crit W.S. (ft)             78.20    Flow Area (sq ft)        7942.43   19303.33   7466.06
  E.G. Slope (ft/ft)      0.000597    Area (sq ft)            10580.96   19303.33   7480.09
  Q Total (cfs)           125000.00     Flow (cfs)             9593.05   105673.90    9733.02
  Top Width (ft)            6115.60    Top Width (ft)          2000.52     677.93   3437.14
  Vel Total (ft/s)             3.60    Avg. Vel. (ft/s)           1.21       5.47      1.30
  Max Chl Dpth (ft)           58.86    Hydr. Depth (ft)           3.97      28.47      2.17
  Conv. Total (cfs)       5114573.0     Conv. (cfs)            392514.7   4323816.0   398242.1
  Length Wtd. (ft)          1681.90    Wetted Per. (ft)        2009.37     707.14   3442.20
  Min Ch El (ft)              48.83    Shear (lb/sq ft)           0.15       1.02      0.08
  Alpha                        1.97    Stream Power (lb/ft s)     0.18       5.57      0.11
  Frctn Loss (ft)              1.32    Cum Volume (acre-ft)    121065.30   47615.91   158123.70
  C & E Loss (ft)              0.02    Cum SA (acres)          17346.09    2149.07   19931.79
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Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 153.85

INPUT
Description: RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 480

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	97.9	6.93	97.92	7.92	97.75	18.82	95.27	20.8	94.92
26.75	94.41	28.73	94.41	37.65	96.29	49.54	99.04	50.53	99.25
64.4	101.43	74.31	103.59	83.23	105.78	85.21	106.53	96.19	112.65
97.19	112.94	103.19	113.83	104.19	113.91	111.19	114.2	113.19	114.24
137.19	114.48	137.86	114.48	137.86	108.48	147.86	108.28	238.86	107.1
241.86	107.4	265.86	106.92	271.86	106.32	281.86	106.12	287.86	105.52
1053.15	105.52	1054.15	105.51	1122.15	105.51	1936.81	106.46	1946.65	107.83
1959.76	111.09	1966.32	113.65	1976.16	113.73	1989.28	112.86	2005.68	111.21
2008.96	109.8	2012.24	107.09	2015.51	106.46	4806.32	106.46	4812.88	106.99
4822.71	109.16	4842.39	110.68	4865.35	114.62	4868.63	114.87	4878.46	114.64
4891.58	115.05	4894.86	114.97	4898.14	114.18	4904.7	109.84	4911.26	107.07
4921.1	105.44	4927.65	103.78	4934.21	101.32	4947.33	93.82	4950.61	92.58
4957.17	91.47	4960.45	91.66	4967.01	94.58	4970.29	95.55	4976.85	96.82
4983.41	99.01	4986.68	99.53	4996.52	100.1	5012.92	100.04	5022.76	99.61
5035.88	98.46	5039.16	98.39	5052.27	99.51	5062.11	99.6	5078.51	100.57
5127.7	101.35	5144.1	102.2	5157.21	101.73	5167.05	101.84	5176.89	101.7
5183.45	102	5196.57	101.67	5209.69	101.64	5216.24	101.46	5226.08	100.38
5242.48	100.52	5252.32	100.92	5265.44	101.19	5275.27	101.7	5285.11	100.7
5298.23	100.35	5324.47	99.03	5337.58	98.89	5350.7	98.57	5357.26	98.13
5360.54	98.32	5367.1	97.9	5386.77	97.53	5393.33	96.99	5399.89	97.04
5406.45	97.42	5413.01	97.24	5429.41	97.92	5439.24	99.16	5452.36	99.76
5462.2	99.18	5472.04	99.13	5485.16	98.53	5501.55	97.29	5508.11	97.21
5521.23	93.12	5527.79	89.45	5534.35	83.56	5537.63	82.31	5544.19	81.12
5550.75	79.58	5560.58	77.74	5567.14	75.65	5573.7	74.28	5590.1	73.05
5593.38	73.03	5598.1	70.94	5599.1	68.64	5629.1	66.54	5639.1	66.84
5659.1	66.44	5669.1	66.44	5679.1	67.04	5699.1	67.04	5709.1	67.44
5719.1	67.44	5739.1	68.24	5749.1	68.94	5759.1	68.44	5769.1	68.44
5769.92	73.03	5776.46	73.79	5796.07	80.83	5799.34	82.31	5812.41	89.47
5815.68	90.23	5825.49	89.27	5828.75	89.24	5838.56	89.86	5851.63	90.36
5861.44	89.92	5871.24	90.05	5877.78	89.4	5884.32	88.33	5890.86	88.73
5900.66	88.81	5907.2	89.6	5920.27	92.31	5926.81	92.56	5943.15	94.15
5949.69	95.72	5956.23	97.86	5962.76	98.42	5982.37	97.84	5992.18	97.91
6001.99	98.27	6015.06	98.49	6031.4	99.06	6047.74	100.02	6067.36	100.39
6073.89	100.36	6080.43	99.28	6090.24	98.87	6103.31	99.58	6116.38	99.63
6122.92	99.46	6139.26	99.75	6162.14	99.9	6168.68	99.76	6198.1	99.95
6237.32	99.81	6243.86	99.98	6266.73	99.79	6289.61	99.86	6319.03	99.74
6325.57	99.58	6335.37	99.81	6348.45	99.64	6354.98	99.76	6368.06	99.48
6381.13	99.53	6384.4	99.38	6397.48	99.61	6410.55	99.36	6426.95	99.48
6430.23	99.38	6459.75	99.43	6469.58	99.25	6476.14	99.43	6485.98	99.31
6512.22	99.4	6522.06	99.54	6531.9	99.37	6561.42	99.4	6574.53	99.24
6590.93	99.4	6600.77	99.25	6607.33	99.37	6617.17	99.21	6633.57	99.23
6659.81	99.03	6709	98.93	6715.56	99.09	6754.92	98.81	6768.04	98.92
6790.99	98.85	6797.55	99.03	6807.39	98.86	6827.07	98.85	6836.91	98.63
6856.59	98.78	6876.27	98.43	6889.39	98.34	6895.94	98.55	6905.78	98.39
6918.9	98.44	6932.02	98.21	6948.42	98.22	6961.54	98.53	6981.22	98.42
7000.9	98.74	7023.85	99.22	7027.13	99.05	7050.09	101.06	7056.65	100.9
7063.21	101.13	7089.45	100.87	7109.13	101.26	7115.68	101.1	7148.48	101.27
7155.04	101.16	7174.72	101.28	7191.12	101.13	7210.8	101.21	7227.19	101.12
7233.75	101.32	7246.87	101.35	7263.27	101.11	7273.11	101.13	7282.95	101.37
7299.35	100.97	7302.63	101.16	7319.03	100.99	7322.31	101.28	7335.42	101.28
7345.26	101.08	7351.82	101.2	7358.38	100.98	7364.94	101.22	7371.5	100.96
7378.06	101.22	7384.62	101	7397.74	101.35	7404.3	101.16	7414.14	101.42
7453.49	101.39	7460.05	101.56	7483.01	101.49	7505.97	101.29	7512.53	101.46
7532.21	101.46	7538.77	101.26	7561.72	101.47	7565	101.65	7584.68	101.46
7617.48	101.63	7627.32	101.31	7643.72	101.47	7647	101.66	7666.67	101.53
7683.07	101.68	7712.59	101.56	7719.15	101.65	7735.55	101.35	7742.11	101.56
7751.95	101.57	7761.79	101.38	7768.34	101.57	7774.9	101.36	7791.3	101.24
7807.7	101.33	7827.38	101.03	7833.94	101.29	7840.5	101.13	7856.9	101.11
7873.29	100.92	7876.57	101.05	7892.97	100.86	7902.81	101.03	7915.93	100.83
7925.77	100.91	7942.17	100.63	7948.73	100.78	7955.29	100.47	7961.85	100.65
7994.64	100.48	7997.92	100.56	8017.6	100.43	8024.16	100.55	8037.28	100.39
8079.92	100.38	8086.47	100.2	8122.55	100.21	8138.95	100.15	8148.79	99.91
8168.47	99.99	8191.43	99.79	8211.1	99.88	8227.5	99.83	8243.9	99.64
8250.46	99.79	8270.14	99.73	8299.66	99.75	8316.05	99.62	8325.89	99.9
8348.85	99.77	8358.69	99.58	8365.25	99.7	8394.77	99.59	8421	99.33
8427.56	99.17	8434.12	99.34	8450.52	99	8460.36	98.62	8463.64	98.8
8476.76	98.37	8496.44	98.59	8506.28	98.07	8516.12	97.33	8525.95	97.54
8548.91	97.24	8562.03	97.81	8598.11	97.84	8611.23	98.31	8617.79	99.54
8621.07	100.61	8624.35	102.43	8640.74	105.57	8647.3	105.87	8686.66	105.29
8722.74	105.51	8752.25	105.53	8798.17	105.72	8837.53	105.51	8860.48	105.25
8876.88	105.29	8922.8	105.63	8945.76	105.41	8971.99	105.41	8981.83	105.55
9017.91	105.49	9040.87	105.71	9050.7	105.64	9070.38	105.81	9106.46	105.61
9126.14	105.69	9132.7	105.57	9158.93	105.43	9185.17	105.37	9214.69	105.5
9260.6	105.24	9267.16	105.39	9286.84	105.44	9322.92	105.77	9372.11	105.51
9385.23	105.63	9391.79	105.84	9424.59	105.9	9454.1	106.02	9486.9	105.77
9572.17	105.73	9578.73	105.8	9604.97	105.69	9624.64	105.74	9634.48	105.9
9677.12	105.79	9719.75	105.49	9742.71	105.49	9749.27	105.37	9801.75	105.41
9844.38	105.67	9867.34	105.64	9913.25	105.71	9926.37	105.57	9946.05	105.55
10001.81	105.0210014.92		105.0610024.76		105.2610060.84		105.0710093.64		105.32
10132.99	105.2210139.55		105.0810178.91		105.210188.75		105.3910195.31		105.26
10221.54	105.3810234.66		105.2610254.34		105.2410270.74		105.1110303.53		105.09
10333.05	104.9610356.01		105.110392.08		104.9410398.64		105.0210418.32		104.78
10438	104.810451.12		104.610464.24		104.7810483.92		104.710503.59		104.75
10516.71	104.5510529.83		104.7710546.23		104.7610559.35		104.6210569.19		104.24
10582.31	102.8310601.98		101.1910611.82		99.5410621.66		99.4310638.06		99.83
10661.02	100.1110680.69		99.9410687.25		99.6510697.09		99.5610713.49		99.93
10723.33	100.7310736.45		100.4410746.29		100.8410762.69		100.9810782.36		100.93
10795.48	100.7310802.04		100.8910831.56		100.9710851.24		101.14 10857.8		101.38
10874.19	101.1710900.43		101.4610913.55		100.6810933.23		100.310946.35		100.41
10959.47	100.32 10969.3		100.0310982.42		100.5810998.82		100.6911021.78		101.28
11054.58	102.511061.14		102.6511080.81		103.8511087.37		103.9111107.05		104.67
11126.73	104.5911139.85		104.7311156.24		104.4311189.04		104.2611202.16		104.02
11208.72	104.15	11212	103.5611221.84		98.08 11244.8		98.4111254.63		98.1

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11343.19   98.1211346.47   98.6311353.02   102.7 11356.3  103.7111359.58  103.96
11369.42  103.4211375.98  103.3811395.66  104.5211408.78  104.8611415.34  104.31
11425.18  104.5811441.58  104.5811451.41  104.7111464.53  104.4911474.37  104.54

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .132  5462.2    .066  5598.1    .015 5769.92    .066 6047.74    .076

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        5462.2 6047.74          1187.43    1110  998.61             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  5462.2   99.18       T
Left Levee      Station=  137.86      Elevation=  114.48
Right Levee     Station=11107.05      Elevation=  104.67
Blocked Obstructions     num=      4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   93.75 4865.35  113.67 4934.21 5078.51  100.57 6073.89 7050.09  100.36
 7768.3411054.58  101.57

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            106.74    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.61    Wt. n-Val.                 0.132      0.054     0.076
  W.S. Elev (ft)            106.13    Reach Len. (ft)          1187.43    1110.00     998.61
  Crit W.S. (ft)             91.35    Flow Area (sq ft)        3023.92   13272.30   18306.30
  E.G. Slope (ft/ft)      0.001086    Area (sq ft)             3163.48   13272.30   18306.30
  Q Total (cfs)           125000.00     Flow (cfs)              3509.57   94973.68   26516.75
  Top Width (ft)           6557.42    Top Width (ft)           545.25     585.54    5426.63
  Vel Total (ft/s)            3.61    Avg. Vel. (ft/s)           1.16       7.16       1.45
  Max Chl Dpth (ft)          39.69    Hydr. Depth (ft)           5.55      22.67       3.37
  Conv. Total (cfs)       3792516.0     Conv. (cfs)            106480.6   2881514.0   804521.7
  Length Wtd. (ft)         1083.45    Wetted Per. (ft)         546.58     601.33    5432.10
  Min Ch El (ft)             66.44    Shear (lb/sq ft)           0.38       1.50       0.23
  Alpha                       3.02    Stream Power (lb/ft s)     0.44      10.71       0.33
  Frctn Loss (ft)             0.39    Cum Volume (acre-ft)    120838.10   46993.32   157572.30
  C & E Loss (ft)             0.09    Cum SA (acres)          17304.01    2124.92   19742.28


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 153.61

INPUT
Description: RGV-04,  6-foot wall applied with 10:1 SS, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     472
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  100.43      15  100.42   38.99  100.65   90.99  100.58  107.99   100.7
  111.99  101.06  117.99   102.8  122.99  101.27  127.99   99.42  130.99   99.52
  146.99  100.69  160.99   95.17  167.99   94.09  169.99   94.16  178.99   95.81
  185.99   97.47  191.99   99.51  203.99  100.34  214.99   102.4  220.98  103.84
  230.98  107.04  239.98  111.28  247.98  113.43  255.98  113.89  279.98  114.13
  280.65  114.13  280.65  108.13  290.65  107.93  381.65   107.1  384.65   107.4
  408.65  106.92  414.65  106.32  424.65  106.12  430.65  105.52 1249.94  105.52
 1284.94  105.51  1934.7  106.46 1937.98  106.68 1944.53  108.49 1951.09  109.56
 1970.77  111.52 1977.33  112.67 2000.28  113.02 2026.51  112.76 2049.47  111.85
  2075.7  109.89 2101.93  106.46 3816.88  106.46 3820.16  106.71 3826.72  108.89
 3829.99   109.3 3849.67  109.74  3875.9  111.46 3895.58  113.75 3915.25  115.27
 3941.48  115.54 3944.76  114.85 3951.32  111.93 3957.88  109.84 3970.99  104.62
 3990.67   99.83 4000.51   97.21 4013.62   93.33 4020.18    92.3 4030.02   91.65
 4049.69   91.76 4062.81   92.54 4072.64   93.51  4079.2   94.96 4089.04    94.6
 4115.27   95.32 4154.62   95.62 4161.18   95.87 4180.86   95.67 4197.26   96.36
 4200.54   96.27 4216.93   97.13 4266.12   97.41 4275.96   97.28 4295.63    97.9
 4328.43   96.74 4338.27   96.61  4348.1   96.08  4364.5   96.15 4384.18   96.01
 4397.29   96.27 4413.69   96.25 4420.25   96.01 4446.48   96.09  4459.6   96.38
 4492.39   96.24 4505.51   96.54 4531.74   97.64  4538.3   98.51 4551.42    98.4
 4577.65   99.35 4607.17   98.75 4617.01   99.12 4623.56   98.99 4659.64    99.2
  4666.2   98.96 4676.03   99.39 4692.43   98.99 4715.38   99.14 4721.94   98.96
  4744.9   99.54 4758.02   99.52 4764.57   99.81 4777.69    99.3 4797.37   99.05
 4813.76   99.49 4826.88   98.99    4840   99.24 4853.11   99.05 4872.79   99.16
  4902.3   99.67 4908.86    99.4 4925.26   99.92 4931.82   99.34 4948.21   99.13
 4961.33   99.34 4974.45    99.1 4994.12   99.03 5020.36   99.57 5046.59   99.28
 5062.99   99.61 5069.55   99.42 5095.78   99.72 5115.46   99.54  5125.3  100.19
 5144.97   99.45 5167.93   99.81 5177.77   99.49 5200.72   99.88 5223.68   99.49
 5230.23   99.66 5249.91   99.21  5282.7   99.66 5302.38    99.6 5308.94   99.83
 5325.33   99.66 5341.73  100.14 5351.57   99.81 5364.69   99.98 5371.24    99.5
 5381.08   99.39 5387.64   99.76  5394.2  100.82 5407.32  101.46 5413.87  101.32
 5420.43  100.31 5430.27   99.52 5446.67   99.37 5466.34   99.45  5489.3   99.31
 5499.14   99.48 5512.25   99.33 5525.37   99.78 5541.77    99.7 5558.16   98.76
 5564.72   98.64 5574.56    97.7 5594.24   96.31 5600.79   96.16 5610.63   96.57
 5627.03   96.04 5633.59   96.33 5640.15   95.44 5649.98   92.81 5656.54   91.81
 5669.66   93.19 5686.06   94.57 5692.61   92.58 5705.73   84.43 5712.29   81.81
 5718.85   78.08 5728.69   73.25 5731.97      73 5734.97   54.25 5742.97    54.4
 5752.97    54.3 5753.47    54.3 5757.97   54.54 5761.97    54.7 5763.97   54.88
 5769.97   55.41 5772.97    55.6 5776.97   56.53 5876.26      73 5882.81   73.21
 5889.37   77.34 5895.93   80.81 5899.21   81.88 5915.61   83.72 5925.45   83.44
 5941.84   83.68  5964.8   84.59 5974.64   85.67 5994.31    89.3 6007.43   93.08
 6020.55   95.36  6027.1   97.05  6043.5   98.53 6056.62   98.56 6073.01   99.06
 6099.25      99 6109.09   99.19  6122.2   99.02 6132.04   99.19 6145.16   98.84
 6191.07   99.06 6207.47   98.83  6217.3   99.03 6256.66   98.87 6282.89      99
 6305.85   98.84 6322.24   98.94 6351.76   98.73 6368.15   98.85 6391.11   98.62
 6404.23   98.78 6443.58   98.74 6459.97   98.59 6482.93   98.68 6505.88   98.61
 6561.63   98.71 6564.91    98.5 6578.03   98.81 6607.55   98.67 6682.97    98.8
 6689.53   98.99 6705.93   98.81 6761.67   99.13 6778.07   98.94 6810.86   99.14
 6823.98   98.91 6879.73   99.22 6935.48   99.16 6978.11   98.92 6991.23   99.12
 7007.62   98.75 7017.46   98.92 7046.97   98.81 7079.77   98.99    7106   98.91
 7128.96   98.65 7145.36   98.88 7155.19   98.67 7187.99   98.91  7201.1   98.72
 7224.06   98.73 7253.57   98.57 7283.09   98.66 7302.76   98.31 7309.32   98.57
 7325.72    98.4 7342.12    98.6 7358.51    98.4 7388.03   98.56 7404.42   98.29
 7420.82   98.56 7473.29   98.61 7489.69   98.46 7506.08   98.81 7515.92   98.34
 7532.32   98.63 7558.55   98.48 7574.95   98.67 7581.51   98.44 7604.46   98.54
 7640.54   98.21 7663.49   98.35 7683.17   98.03 7699.56   98.46 7712.68   98.15
 7735.64   98.31 7752.03   98.11 7781.55    98.3 7794.67   98.08 7840.58   97.96
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 7876.65   97.43 7883.21   96.98 7893.04   96.98 7909.44   96.37 7929.12   96.15
 7981.59    96.4 8007.82   96.26 8030.78   96.36  8106.2    96.2 8171.79    96.2
 8207.86   96.05  8217.7   96.15 8250.49   95.99 8289.84   96.07 8299.68   95.98
 8339.03   96.05 8345.59   95.94 8411.18   96.03 8460.37    95.7    8503    95.6
 8516.12   95.24 8525.95    95.7 8552.19   95.72 8562.03   96.76 8568.58   98.34
 8571.86   98.14 8575.14  100.06 8591.54  100.45  8598.1  100.36 8653.85  100.57
 8680.08  100.91 8706.31  100.48 8719.43  100.74 8745.67  100.86 8768.62  100.74
 8840.77  100.56 8880.12  100.62 8916.19  100.47 8932.59  100.63  8978.5  100.33
 9008.01  100.34 9014.57  100.14 9080.15  100.14 9106.39   99.95 9129.34  100.08
 9165.42   99.92 9181.81  100.15 9201.49   99.86 9234.28   99.97 9253.96   99.82
 9273.63   99.93 9283.47   99.66 9296.59    99.8 9329.38   99.79 9362.17   99.56
 9365.45   99.68 9411.36   99.46 9460.55   99.65 9473.67   99.43 9519.58    99.6
 9539.26   99.79 9555.65   99.59 9581.89   99.75 9614.68   99.72 9631.08   99.58
 9647.47   99.67 9673.71   99.23 9693.38   99.26 9709.78  100.33  9722.9   99.65
 9736.01  100.22 9755.69  100.47 9768.81  101.33 9775.37  102.24 9781.92  102.49
  9785.2  101.73 9798.32  101.04 9804.88  100.34 9811.44   98.82 9821.28   95.58
 9831.11   91.87 9837.67   90.56 9844.23   90.07  9880.3   89.99 9919.65   90.23
 9926.21   91.05 9939.33   93.76 9945.89    95.6 9955.73   99.75 9962.29  101.53
 9981.96   101.3 9988.52  101.7510004.92  102.3210024.59  101.9210044.27  101.08
10054.11  100.9210077.06  101.0710090.18  100.9210103.29  101.0810109.85  100.59
10122.97  100.2910149.21  100.0210159.04   99.7210198.39    99.110214.79   99.01
10224.63   99.2910241.03   99.3410250.86  100.27 10260.7    99.610283.66    99.2
10296.77   98.6110326.29   98.45 10355.8   98.5210378.76   98.2710404.99   98.47
10431.22   98.2510454.18   98.39 10467.3   98.1810503.37   98.2910549.28   98.13
10582.07   98.2710598.47   98.1310618.14   98.2210631.26    9810650.94   98.16
10680.45   98.0210772.27   98.0210811.62    97.910883.77   97.9510913.28   97.84
10923.12   97.9410952.63   97.8310995.26   97.9611008.38   97.8911067.41   97.99
 11083.8   97.8211126.44   97.9611224.81   97.5811300.24   97.5111323.19   97.62
11329.75   97.4811355.99   97.4811365.82   97.3211382.22   97.4911388.78   97.89
 11401.9   97.5911408.46   98.0911437.97   97.0911447.81   97.45 11464.2   98.66
11500.28    98.611506.83   98.1511513.39   98.3411523.23  100.7711529.79  101.24
11539.63   99.6411552.74   99.1411562.58   97.1711569.14    96.311585.54      96
 11592.1   96.1411615.05   97.6111634.73   97.3511657.68   97.5511674.08    97.3
11746.22   97.4111779.02   97.3411798.69   97.5911821.65    97.6   11861   97.96
11870.84   98.8411877.39  100.6911880.67  101.0411887.23    99.611900.35   98.13
11906.91    98.411916.75  101.81 11923.3  102.8111929.86  102.9211942.98  102.28
11949.54   99.22 11956.1   97.3311962.66   97.1512185.65   97.1512188.93   97.78
12198.77  101.9412202.04   102.812218.44   104.212244.68  104.8512261.07  104.16
12290.59   103.612300.42  104.78

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5525.37     .07 5718.85    .025 5895.93     .07 6073.01    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5525.37 6073.01          1342.72    1110     910             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5525.37   99.78       T
 6073.0112300.42   99.06       T
Left Levee      Station=  280.65      Elevation=  114.13
Right Levee     Station=12244.68      Elevation=  104.85
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   229.6 1976.99  112.68 2023.38 3891.89  112.76

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            106.26    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.33    Wt. n-Val.                 0.066      0.030     0.066
  W.S. Elev (ft)            105.93    Reach Len. (ft)          1342.72    1110.00    910.00
  Crit W.S. (ft)             90.14    Flow Area (sq ft)        9459.90   12400.41  40304.56
  E.G. Slope (ft/ft)      0.000179    Area (sq ft)            11965.06   12400.41  46385.95
  Q Total (cfs)           125000.00     Flow (cfs)             9467.77   73441.40  42090.82
  Top Width (ft)           8332.73    Top Width (ft)          1557.68     547.64   6227.41
  Vel Total (ft/s)            2.01    Avg. Vel. (ft/s)           1.00       5.92      1.04
  Max Chl Dpth (ft)          51.68    Hydr. Depth (ft)           6.07      22.64      6.47
  Conv. Total (cfs)       9348888.0    Conv. (cfs)             708105.0   5492764.0  3148019.0
  Length Wtd. (ft)         1063.01    Wetted Per. (ft)        1560.44     574.91   6237.45
  Min Ch El (ft)             54.25    Shear (lb/sq ft)           0.07       0.24      0.07
  Alpha                       5.21    Stream Power (lb/ft s)     0.07       1.43      0.08
  Frctn Loss (ft)             0.20    Cum Volume (acre-ft)    120631.90   46666.23  156830.80
  C & E Loss (ft)             0.07    Cum SA (acres)          17275.35    2110.48  19608.69


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 153.36

INPUT
Description: RGV-04, 8-foot wall applied with 10:1 SS, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     462
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.21       7  111.21      31  111.45   31.67  111.45   31.67  103.45
   41.67  103.25  132.67   102.7  135.67     103  159.67  102.52  165.67  101.92
  175.67  101.72  181.67  101.12     189  101.26     227  101.66     280  101.77
     310  101.28     333  101.14     337  100.65     353  100.84     370   99.69
     384   95.05     391   94.14     430   94.82     478   95.06     561   95.12
  589.99   95.02  630.99   95.54  829.99   95.63  871.99   96.13  910.99    97.3
  950.99    99.3  976.99   99.67  993.99   99.65 1026.53   99.56 1046.21   99.75
 1072.44   99.48 1105.24   99.46  1111.8   99.67 1131.48   99.28 1154.43   99.52
 1190.51   99.31 1262.66   99.28  1288.9   99.42 1318.42   99.94 1361.05   99.88
 1410.25  100.05 1429.92   99.93 1488.96  100.18 1521.75   99.83 1613.58   99.74
 1682.46  100.02 1689.01   99.89 1738.21  100.15 1780.84  100.24 1790.68  100.54
 1823.48  100.39 1846.44  100.69 1875.95  100.62 1905.47  100.85 1921.87   100.7
 1944.83  100.94  1997.3  100.67 2046.49  100.85 2069.45  100.58 2121.93  100.83
 2138.33  100.65 2151.45   101.2 2167.84  100.76 2200.64  101.45  2207.2  100.84
 2217.04   97.99 2230.16   95.18    2240   92.19  2725.4   92.19 2735.24   93.19
 2751.64   96.23 2771.31    97.3 2817.23   97.35 2836.91    97.8 2872.99    97.6
 2879.55   97.94  2902.5   97.54  2935.3   97.47 2964.82   97.99 2991.06   97.61
 3017.29   97.63 3030.41    97.9 3053.37   97.82 3059.93    98.1 3073.05   97.65
 3109.13   97.74 3148.48   97.58 3217.36   97.57 3233.76    97.7 3246.88   97.22
 3256.71   97.49 3289.51    97.4 3312.47    97.9 3328.87   97.49 3345.27   97.75
  3371.5   97.58 3378.06   96.98 3397.74   98.65  3437.1   97.87 3456.78   98.15
 3466.62   97.79 3489.57   98.23 3499.41   97.91 3525.65   98.34 3542.05   97.69
 3568.29   97.87 3581.41   98.23 3601.09   97.96 3620.76   98.36 3640.44   97.94
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 3686.36   98.05 3706.04   97.75 3758.51   97.98 3774.91   97.57 3781.47   97.86
 3801.15   97.55 3817.55   98.07 3830.67   97.74  3856.9   97.58 3866.74   97.78
 3899.54   97.39 3929.06   97.64 3974.97   97.35 3991.37    97.7 3997.93   97.36
 4011.05   97.75 4034.01    97.6 4043.85   98.18 4063.53   97.88 4076.65   97.13
 4089.76   97.55 4138.96    97.9  4148.8   97.46 4168.48   98.32 4184.88    97.6
    4198   97.95 4230.79   97.75 4237.35   98.03 4257.03   97.69 4306.23   97.65
 4352.14   97.94 4361.98   97.62 4398.06   97.72 4417.74   97.99 4437.42   97.59
 4453.81   97.78 4460.37   97.46 4496.45    97.8 4525.97   97.47 4555.49   98.05
 4578.44   97.59 4598.12   98.07 4644.04   98.12 4673.56   97.79 4696.51   98.21
 4716.19   97.92 4745.71   98.37 4778.51    97.8 4794.91   97.95 4808.02   98.68
 4821.14   98.22 4850.66   98.01 4863.78   98.31 4873.62   97.94  4909.7   98.14
 4916.26   97.77 4939.21   98.36 4972.01   98.03 5001.53      98 5014.65   97.63
 5037.61   97.96 5060.56   97.56 5096.64   98.04 5116.32   97.84 5158.96   98.08
 5195.03   97.79 5208.15   98.11 5227.83    97.8 5277.03   98.03 5342.62   98.01
 5506.61   98.74  5539.4   99.48 5545.96   99.01 5559.08   99.61 5575.48   99.27
 5585.32   97.23 5598.44   92.84 5611.56   90.53 5634.52   89.36 5654.19    90.7
 5667.31    90.5 5693.55   90.92 5700.11   90.18 5706.67   88.16 5716.51   86.84
 5726.35   86.78 5732.91    84.9 5755.87      73 5765.87   70.84 5775.87   70.24
 5835.87   69.04 5855.87   68.84 5895.87   68.84 5915.87   68.44 5925.87   68.44
 5935.87   69.74 5945.87   69.84 5955.87   72.84 5955.96      73 5959.24   73.08
  5965.8   75.33 5978.92   81.34 5988.76   88.65  5998.6   94.21 6005.17   97.23
 6011.73   98.24 6018.29   97.65 6044.53   98.35 6087.17   97.88 6201.98   98.16
 6234.79   98.12 6283.99   97.84 6326.63   98.17 6352.88   97.95 6369.28   98.07
 6428.32   98.02 6474.25   97.71 6520.17   97.75 6546.41    97.6 6589.06   97.65
 6661.22   97.41 6716.99   97.53 6779.31   97.33  6831.8   97.39 6890.84   97.18
 6949.89   97.16 6959.73   97.28 7035.17   97.14 7071.26   97.47 7136.86   97.31
 7169.67   97.52 7222.15   97.43 7291.04   97.44 7317.28   97.23 7399.29   97.41
 7412.41   97.13 7432.09   97.32 7569.86   97.02 7599.38   97.27 7664.99   97.15
 7678.11      97 7717.47   97.11 7786.36   96.91 7806.04   97.04 7851.96   96.58
 7881.49   95.86 7914.29   92.39 7963.49   91.75 8058.62   91.54  8078.3   91.63
 8173.43   90.95 8196.39   91.03 8225.92   90.75 8232.48   91.37 8248.88   90.61
 8255.44   90.79    8262   89.04 8271.84   88.02 8298.08    87.7 8304.64   86.13
 8334.17   82.62 8344.01   82.85 8347.29   83.72 8357.13   88.56 8363.69   89.17
 8389.93   90.39 8399.77      93 8416.17   99.46 8432.57   99.87 8448.98   99.04
  8478.5   98.86 8537.54   98.73 8563.79   99.85 8573.63   98.61 8580.19   99.34
 8596.59   97.93 8609.71   99.24 8622.83    98.7 8665.47   98.37    8695   98.71
 8721.24   98.11 8750.76   98.58  8793.4   98.29 8813.09   98.42 8839.33   97.84
 8901.65   97.48 8931.18   98.23 8970.54   98.34 8983.66    97.7 9000.06   92.19
  9009.9      91 9032.86   89.63 9387.13   89.63 9403.54   90.18  9426.5   91.83
 9433.06   93.33  9442.9   94.53  9459.3   92.42 9488.82   93.37  9508.5   96.03
 9524.91   96.49 9534.75    95.9 9551.15   95.92 9580.67   95.21 9600.35   95.11
 9620.03   95.43 9682.36   95.67 9711.88   95.58    9725   95.76 9764.37    95.7
 9823.41   95.14 9852.93   95.16 9882.46   94.93 9938.22   95.06 9993.98   95.05
10112.07   94.88 10190.8   94.89   10240   95.0810308.89   95.0210351.53   95.18
10413.86   95.1910433.54   95.4410495.87   95.5110541.79   96.0410581.15   96.21
10600.83    96.510715.64   96.8410761.57   97.2310791.09   97.2310823.89   97.76
10915.74   97.5310974.79   97.1510984.63   97.2711040.39   97.1111056.79   96.82
11073.19   97.1111092.88    96.811128.96   96.9611184.72   96.7911210.97   96.92
11283.13   96.7511361.86    96.111391.38   95.65 11404.5   95.6811417.62   96.43
11424.18   95.6411447.15    94.811470.11   95.0411479.95   95.7411499.63    95.1
11516.03   96.6611532.43   93.1611548.83   90.6611555.39   90.17 11571.8   90.13
11578.36   89.6311975.27   89.6311988.39   90.2612004.79   97.1212014.63   98.02
12027.75   97.4612037.59   98.2212047.44    97.712067.12   97.7812126.16   97.28
12149.12   97.8612162.25   97.3312201.61   97.7812250.81   97.5112270.49   98.58
12283.62    98.412296.74   98.85 12319.7   98.6812349.22   97.4512365.62   98.56
12411.55   98.5312437.79      9612460.75    96.612467.31   96.0212490.27   97.29
12506.67   96.9912523.08   97.4112555.88    97.212582.12   97.3112588.68   97.62
12628.04   96.6412651.01   97.5312657.57   96.9512683.81   97.0412736.29   96.73
12749.41   96.9712765.82   96.54 12785.5   96.59 12818.3   97.4112828.14    96.9
12841.26   97.5212864.22   97.7812880.62   97.5112913.43   97.6112923.27   99.04
12939.67   97.3112979.03   96.7312992.15   97.15   13002   96.9313011.84    97.8
13021.68   97.9813044.64   96.8713077.44   97.7813103.68   97.9213120.08   97.14
13139.77   97.6613156.17   97.7513175.85   95.5313185.69   95.3413221.77   97.64
13261.14   97.9713277.54    97.813290.66   99.28 13300.5   101.613310.34  101.57
 13316.9   99.6113336.58   96.6213352.98   95.0713362.83   95.0413375.95   96.11
13385.79   96.3113412.03   95.2813487.48   94.7713520.28   94.8713530.12   96.03
13539.96   99.24 13549.8  100.5913562.92   100.613569.48   99.0413589.16   98.79
13605.57   99.2413618.69  100.6713658.05  100.7113671.17  103.9413690.85  104.06
13697.41  103.4513710.53  100.9713723.66  100.9913743.34  102.3413759.74  102.29
13772.86  104.2813789.26  104.94

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .096 5559.08    .066 5755.87    .015  5965.8    .066 6011.73    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5559.08 6011.73          1522.36 1400.85 1430.05             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5559.08   99.61       T
 6011.7313789.26   98.24       T
Left Levee      Station=   31.67      Elevation=  111.45
Right Levee     Station=13789.26      Elevation=  104.94
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 2181.57 5557.15   99.63 6008.35 8413.97   98.24 8976.1712013.95   98.01

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            105.99    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                 0.096      0.047     0.085
  W.S. Elev (ft)            105.90    Reach Len. (ft)          1522.36    1400.85   1430.05
  Crit W.S. (ft)             92.55    Flow Area (sq ft)       33217.37   11549.06  58376.67
  E.G. Slope (ft/ft)      0.000205    Area (sq ft)            35574.99   11549.06  60832.89
  Q Total (cfs)           125000.00    Flow (cfs)             24303.86   44749.70  55946.45
  Top Width (ft)          13757.59    Top Width (ft)          5527.41     452.65   7777.53
  Vel Total (ft/s)            1.21    Avg. Vel. (ft/s)           0.73       3.87      0.96
  Max Chl Dpth (ft)          37.46    Hydr. Depth (ft)           6.01      25.51      7.51
  Conv. Total (cfs)       8736762.0    Conv. (cfs)             1698697.0  3127740.0  3910326.0
  Length Wtd. (ft)          1428.79    Wetted Per. (ft)        5531.28     465.13   7782.94
  Min Ch El (ft)              68.44    Shear (lb/sq ft)           0.08       0.32      0.10
  Alpha                        4.01    Stream Power (lb/ft s)     0.06       1.23      0.09
  Frctn Loss (ft)             0.17    Cum Volume (acre-ft)    119899.20   46361.09  155710.90
  C & E Loss (ft)             0.04    Cum SA (acres)          17166.15    2097.74   19462.41


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
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CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 153.08*

INPUT
Description: RGV-04,8-foot wall applied with 10:1 SS.
Station Elevation Data num= 464

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	106.9	8.03	109.22	15.13	110.64	39.13	110.88	39.8	110.88
39.8	102.88	49.8	102.68	140.8	102.27	143.8	102.57	167.8	102.09
173.8	101.49	183.8	101.29	189.8	100.69	211.33	100.73	260	100.11
271.33	99.34	280.66	96.25	307.91	95.81	327.71	96.01	423.82	96.27
437.49	96.55	561.35	96.65	606.39	97.02	616.04	93.76	622.07	94.85
646.6	94.55	724.52	94.53	753.04	94.88	891.49	94.95	920.71	95.29
947.85	96.07	975.68	97.4	1005.59	97.64	1019.53	100.12	1049.18	100.14
1057.19	99.86	1089.23	97.29	1105.24	97.75	1125.27	97.44	1181.93	97.46
1209	97.81	1248.09	97.78	1293.21	97.9	1311.25	97.82	1365.39	98.02
1395.46	97.74	1473.66	97.7	1541.73	97.99	1561.76	97.89	1633.05	98.16
1641.84	98.38	1672.15	98.24	1693.2	98.46	1720.26	98.43	1783.43	98.72
1831.54	98.56	1876.65	98.75	1897.7	98.58	1945.83	98.78	1960.87	98.62
1972.9	98.99	1987.93	98.71	2018.01	99.19	2024.02	98.78	2033.04	96.89
2045.08	95.04	2054.1	93.07	2146.41	93.1	2178.45	93.19	2278.56	93.19
2366.66	93.27	2499.21	93.32	2508.24	93.97	2523.28	95.98	2541.31	96.7
2583.42	96.79	2601.47	97.12	2634.56	97.01	2640.57	97.23	2661.62	96.96
2691.69	96.9	2718.76	97.26	2742.83	97.05	2778.91	97.29	2818.01	97.08
2939.3	97.15	2959.32	97.7	2967.33	97.64	2987.36	96.66	3016.51	96.63
3037.56	96.91	3052.6	96.64	3067.64	96.83	3091.69	96.73	3097.71	96.34
3115.76	97.45	3151.85	96.91	3169.9	97.1	3178.92	96.86	3199.97	97.16
3208.99	96.95	3233.05	97.25	3248.09	96.82	3284.18	97.23	3302.23	97.07
3320.27	97.3	3338.31	97.05	3380.42	97.13	3398.47	96.94	3446.59	97.14
3485.69	96.86	3500.73	97.21	3512.76	96.99	3545.83	97.02	3575.91	96.81
3602.98	97	3645.08	96.8	3660.12	97.03	3699.22	96.97	3708.24	97.36
3726.29	97.17	3738.32	96.68	3750.34	96.97	3795.46	97.23	3804.48	96.95
3822.53	97.53	3837.57	97.06	3849.6	97.31	3879.67	97.18	3948.85	97.11
3990.95	97.34	3999.97	97.14	4051.1	97.32	4090.2	97.01	4123.28	97.26
4150.35	97.04	4177.42	97.55	4198.47	97.38	4216.52	97.76	4258.62	97.88
4285.69	97.69	4306.74	97.95	4324.79	97.73	4351.86	98.05	4376.91	97.67
4396.97	97.83	4409	98.28	4421.03	97.94	4469.15	97.83	4502.24	97.96
4508.25	97.72	4529.3	98.11	4559.38	97.82	4586.44	97.83	4598.48	97.53
4619.53	97.79	4640.58	97.56	4673.66	97.93	4691.71	97.77	4730.81	97.88
4763.89	97.78	4801.38	97.91	4825.41	98.79	4841.43	99.12	4865.46	98.12
4921.52	97.72	4945.55	98.4	5013.63	98.62	5049.61	98.55	5073.69	98.73
5097.72	99.84	5110.01	99.28	5117.38	97.71	5127.2	94.52	5137.03	92.71
5154.23	91.34	5163.2991.57373	5168.96	91.72	5198.44	90.85	5215.64	87.36	
5223.01	86.92	5227.93	85.4	5245.12	76.41	5252.61	74.45	5260.1	73.54
5289.7571.04794	5316.46	70.24	5334.65	68.34	5364.97	67.84	5384.97	67.84	
5394.4968.51207	5402.96	69.11	5420.94	69.4	5437.93	71.33	5452.57	74.65	
5471.68	83.29	5485.58	87.47	5494.6	89.5665	5506.42	91.76	5527.62	96.72
5539.42	98.01	5546.6	97.43	5561.78	97.3	5575.33	97.58	5622.02	97.23
5747.72	97.29	5837.51	96.96	5884.2	97.09	5912.94	96.93	5972.74	97.04
6045.83	96.58	6096.1	96.59	6232.73	96.2	6260.68	96.35	6308.21	97.22
6437.31	97.34	6545.84	97.22	6601.75	97.34	6659.97	97.2	6699.49	97.41
6761.09	97.23	6807.24	97.39	6864.7	97.3	6940.12	97.33	6968.85	97.13
7058.65	97.25	7073.01	97.04	7144.1	97.15	7183.23	97.02	7245.4	96.96
7277.72	97.15	7328.6	97.1	7363.92	96.91	7407.02	96.97	7482.45	96.76
7503.99	96.84	7554.27	96.53	7586.6	96.01	7622.52	93.71	7676.38	93.21
7780.54	93.02	7802.09	93.05	7906.25	92.58	7931.38	92.6	7963.72	92.37
7970.9	92.79	7988.86	92.29	7996.04	92.42	8003.22	91.25	8013.99	90.56
8042.72	90.33	8049.91	89.28	8082.24	86.95	8093.01	87.11	8107.38	90.9
8114.56	91.29	8143.29	92.06	8154.06	93.78	8172.02	98.11	8189.98	98.38
8207.94	97.81	8240.26	97.64	8304.91	97.52	8333.65	98.22	8344.42	97.38
8351.61	97.88	8369.56	97	8383.93	97.81	8398.29	97.43	8444.98	97.25
8477.31	97.44	8506.04	97.06	8538.36	97.44	8578.24	97.41	8622.96	98.65
8656.52	97.77	8715.22	98.23	8723.61	98.68	8748.78	99.25	8771.14	99.08
8793.36	98.4	8811.32	94.29	8822.09	93.23	8847.23	92.05	8891.35	92.03
8933.29	91.74	8989.2	91.78	9235.12	91.5	9253.08	91.83	9278.22	92.86
9296.18	94.7	9314.14	93.27	9346.46	93.92	9368	95.59	9385.97	95.92
9396.75	95.49	9414.7	95.52	9447.02	94.98	9503.61	94.75	9605.05	94.97
9648.15	94.93	9712.8	94.56	9783.18	94.63	9853.07	94.55	9878.23	94.73
9911.78	94.67	9931.34	94.94	9959.31	94.43	9978.87	94.6210001.24	94.43	
10037.58	94.4410048.76	94.7	10090.7	94.7910104.68	94.6710138.22	94.95			
10157.8	94.7610171.78	94.9810208.12	94.8510233.28	95.1810269.63	94.76				
10305.97	95.2710336.72	94.9810375.86	94.9610392.64	95.2310437.36	95.34				
10456.93	95.2410493.28	95.4810518.44	95.810542.44	95.8210579.95	96.31				
10593.92	95.9510630.27	96.1510647.04	95.9110689.69	96.0510747.68	97.12				
10784.03	96.89 10800.8	97.3210842.74	96.7710907.04	96.6110943.38	96.78				
10968.54	96.2910988.12	96.5211010.48	96.1311081.17	96.7211108.33	96.11				
11153.06	96.2411175.42	95.88 11195	96.0611259.29	96.2611290.05	95.85				
11345.96	95.6 11385.1	95.611421.44	95.2311443.92	95.2911458.29	95.62				
11465.47	95.1111490.62	94.5811515.76	94.7611526.53	95.1211548.08	94.5				
11566.03	95.5211583.99	93.1911601.95	91.5211609.13	91.19 11627.1	91.17				
11634.28	90.8312008.54	90.83 12033.7	91.6412053.27	91.6212083.22	91.93				
12101.17	96.6612111.95	97.2512126.31	97.1612137.09	97.7612147.87	97.39				
12181.87	96.9412234.06	96.48 12259.2	96.7912273.58	96.3712316.67	96.53				
12370.54	96.2912392.09	96.912406.46	96.8312420.83	97.1912445.97	97.11				
12478.29	96.412496.24	97.1312522.94	97.2412546.53	97.1112575.26	95.3				
12600.4	95.7112607.58	95.3312632.72	96.2212650.68	96.0712668.65	96.28				
12733.29	96.2812740.47	96.4912783.57	95.7712808.71	96.29 12815.9	95.9				
12844.45	96.1312902.09	96.0912916.45	96.312955.97	96.1412991.88	96.7				
13002.65	96.4213017.02	96.9413042.16	97.1913096.04	97.313106.81	98.23				
13124.77	97.0813140.79	96.9513167.86	96.1513193.01	96.0913214.56	96.73				
13239.7	95.9513258.21	96.3913304.34	96.36 13322.3	95.8413361.81	96.25				
13383.36	94.7713394.13	94.6413433.64	96.1713476.74	96.39 13494.7	96.28				
13509.06	97.2713519.84	98.8113530.61	98.7913537.79	97.4913557.34	95.68				
13588.08	95.7313602.45	96.4913613.22	96.613641.95	95.8513694.33	95.65				
13716.69	95.3913760.47	95.4913771.25	96.3913782.02	98.4813792.79	99.47				
13807.16	99.6313814.34	98.6613834.11	98.4813850.89	98.6713870.46	100.55				
13878.85	99.8813895.62	99.9413911.32	99.4813925.68	101.4213954.41	101.18				
13968.78	100.1613983.15	100.27 14004.7	101.2814021.42	101.5114029.81	102.92				
14038.2	105.7414046.59	107.3314054.98	107.9414070.28	106.9814081.22	107.8				
14088.87	104.7114095.43	103.9114099.81	102.2114127.14	102.21					

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.096	5097.72	.066	5117.38	.015	5539.42	.066	6761.09	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5097.72 5539.42 1522.36 1400.85 1430.05 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent

```
       0 5097.72   99.84       T
Left Levee      Station=    39.8      Elevation=  110.88
Right Levee     Station=14054.98      Elevation=107.9367
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  982.21 5094.66   99.78 5535.2813815.26   97.99

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 152.81*

INPUT
Description: RGV-04, 8-foot wall applied.
Station Elevation Data    num=     456
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   105.6   17.06  110.08   41.06  110.32   41.73  110.32   41.73  102.32
   51.73  102.12  142.73  100.65  145.73   101.4  169.73  100.92  175.73   99.42
  185.73   99.22  191.73   97.72  195.55   97.55   234.1   97.47  259.34    97.8
  381.31   97.96  426.87   97.88   450.7   98.39   666.6   98.35  715.67   98.63
  745.11   99.03  752.12    95.3  761.93    92.5  772.45   94.68  795.58    94.2
  815.21   94.04   875.1   94.22     953   94.27  969.44   94.44 1000.36   95.51
  1017.2   95.63 1023.43   95.59 1059.84   95.47 1099.58   95.69 1192.58   95.71
 1241.82   95.86 1285.65   95.59 1303.87   95.72 1340.29   95.66 1354.86   95.86
  1402.2   95.97 1420.41   95.82 1460.48   95.89 1485.25   96.07 1602.87   96.36
 1649.87   96.54 1657.15   96.43 1706.81   96.65 1725.96   96.59 1769.73   96.73
 1808.02   96.65 1835.37   96.92 1840.84   96.73  1868.2   93.94 1952.16   94.01
  1981.3    94.2 2010.42   94.14 2035.92   94.27 2152.47   94.36 2203.45   94.32
  2250.8    94.5 2273.03   94.44 2294.91   95.73 2311.32    96.1 2349.62   96.23
 2366.03   96.43 2448.09   96.32 2472.71   96.53 2494.59   96.49 2527.41   96.69
 2562.98    96.5 2625.89   96.69 2673.28   96.72  2691.5   97.74 2698.78   97.66
 2716.99   95.84 2762.66   95.92 2776.33   95.79 2811.89   95.89 2817.36    95.7
 2833.77   96.25  2866.6   95.95 2918.57   95.99 2940.45   96.15 2954.13   95.95
 2986.96   96.23 3036.19   96.17 3055.71   96.26  3090.9   96.13 3134.66    96.3
 3170.22   96.17  3183.9   96.35 3216.72   96.19  3276.9   96.36 3315.19   96.25
 3364.43   96.33 3372.64   96.54 3399.99   96.23 3476.58   96.75  3501.2   96.66
 3591.47   96.57 3629.76   96.74 3720.02   96.56 3750.12   96.72 3774.74   96.62
 3809.62   97.27 3824.19   97.21 3842.39   97.56 3933.38   97.54    3958   97.72
 3980.79   97.45 4009.97   97.88  4024.5   97.62 4056.47   97.84 4064.68   97.71
 4119.38   97.87 4151.96   97.59 4166.53   97.71  4182.3   97.42 4220.59   97.57
 4246.67   97.82 4312.22   97.61 4366.85   97.99 4381.42    98.8  4388.7   99.61
 4403.27  100.21 4425.13   98.21 4446.98   97.72 4461.55   97.77 4476.11   97.31
 4487.04   97.55 4497.96   98.57 4516.18   98.44 4559.89   98.68 4614.51   98.13
 4636.37  100.08 4644.53   99.29 4655.97   96.19 4673.94   93.31 4683.74   92.74
  4700.391.08401 4703.34   90.78 4722.94    85.9 4734.38   79.82 4739.36   78.07
 4761.97   72.93 4768.59   72.03 4781.81   71.58 4793.91   67.84 4814.06   67.24
 4844.06   67.24 4870.04   68.49 4896.02   68.96 4920.54   69.98 4925.7771.40977
 4931.66   73.02 4941.69   74.77 4954.23    80.7 4961.76    83.7 4969.29   87.45
 4979.32   90.22 4989.35   91.47 5019.45   92.25  5023.492.62392 5039.52   94.15
 5050.06   96.21 5059.58   97.44  5067.1   97.78  5091.4   96.57 5109.63   96.82
 5156.86   96.59 5209.89    96.6 5246.34   96.42 5316.22   96.41 5364.82   96.14
 5441.77      96 5462.04   95.88 5510.64   96.09 5537.98   96.03 5580.51   95.65
 5641.27   95.39 5656.46   95.47 5723.29   95.29  5820.5   94.93 5850.88   95.28
 5902.52   96.91 5929.86   97.15 6024.04   97.24 6081.76   97.36 6160.75   97.28
  6221.5   97.43 6284.78   97.26 6327.72   97.35 6394.66   97.13  6437.2   97.25
 6513.14   97.16 6586.05   97.23 6634.66   96.98 6671.11   97.17 6733.61   96.95
 6810.86   97.07 6853.39    96.9  6911.1   96.89 6953.64   97.03 6980.98   96.89
 7011.36   97.02 7049.74   96.81 7078.19   96.86 7172.37   96.62 7201.95   96.65
 7256.58   96.48 7291.72   96.17 7330.74   95.02 7389.28   94.68 7448.82   94.61
 7457.93   94.51 7525.88   94.47 7558.18   94.32 7618.94   94.29 7701.51   93.99
 7709.32    94.2 7736.64   94.04 7756.15    93.1 7787.37   92.96 7795.17   92.42
 7830.31   91.28 7842.02   91.37 7857.63   93.24 7896.65   93.73 7908.36   94.57
 7927.87   96.76 7947.38   96.89 7966.91   96.57 8029.05   96.34 8072.27   96.31
 8103.51    96.6 8115.21   96.15 8123.02   96.41 8142.53   96.07 8158.14   96.37
 8177.91   96.13  8256.9   96.19 8275.12   95.97 8311.58   96.02 8341.95    96.5
 8369.29   96.48 8393.59   97.71 8402.71   97.94  8417.9    99.2 8454.36   97.82
 8466.51   97.88 8499.92   98.61 8518.15   98.72 8527.26   99.42 8554.61  100.23
 8578.92   99.83 8603.06   99.11 8622.57   96.38 8630.56   95.62 8657.91   94.57
 8673.09   94.37 8688.28   94.54  8697.4    94.2 8709.55   94.44 8727.77      94
 8755.12   93.86 8815.88   93.93  8873.6    93.8 9022.46   93.58 9052.84   93.38
 9102.63   93.48 9129.95   93.88 9149.46   94.86 9168.97   94.11 9204.09   94.47
 9241.19   95.39 9258.74   95.07  9329.3   94.73 9374.86   94.03 9383.98    94.1
  9485.1   94.19 9531.94   94.17 9602.18   93.98 9651.32      94 9678.66   94.32
 9699.93   93.93 9715.12   94.14 9754.62   94.03 9781.96    94.4 9797.14   94.17
 9818.41   94.31 9827.52   94.82 9839.67   94.86 9870.06    93.9 9891.32   94.29
 9915.62   93.94 9936.89   94.18 9955.12      94 9967.26   94.5110012.84    94.7
10028.03   94.4510049.29   94.5810064.48   94.9410085.75   94.4810100.94   94.88
10140.43   94.6510167.77   95.32   10186   94.6510207.27   94.4210246.76   95.36
10280.18   94.7810292.33   94.9810304.69   94.6310322.72   94.5510340.94      95
10389.55   95.1910410.81   94.8810438.16   95.1910450.31   94.9910477.65   95.49
10501.95   95.4110544.49   96.0810559.68   95.3210599.17   95.6310617.39    95.1
10666.01   95.2810678.16   95.8110726.76      9710744.99   96.8610766.26   96.37
10784.49   96.9810830.05   95.8510863.48   95.8710899.93   95.6810939.42   96.24
10966.76    95.410988.03   95.7811012.33   95.0711036.64   95.4511070.05   96.44
11094.36   96.2511118.66   95.3911139.93   95.6411167.27   95.5411191.57    94.9
11212.84   95.3111246.26    95.411282.71   95.6611316.13   94.9111376.89   94.72
11419.43      9511434.62   94.7211458.92    94.711477.14   95.0711506.76   94.57
11534.09   94.3711573.11   94.5111596.53    93.911616.04   94.3811635.55   93.21
11655.06   92.38 11690.2   92.0412096.89   92.0412115.12   93.3312124.23   93.65
 12145.5   93.6112157.65   94.0212178.04   93.6112197.56   96.2112236.58   97.31
12285.24   96.1912341.96   95.6712369.28   95.73 12384.9   95.4212467.53    95.1
12529.31   95.2612544.92   95.5212572.23   95.5412607.36   95.3512655.88   95.93
12681.51   95.6812712.73    94.612740.05   94.8112747.86   94.6412762.21   95.16
12819.93   95.0912892.26   95.3512939.09    94.912966.42   95.0612980.95   94.84
13005.25   95.2213067.89   95.4513093.35    95.813126.43   95.6813165.46   95.98
13177.17   95.93 13193.6   96.3813263.47   97.0513278.64   96.9913290.35   97.42
13309.86   96.8513327.27    96.813356.69   95.5613375.88   95.0713395.73   95.49
13434.76   95.0313454.87   95.4413476.13   94.76   13505    94.813524.51   94.54
13567.45   94.7413590.87      9413602.58   93.94 13645.5   94.7113711.86   94.76
13727.47   95.2513739.17   96.0313750.88   96.0213758.69   95.3613779.93   94.46
 13801.2   96.3313840.65   96.8913871.87   96.4313928.79   96.3413953.09   95.95
13974.37   96.1414000.67   96.1214035.79   98.34 14051.4   98.65 14059.2   98.29
14098.92   98.1814108.03   98.7814120.19  100.42 14129.3   99.0914138.41   98.75
14147.52   99.1914164.58   98.2514180.19    98.914199.17   98.6314223.48    99.4
14256.89   99.7914284.23  100.7214293.34  102.5514302.46  107.1514311.58  110.03
14320.69  110.9314338.19  110.1714351.31  109.01 14368.8  109.9214373.17  110.65
14377.55  109.4314388.48  104.4914392.86  103.5514401.61  102.8714410.35   99.49
14465.02   99.49

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
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       0    .169 4636.37    .066  4700.3    .015  5067.1    .066 5441.77    .102

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4636.37  5067.1          1522.36 1400.85 1430.05             .1       .3
Left Levee      Station=   41.73      Elevation=  110.32
Right Levee     Station=14320.69      Elevation=110.9333
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 4636.37  100.08  5067.114465.02   97.78

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 152.53

INPUT
Description: RGV-04, 8-foot wall applied with 10:1 SS, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     450
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  104.29      11  105.58      19  109.51      43  109.75   43.67  109.75
   43.67  101.75   53.67  101.55  144.67  101.16  147.67  101.46  171.67  100.98
  177.67  100.38  187.67  100.18  193.67   99.58  278.95   99.69  329.94   99.55
  364.93   99.67  429.92   99.49  463.91  100.22  645.87  100.05  686.87   100.2
  771.85  100.05  841.84  100.45  872.83  101.32  883.83  101.04  893.83   95.45
  907.82   91.24  922.82    94.5  942.82   94.67  955.81   93.78  983.81   93.53
  1028.8   93.62 1095.41   93.61 1115.09   93.71 1157.72   93.48 1174.12   93.68
 1206.92   93.61 1220.04    93.9 1262.67   93.95 1279.07   93.75 1315.15   93.75
 1344.66   94.07 1351.22   93.89 1426.65    94.1 1485.69   94.42 1492.25   94.29
 1538.16   94.55  1597.2   94.69 1607.04   94.55 1669.35    94.7 1689.03   94.88
  1757.9   94.92 1784.14    95.2 1810.37   95.12 1833.33   95.31 1866.13   95.18
 1879.25   95.32 1938.28   95.44 1984.19   95.38 2026.83   95.66 2072.75   95.45
 2148.18   95.84 2217.05   95.73 2272.81    96.1 2302.32   95.92 2341.68   95.98
 2364.64   96.25 2407.27    96.3 2423.67   97.79 2430.23   97.68 2446.63   95.01
 2463.03   95.17 2489.26   94.91 2541.74   95.07 2587.65   94.98 2663.09   95.08
 2705.72   95.31 2718.84   95.19 2751.64   95.39 2771.31   95.28 2817.23   95.46
 2905.78    95.5 2938.58   95.72 3023.85   95.68 3161.59   96.04 3250.15   96.02
 3276.38   96.19 3319.02   95.97 3364.93   96.18 3404.29   96.19 3417.41   96.37
 3430.53      97 3443.65   96.94 3460.04    97.3  3515.8    97.5 3548.59   97.31
 3558.43   97.45 3584.67   97.23 3597.79   97.62 3624.03   97.34 3630.59   97.59
 3712.58   97.62 3738.81   97.37 3751.93   97.56 3765.05   97.31 3824.09   97.74
 3883.12   97.42 3896.24    97.8 3912.64   97.68 3932.31   98.06 3945.43   99.24
 3951.99  100.44 3965.11   101.3 3978.23      99 3984.79   98.31 4004.47   97.58
 4017.59   97.63  4030.7   96.91 4040.54   97.23 4050.38   98.74 4066.78    98.5
 4106.14   98.73 4145.49   97.98 4155.33   97.53 4168.45   99.87 4175.01  100.31
 4188.13   97.02 4211.08   89.81 4220.92   84.94 4237.32   74.63  4240.6   73.41
 4247.16   72.93 4253.16   67.34 4263.16   66.64 4303.16   66.64 4323.16   67.44
 4343.16   68.04 4363.16   68.44 4383.16   68.64 4403.16   68.64  4417.7   72.93
 4430.81    74.9 4447.21   82.82 4457.05   86.66 4466.89   91.62 4480.01   94.88
 4493.13   95.46 4532.48   92.74 4558.72   93.55 4575.12    96.1 4584.95   97.27
 4594.79   97.55 4621.03   95.85 4640.71   96.07 4670.24   95.96 4748.96    95.9
 4788.32    95.6 4863.77   95.54 4916.25   95.22 4932.65   95.26 5021.22   94.81
  5073.7   95.11 5103.22   95.03 5149.14   94.51 5214.75   94.22 5231.15   94.33
 5303.31   94.13 5355.79   93.81 5408.28   93.66 5441.08    94.2 5496.84    96.6
 5526.36   96.99 5591.97   97.17 5628.05   97.18 5690.37   97.41 5749.42   97.44
 5775.66   97.33 5841.26   97.53  5883.9   97.33 5969.19   97.28 6028.23   97.03
 6074.16   97.13 6156.16   97.03 6234.88   97.12 6287.37   96.84 6326.73    97.1
 6415.29   96.78 6477.62      97 6523.54   96.78 6559.62   96.93 6585.86   96.82
 6631.79   96.92 6661.31   96.72 6694.11   96.94 6730.19   96.71 6766.27   96.75
 6822.04    96.6 6838.44   96.74 6867.96   96.47 6966.37   96.42 6972.93   96.23
 7022.13   96.42 7077.89   96.16 7166.46   96.09  7176.3   95.95  7225.5   95.99
 7284.54   95.76 7350.15    95.9 7396.07   95.79 7425.59   95.58 7478.07   95.67
 7553.52   95.55 7592.88   95.64 7665.04   95.34 7694.57   95.44 7792.97   95.11
 7806.09   95.24 7891.38    94.9 7911.06   95.23 7924.18   94.97  7953.7   94.86
 7983.22   95.06 8038.99   94.94 8058.67   94.75 8078.35   94.98 8098.03   94.84
 8130.83    95.5 8160.35   95.56 8186.59   97.37 8196.43   97.72 8212.83   99.76
  8252.2   97.86 8265.32   97.99  8301.4   99.16 8321.08    99.2 8330.92  100.16
 8340.77  100.19 8360.45  101.21 8386.69  100.59 8396.53  100.08 8419.49    99.7
 8442.45   97.74 8455.58   97.62 8471.98   96.94 8488.38   96.74 8504.78   96.99
 8514.62   96.49 8527.74   96.84 8547.42   96.18 8576.95   95.97 8642.55   96.08
 8668.79    95.9 8685.19   96.11 8704.88   95.88  8750.8   95.82 8816.41   95.61
 8865.61   95.56 8898.41   95.25 8941.06   95.22 8980.42    94.9 9009.94   95.07
 9042.74   94.81 9062.43   95.03 9088.67   94.69 9101.79   94.91 9114.91   94.64
 9147.71   94.74 9154.27   94.52 9196.92   94.52 9246.12    93.3 9255.96    93.4
 9521.66    93.4 9544.63   93.47 9574.15   94.01 9597.11    93.4 9613.51    93.7
 9656.16   93.52 9685.68   94.08 9702.08   93.73 9725.04   93.95 9734.88   94.72
    9748   94.79 9780.81   93.36 9803.77   93.96 9830.01   93.45 9852.97   93.83
 9872.65   93.56 9885.77   94.33 9934.98    94.6 9951.38   94.23 9974.34   94.41
 9990.74   94.9210013.71    94.210030.11   94.7810072.75   94.4510102.27   95.47
10121.95   94.4610144.92   94.0710187.56   95.4510223.64   94.5710236.76   94.88
10249.88   94.3610269.57   94.1310289.25   94.7810341.73   95.0310364.69   94.53
10394.22   94.8510407.34    94.510436.86   95.18 10463.1   95.0210509.03   95.85
10525.43   94.6910568.07    95.110587.75   94.2910640.24   94.4910653.36   95.24
 10679.6   95.9510686.16   96.4610705.84   96.8910725.52   96.6710748.49   95.85
10768.17   96.6510817.37   94.9410853.46      9510892.82   94.7610905.94    95.2
10935.46   95.6910964.98   94.5110987.95   95.0411014.19      9411040.43    94.6
11076.51   96.2411102.76   95.85   11129   94.6711151.96   95.0111181.48   94.85
11207.72   93.9111230.69   94.5611266.77   94.6511306.13   95.0611342.22   93.96
11407.82   93.8411453.75   94.4111470.15   94.0511496.39   94.1711516.07   94.77
11535.75   93.9911604.64   94.2511647.28   93.2412185.25   93.2412195.09   93.91
12204.93   95.1812214.77   95.6612237.73    95.612250.85   96.2212263.97   95.34
12280.37   95.2312290.21   95.7612306.62   95.71 12326.3   96.69 12342.7   96.96
12388.62   95.4412424.71   95.0412483.75   94.6312516.55   94.1812585.44   93.84
12614.96   93.8412634.64   93.5212674.01   93.9112710.09   93.9912739.61   94.33
12762.57   94.2412788.82   94.6312798.66   94.2412821.62   94.2612838.02    93.9
12887.22   93.9212903.63    94.412913.47   94.0412942.99   94.2612965.95   93.95
12998.75   94.2813077.48   94.1813113.56   93.8513139.81   93.7813166.05   94.31
13195.57   94.6213248.05   94.8913261.18   95.3213313.66   95.1913343.18   95.28
13369.42    95.813398.95   96.0313428.47   96.6913444.87   96.7913474.39    96.6
13513.76   96.6513536.72   95.3713566.24   94.0613576.08   94.4413615.45    94.1
13635.13   94.1213651.53   94.4913674.49   93.2414002.52   93.2414015.64   95.64
14025.48   96.9414051.72   97.2614114.05   96.9414163.25   97.0314189.49   96.52
14212.46   96.8114245.26   96.7314251.82   97.1214268.22   96.9314310.86    98.1
14327.26   97.8314337.11   98.1514346.95   97.6914356.79   98.2814363.35   99.82
14369.91   100.314379.75   98.2914389.59   97.7814399.43   98.4314405.99   97.59
14428.95    96.5 14455.2   95.9314468.32   96.6214481.44   98.3414491.28   98.84
14517.52   98.7814547.04   99.9414556.88  102.1914566.72  108.5714576.57  112.73
14586.41  113.9314599.53  113.0814612.65  112.7814632.33  111.0514642.17  111.33
14658.57  112.4114665.13  113.5114671.69  111.6814688.09  104.2614694.66  102.85
 14704.5  102.5414707.78  101.8414717.62   97.24 14720.9   96.76 14802.9   96.76
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Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .169 4175.01    .066 4237.32    .015 4430.81    .066 4457.05    .102

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4175.01 4594.79          1576.77 1533.33 1581.16             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4175.01  100.31       T
 4594.79 14802.9   97.55       T
Left Levee      Station=   43.67      Elevation=  109.75
Right Levee     Station=14586.41      Elevation=  113.93
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    9.01  3966.2  101.43 4597.1814224.23   96.85

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            105.22    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                 0.169      0.061      0.102
  W.S. Elev (ft)            105.14    Reach Len. (ft)          1576.77    1533.33    1581.16
  Crit W.S. (ft)             91.80    Flow Area (sq ft)       15536.27   10158.42   74897.40
  E.G. Slope (ft/ft)      0.000366    Area (sq ft)            15947.74   10158.42   81219.45
  Q Total (cfs)           125000.00    Flow (cfs)               6311.84   38661.05   80027.12
  Top Width (ft)          14517.75    Top Width (ft)           4131.34     419.78    9966.63
  Vel Total (ft/s)            1.24    Avg. Vel. (ft/s)            0.41       3.81       1.07
  Max Chl Dpth (ft)          38.50    Hydr. Depth (ft)            3.76      24.20       7.51
  Conv. Total (cfs)       6537483.0    Conv. (cfs)              330108.4   2021968.0   4185407.0
  Length Wtd. (ft)          1558.20    Wetted Per. (ft)         4135.67     433.16    9969.04
  Min Ch El (ft)              66.64    Shear (lb/sq ft)            0.09       0.54       0.17
  Alpha                        3.38    Stream Power (lb/ft s)      0.03       2.04       0.18
  Frctn Loss (ft)              0.25    Cum Volume (acre-ft)    117165.40   45333.57   149215.60
  C & E Loss (ft)              0.05    Cum SA (acres)          16660.03    2055.65   18589.13


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 152.25*

INPUT
Description: RGV-04, 8-foot wall applied with 10:1 SS.
Station Elevation Data    num=     455
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
        0  102.61    6.41  104.23   16.03  104.67    39.1  109.27    63.1  109.51
    63.77  109.51   63.77  101.51   73.77  101.31  164.77  100.72  167.77  101.02
   191.77  100.54  197.77   99.94  207.77   99.74  213.77   99.14  303.06   99.16
   392.59   99.13  460.26   98.99  495.65   99.44  650.24   99.39   663.2   99.65
   714.17   99.69   746.6   99.39  779.95   99.44  813.31   95.98  889.15   95.71
   921.42    96.2  932.87      96  943.29   92.25  957.85   89.42  967.85   91.59
   981.19   91.71  989.85   91.11 1008.51   90.95 1038.51   91.01  1051.3    96.1
  1062.88   93.83 1066.74   93.59 1082.74   94.24 1110.47   93.87 1124.67   94.02
   1150.8   93.73 1191.13   93.98 1203.74   93.52 1218.87   94.06 1228.95   93.76
  1279.37   93.63  1307.1   94.24 1347.43   93.51 1418.02   93.53 1430.62   93.97
  1460.87   93.62 1478.52   93.95 1496.17   93.59 1564.89   93.54 1599.63   93.74
  1607.36   93.61 1723.04   93.96 1778.51   93.92 1806.23   94.09 1821.36   94.64
  1844.05   96.79 1866.74   95.19 1889.42   96.43 1902.03   96.54 1912.11   97.53
  1919.68   97.62 1939.85    96.2 1960.01   96.06 1972.61   95.58 2002.86   95.23
  2048.24   94.95 2081.01   95.06 2101.18    95.4 2147.97   95.27 2254.96   95.79
  2315.46    96.3 2328.07   96.06 2363.35   95.94 2386.05   96.14 2451.59   95.92
  2496.97    96.1 2595.28   96.01 2607.89   96.32 2633.09   96.25 2653.26   95.17
  2698.64   94.99 2773.54   94.98 2800.58   95.15 2839.81   95.17 2857.46   96.03
   2877.8   96.13 2897.11   94.36 2916.42   94.47 2955.77   94.39 2968.38   94.86
  2988.54   94.68 3018.79   95.03 3071.73   94.89 3114.59   95.08  3127.2   94.95
  3217.62   95.29 3256.24   95.62 3296.09    95.5 3389.37   95.72  3454.9   95.39
  3467.51   94.64 3475.07   94.92 3495.24   94.58 3535.57   94.75 3738.92   95.11
  3775.06   95.09 3893.54   95.22 3903.62    95.1 3978.34   95.29 4024.68   95.29
  4055.57   95.84 4097.73    96.1 4206.17   96.16 4237.06   96.02 4252.51    96.3
  4283.41   96.16 4291.13   96.34 4329.65   96.46  4359.9   97.41 4448.13    97.1
  4463.26   97.78 4473.34   96.95 4503.59   96.68 4518.71   97.09 4541.41   97.08
  4561.57   96.37 4594.34   96.47 4611.98   97.06 4646.38   97.19 4661.83   97.84
  4669.55   98.58    4685   99.19 4700.45   97.61 4712.83    97.1 4740.55   97.45
  4762.23   96.03 4773.81   96.26 4788.45   97.54 4813.66   97.18 4833.83   97.14
  4848.95   97.42 4881.72    96.4 4908.97   95.81 4924.42   97.42 4932.14   97.73
  4964.62   93.94 4972.74    91.9 4982.49   91.75 5001.6887.73074 5016.59   86.02
  5026.34   85.65 5034.46   82.32 5047.67   75.19 5059.29   72.41 5065.99   71.63
  5079.38   71.17 5091.62   67.21 5112.03   66.54 5137.76   66.54    5180   67.83
  5199.2868.68822 5218.19   69.53 5229.75    72.9 5240.17    74.4 5261.03    83.5
  5268.86   87.58 5279.29   90.68 5289.72   91.75    5321   90.49 5341.86    91.5
  5362.71   95.65 5370.53   96.79 5394.55   95.86 5430.93   95.83 5438.98   95.27
   5459.1   95.07 5511.62   95.12 5547.64    94.8 5616.68   94.72 5748.99   94.06
  5777.18   94.12 5801.33    93.2 5877.83   92.69 5937.87   92.49 5952.88   92.57
  6018.91   92.43 6066.94   92.22 6095.25   92.24 6114.97   92.86 6151.61    94.8
  6196.02    96.3 6223.03    96.6 6280.45   96.86 6320.71   96.79 6373.05   96.54
  6413.31   96.84 6451.17   96.66  6511.2    96.7 6550.22   96.52 6628.27   96.44
   6682.3   96.24 6724.33   96.27 6832.04   96.17 6871.41   96.25 6919.44      96
  6955.46   96.12 7021.28   95.82 7033.36   95.99 7057.51   95.77 7069.59   94.91
  7129.98   94.55 7150.12   94.95 7210.51   94.87 7234.63   95.05 7261.64   94.92
  7291.66   95.17 7324.68   95.03 7423.74   94.96 7476.24   94.54 7516.49   94.63
  7546.81   94.46 7591.83    94.6 7637.28   94.49 7661.44   94.15 7732.92    93.7
  7806.38   93.75 7874.83   94.19 7943.28   94.23 7961.05    93.8 7999.64   93.44
  8078.12   93.37 8114.14   93.43 8180.17   93.23  8207.2    93.3 8297.24   93.08
  8309.25   93.16  8387.3   92.94 8405.31   93.16 8444.33   92.91 8471.34   93.04
  8540.39   92.84 8576.41    92.9 8606.43   93.34 8633.44   93.38 8666.46   94.82
  8681.46   96.18 8717.49   94.91  8729.5      95 8762.52   95.78 8780.53    95.8
  8816.55   97.14 8849.57   96.39 8870.58   96.14 8891.59   94.83 8933.63   94.16
  8948.63   94.33 8957.64      94 8969.64   94.23 8987.65   93.79 9014.68   93.65
  9074.71   93.72 9233.81   93.41 9278.84   93.38 9308.85   93.17 9347.88   93.15
   9383.9   92.94 9410.92   93.05 9440.93   92.88 9458.95   93.02 9482.96    92.8
  9536.99   92.83 9582.02   92.68 9627.05   91.87 9636.05   91.94  9879.2   91.94
  9900.22   91.98 9927.23   92.34 9948.24   91.94 9963.25   92.1410000.67    92.2
 10032.87   93.16 10044.3   93.1810086.33   94.2510116.35   93.6110137.36   94.29
 10161.38   93.7910182.39   94.02 10200.4   93.81 10212.4   94.3110257.44   94.56
 10272.44    94.310308.46   94.7410329.48   94.2510344.49   94.6310383.51   94.41
 10410.52   95.1310428.53   94.4510449.55   94.1810488.58   95.0910521.59   94.49
  10533.6   94.6910563.62   94.1810581.63   94.5910629.66   94.6910650.67   94.36
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10677.69   94.57 10689.7   94.3510716.71   94.8310740.73   94.7410782.76   95.27
10797.77   94.4910836.79    94.7 10854.8   94.1510902.83   94.2510914.84   94.73
10962.86   95.7510980.87   95.5511001.89   94.98 11019.9    95.511064.93   94.33
11097.95   94.3511133.97   94.1711172.99    94.811200.01   93.9611221.03   94.28
11245.04   93.5811269.05   93.9811302.07   95.0811326.09   94.82 11350.1   94.02
11371.11   94.2311398.13   94.0411422.14   93.3211443.16   93.7511476.18   93.81
 11512.2   94.0811545.22   93.3511605.26   93.2711647.29   93.65 11662.3   93.41
11686.31   93.4911704.32   93.8911722.33   93.3711785.37   93.5411824.39   92.87
11909.09   92.8711933.24   93.1812001.69   93.31   12050   93.1412086.23   93.27
12134.56   92.9512178.84   93.2212211.05   92.87 12316.7   92.8712343.71   94.48
12364.72   94.4412376.73   94.8612388.73   94.2712403.74    94.212427.76   94.52
12445.77   95.1712460.78   95.3512496.91   94.4812521.07   94.7512541.21    94.3
12577.44   95.6912625.75   95.0412653.94   94.5212682.12   94.4212710.31   94.07
12718.35    93.212727.94   93.0612763.97   93.3212796.99   93.37   12824    93.6
12845.01   93.5412869.03    93.812878.04   93.5412914.06   93.3112959.08   93.32
 12974.1   93.64 12983.1    93.413010.12   93.5513031.13   93.3413061.14   93.56
13133.19    93.513177.34   93.2613214.24   94.1313241.26   94.3413338.39   94.21
13350.46   94.4813398.79   94.5513427.38   94.7313454.39   95.1713532.44   95.14
13580.46   93.4213589.47   93.6713640.35   93.4513648.41   93.8513660.49   95.39
13688.66   93.2513704.77      9313732.96   92.9913757.11   93.3913789.33   92.89
13809.45   92.9313829.59   94.9313849.72   94.6713894.01    94.713938.29   95.16
13979.71   95.0914000.72   97.5214024.74   97.81 14123.5   97.6914139.61   98.16
14155.71   97.2714163.76   97.2114187.92   98.1814207.85   98.5114224.15   98.46
14232.21   97.0814261.88   97.6114294.91   97.3314303.91   97.7314315.92   99.07
14324.92   97.7314333.93   97.3914342.93   97.8314348.93   97.2714369.95   96.54
14393.97   96.1614405.97   96.6214417.98   97.7714426.99    98.1   14451   98.06
14465.73   98.4814477.81   99.3714485.86  102.4514496.02  107.2314505.04  110.01
14514.04   111.114531.53  110.3414544.65  109.1814562.15  110.0914566.52  110.82
14570.89   109.614581.83  104.6614594.95  103.04 14603.7   99.6614658.37   99.66

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .169 4932.14    .066 5001.68    .015 5268.86    .066 5370.53    .102

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4932.14 5370.53          1576.77 1533.33 1581.16             .1       .3
Left Levee      Station=   63.77      Elevation=  109.51
Right Levee     Station=14514.04      Elevation=111.1033
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     775 4929.43   97.71 5379.23 14246.7   96.77

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.98*

INPUT
Description: RGV-04, 8-foot wall applied with 10:1 SS.
Station Elevation Data    num=     457
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  100.92    8.21  103.62   20.51  103.55   31.18  104.32   41.03  106.22
   50.04  109.03   74.04  109.27   74.71  109.27   74.71  101.27   84.71  101.07
  175.71  100.28  178.71  100.58  202.71   100.1  208.71    99.5  218.71    99.3
  224.71    98.7  231.95    98.7  490.59   98.49  527.38   98.66  608.14   98.67
  664.97   98.87  688.09    98.7  701.57   99.22  754.55   99.23  788.27   98.62
  822.94   98.76  857.62   91.91  906.75   91.12  981.92   90.95  992.74   89.05
 1007.89    87.6 1012.89   88.69 1033.22   88.36 1048.21   88.39 1071.28   95.63
 1079.98   96.41 1114.79   97.17 1126.39   96.57  1152.5   96.61    1167   97.05
  1175.7   96.44 1196.98    96.6 1219.21   95.46 1230.81   94.33 1259.83   93.87
 1274.33   94.29 1291.73   93.97 1314.94   94.26 1338.14   93.92 1364.25   93.93
 1384.55   94.41 1399.06   93.48 1416.46   94.54 1428.06   93.95 1448.37   94.05
 1457.08   93.75 1474.48   93.98 1486.08   93.66 1497.69   94.44 1512.19   94.18
 1517.99   94.86 1538.29   94.06  1564.4    93.4 1590.51   93.75 1616.61   93.34
 1645.62   93.41 1660.13   94.32 1677.53   93.54 1694.94   93.32 1715.24   93.98
 1735.55   93.23 1752.95   93.46 1814.62   93.33 1883.49   93.33  1958.9   93.65
 1982.11   93.48 1996.61    93.7 2037.22   93.52 2043.02   93.87 2060.43   93.53
 2092.34   93.74 2109.75   94.75 2135.85   98.99 2141.65   99.04 2147.45   97.39
 2156.16   96.94 2161.96   95.75 2170.66   96.08 2188.06   98.18 2202.57   98.45
 2214.17  100.51 2222.87  100.66 2246.08   97.78 2257.68   97.21 2269.28   97.47
 2283.79   96.49  2318.6   95.59 2370.81   94.99 2391.12    95.4 2408.52    95.2
 2431.73   95.75 2440.43   95.57 2518.76   95.38 2527.46   95.75 2608.68   96.22
 2640.58   96.83 2663.79    96.7 2678.29   97.18  2692.8   96.72 2733.41   96.45
 2759.52   96.72 2834.94   96.37 2887.15   96.57 2916.16   96.23 2971.28   96.27
 2977.08   96.52 3000.28   96.25 3014.79   96.89 3026.39   96.58 3043.79   96.73
 3055.39   96.15    3067   94.45 3119.21   93.91 3148.23   94.12 3174.33   93.97
 3281.65   94.05 3301.96   95.25 3347.59    93.7 3394.79   93.59 3415.09   93.84
  3429.6   94.75  3441.2   94.86  3452.8   94.34 3487.61      95 3548.53    94.8
 3597.84   95.12 3623.95   94.96 3696.46   95.19 3745.77   95.77 3774.79   95.89
  3806.7   95.67 3861.81   95.75 3890.81   95.62 3914.02   95.95 3963.34    95.6
 3989.44   95.19 4003.95    93.6 4012.65   94.12 4035.85   93.46 4082.26   93.81
  4224.4   94.08 4296.92   94.17 4357.83   94.14 4494.17   94.34 4505.77   94.15
  4598.6   94.42 4645.07   94.39 4680.62   94.68 4729.12   94.87 4775.54   94.72
 4804.55    94.9 4889.45   94.81 4942.78   94.98    4996   95.32  5016.3   96.15
 5030.81    97.2 5042.41      97 5132.33   96.86 5149.73   98.16 5161.33   96.45
 5196.15   95.72 5213.55   96.43 5239.66   96.52 5262.86   95.19 5294.77   95.53
 5300.57   95.37 5320.87   96.37 5332.48   96.22 5378.23   96.44  5407.9   97.06
  5416.6   96.45 5436.91   96.04 5468.81    97.3 5486.22   95.55 5494.92   95.12
 5515.22    95.4 5523.93   96.38 5541.33   96.29 5552.93   95.81 5564.53   96.02
 5576.14   95.63 5593.55   96.13 5613.85   95.49 5631.26   94.57 5662.61   94.09
 5689.27   95.16 5716.25   93.19 5726.06   91.95 5738.32   91.74 5750.58   88.91
5757.1189.44713 5765.29   90.12  5775.1   88.03 5794.72   84.95 5806.98   85.43
 5816.79   84.86  5821.7   86.54  5831.5   86.51 5843.77   82.37 5856.03   75.63
 5863.71   72.16 5871.19   70.92 5891.38   69.86 5903.62 69.5814 5911.59    69.4
 5930.08   67.09 5960.89   66.44 5974.23   66.44 6004.88   67.39 6033.22   70.43
  6041.8   72.86 6049.54    73.9 6055.81   75.66 6070.82   83.54 6078.56   86.47
6089.5688.05505 6109.52   88.25 6121.14   88.73 6136.22   92.34 6146.28   96.04
 6164.53   96.05 6193.76   95.34 6201.07   95.67 6208.38   94.58 6226.63   94.19
 6274.27   94.33 6306.95      94 6409.28   93.84 6416.58   93.56 6460.41   93.44
 6467.72   93.63 6489.63   93.25 6515.21   93.32 6537.12   91.33 6544.42   91.06
 6606.52   90.86 6734.51   90.74 6796.46   90.61 6818.38   91.73 6843.95   94.39
 6854.91   95.08 6895.19      96 6946.22   96.23  6971.8   96.56 7008.32   96.38
 7055.81   95.68 7081.38   95.87 7092.33   96.26 7143.48   95.91 7238.45   95.66
 7421.08   95.31 7472.22   95.27  7512.4   95.39 7584.19   95.14  7643.9   94.79
 7654.86   95.19 7676.77   94.69 7687.73   92.91  7720.6   92.27 7742.53    92.3
 7760.79   93.05 7815.59   92.87 7841.15   93.21 7861.97   93.11 7903.25   93.48
 7925.17   93.33 7987.26   93.36 8056.66   92.63 8093.19   92.82 8133.38   92.68
 8202.77    92.8 8224.69   92.15 8264.87   91.57 8323.32   91.37 8356.19   91.62
 8381.76   92.12 8418.29   92.51 8480.38   92.73 8491.34   92.15 8531.52   91.22
  8635.4   91.22 8883.22   90.97 8899.56   91.08 9022.11   90.92 9106.53   91.19
 9136.48   91.91  9150.1   92.59 9182.79   91.96 9239.97   92.41 9272.66   93.08
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 9321.68   92.57 9340.74   91.92 9365.26   91.65 9411.55   91.62 9452.41   91.33
 9506.87   91.37 9692.06   91.19 9787.38   90.97 9855.47   91.02 9877.25    90.9
 9967.13   90.8510016.14   90.4710236.74   90.4710280.32   90.6810299.38   90.47
10346.94   90.8810354.25    91.510368.85   91.6910376.16   92.3310405.38    93.4
10445.56   94.0210452.87   93.8610467.48   94.6810482.09   94.2510528.14   94.06
10573.41   94.5110593.51   94.3810626.18   94.5610645.25    94.310658.87   94.48
10694.27   94.3610718.78   94.7910754.19   94.2910789.59   94.7210857.68   94.22
10874.02   94.3910972.06    94.210996.57   94.4811056.49    94.7 11070.1   94.29
 11105.5    94.311121.84   94.0111165.42   94.0111219.88   94.6211255.29   94.11
11271.63   94.3511312.48   93.7211375.12   93.5811410.52   93.9111435.03   93.41
 11454.1   93.5111475.89   93.1711527.63   93.9111571.21   93.3711614.78   93.23
11636.56   92.7211655.63   92.9411718.27   93.1111748.23   92.7411802.69    92.7
11840.83   92.8911876.23   92.8111892.57   93.0111908.91   92.75 11966.1   92.84
 12001.5    92.512078.35    92.512100.26   93.1312162.35   93.3712206.19   93.03
12217.15   93.3412239.06   93.29 12282.9   92.6612304.81   93.1912323.08   93.19
12352.29    92.512448.14    92.512472.65   93.3112502.61   93.49 12513.5    93.2
12548.91   93.3212578.86   93.7412611.64    93.312633.56   94.2712651.83   93.61
 12684.7   96.6512728.53   95.94 12754.1   95.0512779.67      9512805.24    94.3
12812.54   92.7112821.24   92.5912949.25   92.9612990.09   92.7213077.25   92.84
 13188.9   92.8113228.95   92.6913250.87   93.7613276.45   94.1213320.28   93.85
13342.19   93.1913375.07   93.1913386.02   93.76 13411.6   93.7813429.86   93.34
13480.31   93.6513551.12   93.6413594.69   92.7713602.86    92.913649.02   92.79
13656.33   93.4613667.29    96.4 13674.6   95.8913692.85   93.2613707.47   92.75
13733.04   92.7413754.95   93.5413765.91    93.413784.18   92.5313802.44   92.63
 13820.7   96.6113838.97   96.1113871.84    96.413879.15   96.1513919.33   97.09
 13956.9   96.9513975.97   98.1113997.75   98.3614061.78    98.614087.36   98.35
14101.97   99.5514116.57   97.9614123.88   97.73 14145.8    99.614156.76   99.55
14175.02  100.2114178.67   99.9514185.98   96.94 14212.9   97.1114242.86   96.98
14261.92   97.8514270.09   97.1814286.43   97.2214310.94   96.5814332.73   96.39
14362.69   97.3614397.84   97.55 14408.8   98.8114416.11  102.9914425.32  105.89
14441.67  108.2814456.98  107.3214467.91  108.1414475.56  105.0514482.13  104.25
 14486.5  102.5514513.83  102.55

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0      .1 5689.27    .066 5863.71    .015 6070.82    .066 6146.28    .082

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5689.27 6146.28          1576.77 1533.33 1581.16             .1       .3
Left Levee      Station=   74.71      Elevation=  109.27
Right Levee     Station=14441.67      Elevation=108.2767
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     754 5691.34   95.13 6150.3214044.75   96.02

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.7

INPUT
Description: RGV-04, Updated on left with new survey to Station 1057.92. 8-foot
             wall applied with 5:1 SS, translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     454
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   99.24      10  103.02      20  103.42      25  102.43      38   102.4
      50  104.88   60.99  108.88   84.99  109.12   85.66  109.12   85.66  101.12
   95.66  100.92  186.66  100.79  189.66  101.39  213.66  100.91  219.66   99.71
  229.66   99.51  235.66   98.31  275.98   98.19  434.97   98.03  482.96    98.1
  555.96   97.88  642.95   97.93  701.95   98.25  725.95   98.01  739.94    98.8
  794.94   98.77  817.94   98.48  829.94   97.84  849.94   98.32  865.93   98.09
  901.93   87.84  952.93   86.53 1007.92   86.02 1057.92   85.78  1082.6   93.07
 1105.57   92.95 1138.37    93.1 1177.74   92.89 1223.67   93.15 1233.51   94.32
 1243.35   94.18 1249.91   94.97 1263.04   94.85 1272.88   95.58    1286    94.6
 1315.53   94.48 1318.81   94.14 1331.93   95.04 1341.77   94.02 1390.98    94.2
  1404.1   93.87 1413.94   94.33 1427.07   94.17 1436.91   93.51 1453.31   94.42
 1472.99   94.07 1499.24   94.53 1525.48   94.11 1548.45   94.49 1555.01   94.12
 1577.97   94.83 1594.38   93.44 1614.06   95.03 1627.18   94.14 1650.15   94.29
 1659.99   93.83 1679.67   94.17 1692.79   93.69 1705.92   94.86 1722.32   94.47
 1728.88   95.49 1745.28   94.97 1751.84   94.25 1768.25   94.09 1781.37   93.29
 1801.05   93.32  1810.9   93.87 1840.42    93.2 1873.23   93.29 1889.63   94.67
 1909.31   93.43    1929   93.03 1951.96      94  1961.8   93.16 1974.93   92.88
 1994.61   93.26  2030.7   93.15 2142.24   93.03 2198.01   93.36 2211.13   93.08
 2227.53   93.43 2253.78   93.13 2270.18   93.44 2316.11   93.09 2322.67    93.6
 2342.36   93.14 2378.44   93.38 2391.57   94.79 2398.13   94.87 2427.65  101.19
 2434.21  101.27 2440.77   98.78 2450.62    98.1 2457.18   96.31 2467.02    96.8
  2486.7   99.93 2503.11  100.36 2516.23  103.49 2526.07   103.7 2532.63  102.94
 2552.32   99.37 2565.44    98.5 2578.56   98.87 2594.96   97.39 2634.33   95.95
 2670.42   95.36 2683.54   95.46 2693.38   95.04 2716.35   95.64 2736.03   95.34
 2762.28   96.09 2772.12   95.79  2860.7   95.42 2870.54   95.99  2893.5   96.06
 2916.47   96.45  2962.4   96.65 2998.48   97.54 3024.73   97.33 3041.13   98.06
 3057.54   97.38 3090.34   97.29 3103.46   96.95 3132.99   97.29 3146.11   96.96
 3169.08   97.17 3185.48   96.91 3218.29   96.82 3241.25   97.11 3277.34   97.04
 3310.14   96.48 3326.55   96.91 3333.11   96.59 3372.48    96.5 3379.04   96.88
 3392.16   96.41 3405.28   96.49 3421.69   97.46 3434.81      97 3454.49   97.21
 3467.61   96.32 3480.74   93.74 3497.14   93.08  3503.7   93.41 3539.79   92.83
  3572.6   93.21 3602.12   92.98  3723.5   92.93 3736.63   94.23 3746.47   94.46
 3756.31    93.5 3769.43   93.02  3825.2   93.07 3851.45   92.89 3874.41    93.3
 3890.82   94.65 3903.94   94.79 3917.06      94 3956.43   94.98 3972.83   95.06
 4025.32    94.7 4081.09   95.16  4097.5   94.76 4110.62   94.91 4192.63   95.14
  4248.4   95.99 4281.21   96.17  4317.3   95.83 4379.63   95.89 4412.43   95.69
 4438.68   96.19 4494.45   95.65 4501.01   95.78 4523.97   94.98 4540.38   92.57
 4550.22   93.32 4566.62   92.45 4576.46   92.33 4628.95   92.86 4665.04   93.02
  4789.7   93.19 4852.03   93.14 4871.72   93.26 4940.61    93.2 5045.59   93.42
 5058.71   93.22  5094.8   93.46 5107.92   93.19 5140.72   93.44 5153.85   93.33
  5212.9   93.54 5278.51   93.47 5360.52   93.64 5413.01   93.35 5445.82   93.62
 5531.11   93.56 5649.22   93.96 5662.34   94.18  5685.3   95.42 5701.71      97
 5714.83    96.7 5806.68   96.81 5816.53   96.63 5829.65   97.51 5836.21   98.54
 5849.33   95.94 5875.58   95.43 5882.14   95.74  5888.7   94.76 5908.38   95.78
 5937.91   95.96 5964.15   94.02 5973.99   93.95 6000.24   94.58  6006.8   94.27
 6029.76   95.68 6042.89   95.49 6082.25   95.43 6098.66   94.91 6118.34    94.7
 6128.18   95.13 6138.02   94.78 6160.99   94.98 6183.95   96.54 6197.07   97.14
 6216.76   94.71  6226.6   94.21 6233.16   94.55 6249.56   94.03 6259.41   95.22
 6279.09   95.18 6292.21   94.45 6305.33   94.74 6318.46   94.13 6338.14   94.83
  6361.1      94 6380.79   92.74 6393.91   92.84 6413.59   92.35  6446.4   92.58
 6466.08   91.24 6482.49   90.73 6495.61   89.26 6512.01   89.54 6521.85   86.84
 6528.41   85.92  6548.1   88.48 6561.22   85.85 6571.06   84.94 6587.46   82.23
 6603.87   83.77 6610.43   83.04 6616.99    83.7 6623.55   86.62 6630.11   87.72
 6636.67   87.37 6643.23    84.9 6653.08   82.41 6659.64   79.54 6669.48   73.56
 6672.76   72.73 6679.76   69.14 6689.76   68.04 6709.76   67.94 6729.76   68.34
 6749.76   67.34 6769.76   66.94 6789.76   66.94 6809.76   66.34 6829.76   66.94
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 6839.76   69.04 6855.76   73.34 6862.99   73.47 6876.11   81.54 6882.67   84.31
 6895.78   85.88 6905.62   86.42 6915.46   90.31 6922.02   95.28 6938.41   96.01
 6964.65      95 6971.21   95.51 6977.77   93.89 6994.16   93.32 7036.79   93.55
 7056.47   93.23 7141.73   93.03 7158.13   93.13 7164.69   92.73 7204.04   92.63
  7210.6   92.94 7230.27   92.43 7253.23   92.52 7259.78   91.91  7272.9   89.46
 7279.46   89.04 7505.73   89.04 7512.29   89.27 7525.41   90.76 7548.36   94.54
  7558.2   95.37 7607.39   95.81 7640.18   95.81 7663.14   96.26 7695.93   95.97
 7738.56   94.81 7761.52   95.09 7771.35   95.67 7817.27   95.17 7902.53   94.83
 7994.35   94.66 8066.49   94.43 8079.61   94.63  8112.4   94.37 8148.47   94.54
 8233.74   94.04 8266.53   93.77 8276.37   94.39 8289.48   94.23 8296.04    93.6
 8305.88   90.91 8335.39   89.94 8355.07   90.04 8371.47   91.15 8420.66   90.88
 8443.61   91.37 8460.01   91.28 8499.36    91.8 8519.04   91.63 8574.78   91.72
 8637.09   90.71 8669.88   91.01 8705.96   90.87 8768.26    91.1 8787.94   90.16
 8824.01    89.3 8876.48   89.07 8905.99    89.5 8928.95   90.29 8961.74   90.84
 9017.49   91.24 9027.33   90.42  9063.4   89.0110673.53   89.0110693.21   89.55
10699.77   90.4310712.88   90.5410719.44   91.4910745.68   93.1210758.79   92.95
10781.75   94.1810788.31    94.110801.43   95.0910814.54   94.5310867.01   94.25
10896.53   94.4910998.18   94.2711024.42   94.4511149.03   94.2811204.78   94.02
11240.85      9411290.04   94.1911339.23   94.1111368.74   93.9111421.21   93.81
11473.68   93.5211496.64   93.2611634.37   92.9511644.21   93.0511683.56   92.75
11785.21   92.7511821.29   92.6111847.52   92.13 12247.6   92.1312267.27   93.07
12283.67   93.3112323.02   93.4412362.37   92.9312372.21   93.3912391.88   93.32
12408.28   92.7212431.24   92.3712450.91   93.1612467.31   93.1712493.54   92.13
12726.37   92.1312736.21   93.3512746.05    93.812762.45   92.9112778.84   95.76
12791.96   97.6212831.31   96.8312854.27   95.5712877.22   95.5812900.18   94.54
12906.73   92.2212910.01   92.1313280.57   92.1313300.25   93.6313323.21   93.93
13362.56   93.3613382.23   92.1313411.75   92.1813421.58   93.0413444.54      93
13460.94   92.1313657.69   92.1313664.25   93.0713674.09   97.4113680.65   96.89
13697.04   93.2713710.16   92.5113733.12   92.4913752.79   93.6913762.63   93.48
13779.03   92.1813795.42   92.3213801.98   94.1813811.82    98.313828.22   97.54
13857.73   97.9813864.29   97.6113880.69   98.4713900.36   99.0113952.83   98.68
 13988.9   99.1314028.25   99.4114051.21   99.0214064.33  100.9514070.88  100.53
14077.44   98.64   14084   98.2414103.68  101.0114113.52  100.9614129.91  101.84
14133.19  101.4414139.75   96.8114143.03   96.6214329.95   96.6214339.79   98.25
14346.35  103.5414349.62  104.5314366.02   104.6 14369.3  105.45

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0      .1  6446.4      .1 6521.85    .066 6669.48    .015 6862.99    .066
 6922.02    .082

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6446.4 6922.02          1340.35    1235 1164.92             .1       .3
Left Levee      Station=   85.66      Elevation=  109.12
Right Levee     Station= 14369.3      Elevation=  105.45
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   18.03   766.2   99.11  839.84 5705.92   96.75 6949.8613935.77   96.05

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            104.50    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.100      0.056      0.082
  W.S. Elev (ft)            104.46    Reach Len. (ft)          1340.35    1235.00    1164.92
  Crit W.S. (ft)             91.49    Flow Area (sq ft)       47459.91   12191.25   61193.04
  E.G. Slope (ft/ft)      0.000157    Area (sq ft)            47459.91   12191.25   61193.04
  Q Total (cfs)           125000.00     Flow (cfs)             33682.66   34721.94   56595.40
  Top Width (ft)          14263.72    Top Width (ft)           6360.74     475.62    7427.36
  Vel Total (ft/s)            1.03    Avg. Vel. (ft/s)            0.71       2.85       0.92
  Max Chl Dpth (ft)          38.12    Hydr. Depth (ft)            7.46      25.63       8.24
  Conv. Total (cfs)       9985339.0     Conv. (cfs)            2690662.0  2773683.0  4520994.0
  Length Wtd. (ft)         1235.56    Wetted Per. (ft)         6368.27     488.01    7433.21
  Min Ch El (ft)             66.34    Shear (lb/sq ft)            0.07       0.24       0.08
  Alpha                       2.59    Stream Power (lb/ft s)      0.05       0.70       0.07
  Frctn Loss (ft)             0.17    Cum Volume (acre-ft)    113199.10   44173.19   141648.20
  C & E Loss (ft)             0.00    Cum SA (acres)          16090.68    2008.38   17642.07


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.49

INPUT
Description: RGV-04, 8-foot wall applied.  Bathymetric elevations translated
             from IBWC 2008 Cross-sections
Station Elevation Data    num=     464
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   103.1       5  103.99      17  108.59      41  108.83   41.67  108.83
   41.67  100.83   51.67  100.63  142.67   99.64  145.67  100.39  169.67   99.91
  175.67   98.41  185.67   98.21  191.67   96.71  243.97   96.61  277.97   96.94
  337.96    96.8  404.95   96.94  451.95    96.9  486.94   96.98  607.93   97.09
  648.92   96.88  701.92   96.92  768.91   96.89   809.9   97.32   863.9   97.27
  890.89   97.16  949.89    97.2  970.88   97.28 1013.88   97.27 1059.61   96.87
 1102.26   97.07 1135.06   96.94 1190.83   97.28  1246.6   96.91 1285.97   97.11
 1299.09   96.98 1351.58   97.13 1361.42   96.92 1417.19   97.12 1433.59      97
 1459.84   97.23 1515.61    97.1 1614.02   97.05 1646.83   97.25 1666.51   97.08
 1709.16    97.2 1741.96   97.01 1850.22   97.21 1886.31    97.1 1928.95   97.23
 1978.16    97.1 2030.65   97.13 2050.33   97.03  2106.1   97.26 2112.66   97.15
 2197.96   97.24 2339.02   97.15 2388.22   97.37 2417.75   97.19 2473.52   97.36
 2506.32   97.32 2522.72   97.79 2545.69   98.04 2555.53   98.58 2571.93    98.8
  2594.9   98.46 2621.14   98.55 2680.19    98.4 2703.15   98.69 2716.27   98.45
 2739.24   98.65 2768.76   98.46 2831.09   98.45 2837.65   98.84 2850.77   98.46
 2860.62    98.7 2893.42   98.44 2939.35    98.4 2955.75   98.79 2962.31    98.4
 2995.12   98.43 3027.92   98.28 3070.57   98.56 3083.69   98.36 3109.93   98.57
 3152.58   98.34 3185.39   98.51 3231.31   98.35 3247.71   98.51 3326.45   98.32
 3336.29    98.7 3365.81   98.93 3392.06   98.33 3444.54    98.5 3480.63   98.34
 3506.87   98.54 3523.28   98.43 3542.96   98.68 3556.08    98.4 3592.17   98.28
 3634.81   98.49 3661.06   98.32 3746.35   98.49 3759.47   98.82 3769.31   98.47
 3795.56   98.52 3844.76   98.29 3854.61   98.52 3903.81   98.27 3936.62   98.43
 3953.02   98.71 3975.98   98.45    4058   98.32  4107.2   98.58 4130.17   98.27
 4136.73    98.5 4179.37   98.44 4199.06   99.09 4218.74   98.65 4231.86   96.51
  4241.7   95.74 4274.51   95.09 4297.47   95.63 4304.03   95.38 4330.28   95.59
  4343.4   95.39 4395.89   95.63 4415.57   95.46 4448.37   95.58 4550.07   95.54
 4615.68    95.7 4641.92   95.94 4674.73   95.91 4700.97   96.44 4717.37   95.89
 4733.77   92.77 4753.46   89.79 4786.26   89.39 4819.07   89.26 4871.55    89.5
 4992.93   89.53 5035.58   89.59 5097.91   89.37 5137.27   89.45 5150.39   89.32
 5209.44   89.55 5268.49   89.67 5294.73   89.54 5347.22   89.62 5363.62   89.76
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 5455.48   89.72 5504.68   89.91 5563.73    89.9 5609.66    90.1  5635.9   90.37
 5655.58   91.35 5665.43   92.27 5681.83   92.45 5691.67   92.11 5783.52   92.54
 5809.77   92.49 5826.17   92.69 5849.13   92.54 5865.53   92.73  5888.5   92.56
 5940.98   92.82 5980.35   92.63 6016.44   92.83 6065.64    92.9 6131.25   92.69
 6154.22   92.87  6206.7   93.01 6229.67   93.28 6239.48   93.88 6252.49   93.94
 6278.51   97.31 6301.28    96.9 6311.03   97.23 6324.04   96.92  6333.8   97.49
 6350.06   97.27 6356.57   97.68 6366.32   97.04 6379.33   95.17 6385.84   95.03
  6402.1   96.16 6411.86   94.79 6431.37   88.93 6437.88   87.99 6447.64   87.62
 6457.39   88.02  6463.9   87.51 6480.16   87.87 6496.42   87.68 6522.44   89.24
 6535.45   90.43 6554.97   90.42 6567.98   90.96 6577.77   90.73 6590.83   89.41
 6603.88   91.05 6613.68   93.94 6623.47    95.3 6633.26   94.13 6652.85   85.44
 6656.12   84.36 6678.97   73.04 6682.23   72.25 6690.23   57.26 6696.23   57.54
 6710.23   57.54 6723.73   57.64 6736.23   57.99 6747.23   58.24 6752.23   58.39
 6758.23   58.63 6771.23   58.84 6781.23   59.07 6855.24   72.25 6858.51   72.68
  6868.3   76.52 6884.62   83.84 6904.21   95.86 6907.47    96.2 7002.14   96.06
 7024.99   96.22 7070.69   95.89 7096.81   96.12 7139.25   95.59 7149.04   94.79
 7168.63   97.66 7184.95   98.56 7214.41   98.33 7234.09   98.45 7273.45   98.06
 7293.13   98.29 7322.66   97.82 7342.34   97.83 7358.74   97.02  7365.3   95.74
 7378.42   94.21  7398.1   93.61  7414.5   94.27 7434.18   94.51 7453.86   94.42
 7529.31    94.4 7571.95   94.29 7621.16   94.38 7634.28   94.23 7670.36   94.29
 7742.52    94.1 7791.73   94.19 7847.49   94.03 7926.22   94.06  8044.3   93.84
 8080.39    93.9 8096.79   93.77 8178.79   93.93 8195.19   93.74 8231.28   93.84
 8237.84   94.08 8306.72   93.93 8323.12    94.1 8365.76   93.95 8401.85   94.11
 8418.25    93.9 8441.21   94.03 8526.49   93.87  8657.7   93.93 8664.26   93.78
 8706.91   93.87 8815.15   93.88 8851.24   93.77  8890.6   93.88 8929.96   93.78
 8969.32   93.48 8992.28   93.63 8998.84   93.41 9008.69   95.02 9028.37   95.42
 9044.77   94.43 9077.57   93.75 9130.05   93.04 9175.98   91.61 9192.38   91.42
 9225.18   91.47  9254.7   90.57 9280.94   90.29 9294.06   90.63  9303.9   91.42
 9313.75   92.79 9323.59    95.1 9336.71    97.4 9349.83   97.67 9362.95   97.38
 9389.19   97.47 9395.75   97.74 9431.83    97.5 9458.07   97.09    9504   96.67
 9530.24    96.6 9615.53   96.04 9700.81   95.85 9727.05   95.67  9786.1   95.62
 9822.18   95.26 9832.02   95.47 9871.38    95.4 9904.18    95.6 9930.43   95.37
 9969.79   95.6710130.52   95.56 10199.4   95.8110212.52   96.0410265.01   96.31
10314.21   96.0710356.85   96.3110379.81   96.6410412.62   96.4310442.14   96.72
10474.94   96.3710501.18    96.310563.51   95.3410619.27   94.8510645.51   94.82
 10730.8   95.3510737.36   95.2310786.56   95.3810832.48   95.2210894.81   95.61
10904.65   95.4610940.73   95.6411052.26   94.4811068.66   94.4211088.34   94.74
11104.74   94.5811153.94   94.9711206.43   95.6811275.31   96.2311294.99   96.05
11311.39   96.2511324.51    95.911357.32    95.511373.72   95.0311390.12   94.98
11406.52   94.32 11426.2      9211436.04    89.3 11442.6   89.0111819.83   89.01
11849.35   89.5211872.31   90.4111885.43   93.2711891.99   95.3211901.83   96.72
11924.79    96.411931.35   95.9511954.32   96.0211977.28   95.5712003.52   94.78
12036.32   95.3112059.28   94.56 12072.4    94.412131.45   94.6912154.41   94.45
12160.97   94.6512174.09   94.1812223.29   93.7712259.38   93.66 12288.9   93.29
12344.66   93.2612410.27   92.5912452.91   92.6412475.87   92.3612485.71   92.55
12541.47   92.4312590.68   92.2112649.72   92.2712695.64   92.4212715.32   92.87
12761.25   92.9312787.49    93.312876.06   95.45 12918.7   96.1612941.66   96.22
 13000.7   95.4713030.22   95.6513056.47   95.2213085.99   95.4113125.35   94.86
13145.03   95.1113164.71   94.9813190.96   95.1213230.32   95.7813253.28   96.54
13269.68   97.3913295.92   97.79   13332   98.6713345.13   98.7413371.37   99.32
13423.85   98.9213430.41   98.2913443.53   99.2913459.93   99.5313489.45   97.24
13509.13   97.4213522.25   97.8613555.06   97.5213584.58   97.4313617.38   97.85
13627.22    97.613660.03   97.5113669.87   97.8913682.99    97.713689.55   98.25
13699.39   97.7613728.91   97.6313738.75   98.0513781.39   98.0513804.35    98.5
13820.75   98.1513827.32   98.3613853.56   98.1113869.96   97.69 13896.2    98.2
13906.04   97.9513922.44   98.1613932.28   97.7313978.21   97.3914007.73   97.36
14027.41   97.6114050.37   97.0414073.33   96.8314079.89   96.2714093.01   97.01
14112.69   97.1314119.25    95.914138.94   95.2114148.78   96.2714168.46  100.25
 14178.3   99.9614184.86   98.3314207.82   97.4414217.66   98.3714230.78  101.86
14240.62  106.7514247.18  109.27 14260.3  112.5314266.87  113.6414276.71  114.37
14299.67  117.3314319.35  116.3414339.03  116.9314345.59   115.614352.15  112.63
14361.99  110.0514368.55  107.5914378.39  102.7514384.95  101.5314398.07  102.64
14404.63  101.3814414.47   96.5214463.68   96.46 14575.2   96.46

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4700.97    .085 6623.47     .07 6723.73    .025 6781.23     .07
 6907.47    .06614299.67     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      6623.47 6907.47         1074.69 1235.01 1212.32            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6623.47    95.3       T
 6907.47 14575.2    96.2       T
Left Levee      Station=   41.67      Elevation=  108.83
Right Levee     Station=14299.67      Elevation=  117.33
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
11311.3911901.83   96.25

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            104.32    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.072      0.063      0.066
  W.S. Elev (ft)            104.29    Reach Len. (ft)          1074.69    1235.01    1212.32
  Crit W.S. (ft)             86.84    Flow Area (sq ft)       48519.58    9607.49   56860.21
  E.G. Slope (ft/ft)      0.000127    Area (sq ft)            56467.85    9607.49   65560.20
  Q Total (cfs)           125000.00    Flow (cfs)              42909.13   25542.41   56548.47
  Top Width (ft)          14194.00    Top Width (ft)           6581.80     284.00    7328.20
  Vel Total (ft/s)            1.09    Avg. Vel. (ft/s)            0.88       2.66       0.99
  Max Chl Dpth (ft)          47.03    Hydr. Depth (ft)            7.37      33.83       7.76
  Conv. Total (cfs)       11086740.0    Conv. (cfs)              3805779.0   2265457.0   5015507.0
  Length Wtd. (ft)         1164.17    Wetted Per. (ft)         6589.08     304.74    7332.06
  Min Ch El (ft)             57.26    Shear (lb/sq ft)            0.06       0.25       0.06
  Alpha                       1.83    Stream Power (lb/ft s)      0.05       0.67       0.06
  Frctn Loss (ft)             0.13    Cum Volume (acre-ft)    111600.10   43864.17   139953.30
  C & E Loss (ft)             0.00    Cum SA (acres)           15891.55    1997.61   17444.77


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.27

INPUT
Description: RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
```

Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	103.64	24	103.88	24.67	103.88	24.67	97.88	34.67	97.68
125.67	97.36	128.67	97.66	152.67	97.18	158.67	96.58	168.67	96.38
174.67	95.78	1352	96.51	1388	96.53	2046	96.94	2082	96.96
2719	97.35	2740	96.33	2776	94.92	3434	95.14	3470	95.15
4128	95.37	4164	95.39	4822	95.61	4858	95.62	5194	95.73
5371	96.75	5454	89.74	5516	89.92	5552	90.02	6210	91.89
6246	91.99	6813	92.84	6846	93.7	6904	96.54	6908	94.6
6951	73.7	6997.2	66.88	7001.2	66.29	7004	65.88	7090.4	68.61
7094.4	68.72	7154	71.67	7182	77.76	7183.6	77.86	7187.6	78.12
7201	78.98	7232	90.66	7276.8	91.59	7280.8	91.67	7359	93.29
7370	95.83	7374	96.75	8100.1	97.17	8136.1	97.19	8414	97.35
8651	95.73	8674	90.86	8862.2	97.69	8898.2	97.74	9614	97.35
9624.3	96.91	9660.3	95.35	9774	90.45	9834	90.45	10334	94.11
10386.4	96.77	10422.4	98.15	11148.5	96.18	11184.5	96.08	11614	94.92
11910.6	95.17	11946.6	95.19	12594	95.73	12672.7	93.07	12708.7	91.85
12714	91.67	12750	91.67	12834	98.98	13434.8	98.1	13470.8	98.04
14196.9	96.97	14232.9	96.92	14762	96.14	14784	101.41	14798	101.01
14826	97.76	14959	113.29						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	6813	.06	6846	.066	6951	.015	7201	.066
7374	.067								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
6904 7374 90 90 90 .2 .5
Left Levee Station= 24.67 Elevation= 103.88
Right Levee Station= 14959 Elevation= 113.29
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	6904	95.64	8414	14959	97.35

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	104.19	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.043	0.067	
W.S. Elev (ft)	104.15	Reach Len. (ft)	10.00	10.00	10.00	
Crit W.S. (ft)	89.82	Flow Area (sq ft)	55791.48	11667.63	49840.74	
E.G. Slope (ft/ft)	0.000095	Area (sq ft)	55791.48	11667.63	49840.74	
Q Total (cfs)	125000.00	Flow (cfs)	54171.41	32760.92	38067.68	
Top Width (ft)	14880.75	Top Width (ft)	6904.00	470.00	7506.75	
Vel Total (ft/s)	1.07	Avg. Vel. (ft/s)	0.97	2.81	0.76	
Max Chl Dpth (ft)	38.27	Hydr. Depth (ft)	8.08	24.82	6.64	
Conv. Total (cfs)	12820440.0	Conv. (cfs)	5556012.0	3360076.0	3904356.0	
Length Wtd. (ft)	10.00	Wetted Per. (ft)	6910.71	479.19	7507.89	
Min Ch El (ft)	65.88	Shear (lb/sq ft)	0.05	0.14	0.04	
Alpha	2.34	Stream Power (lb/ft s)	0.05	0.41	0.03	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	110215.30	43562.58	138347.50	
C & E Loss (ft)	0.00	Cum SA (acres)	15725.20	1986.92	17238.33	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE

RIVER: Rio Grande
REACH: Lower Reach RS: 151.255

INPUT
Description: Pharr

Distance from Upstream XS = 10
Deck/Roadway Width = 40
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 28

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	125.18	103.64	0	125.18	117.1	694	119.06	110.98
1388	118.99	110.9	2082	118.99	110.9	2776	118.99	110.9
3470	118.99	110.9	4164	118.99	110.9	4858	118.99	110.9
5552	118.99	110.9	6246	118.99	110.9	6908	118.95	110.87
7001.2	118.86	110.78	7094.4	118.86	110.78	7187.6	118.86	110.78
7280.8	118.93	110.85	7374	118.97	110.88	8136.1	118.99	110.9
8898.2	118.99	110.9	9660.3	118.99	110.9	10422.4	118.99	110.9
11184.5	118.99	110.9	11946.6	118.99	110.9	12708.7	118.99	110.9
13470.8	118.99	110.9	14232.9	124.87	116.79	14959	134.32	126.24
14959	134.32	113.29						

Upstream Bridge Cross Section Data
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	103.64	24	103.88	24.67	103.88	24.67	97.88	34.67	97.68
125.67	97.36	128.67	97.66	152.67	97.18	158.67	96.58	168.67	96.38
174.67	95.78	1352	96.51	1388	96.53	2046	96.94	2082	96.96
2719	97.35	2740	96.33	2776	94.92	3434	95.14	3470	95.15
4128	95.37	4164	95.39	4822	95.61	4858	95.62	5194	95.73
5371	96.75	5454	89.74	5516	89.92	5552	90.02	6210	91.89
6246	91.99	6813	92.84	6846	93.7	6904	96.54	6908	94.6
6951	73.7	6997.2	66.88	7001.2	66.29	7004	65.88	7090.4	68.61
7094.4	68.72	7154	71.67	7182	77.76	7183.6	77.86	7187.6	78.12
7201	78.98	7232	90.66	7276.8	91.59	7280.8	91.67	7359	93.29
7370	95.83	7374	96.75	8100.1	97.17	8136.1	97.19	8414	97.35
8651	95.73	8674	90.86	8862.2	97.69	8898.2	97.74	9614	97.35
9624.3	96.91	9660.3	95.35	9774	90.45	9834	90.45	10334	94.11
10386.4	96.77	10422.4	98.15	11148.5	96.18	11184.5	96.08	11614	94.92
11910.6	95.17	11946.6	95.19	12594	95.73	12672.7	93.07	12708.7	91.85
12714	91.67	12750	91.67	12834	98.98	13434.8	98.1	13470.8	98.04
14196.9	96.97	14232.9	96.92	14762	96.14	14784	101.41	14798	101.01
14826	97.76	14959	113.29						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	6813	.06	6846	.066	6951	.015	7201	.066
7374	.067								

Bank Sta: Left Right Coeff Contr. Expan.
6904 7374 .2 .5

```
Left Levee      Station=   24.67      Elevation=  103.88
Right Levee     Station=   14959      Elevation=  113.29
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    6904   95.64    8414   14959   97.35

Downstream  Deck/Roadway Coordinates
    num=       28
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0  125.18  103.64       0  125.18   117.1     694  119.06  110.98
    1388  118.99   110.9    2082  118.99   110.9    2776  118.99   110.9
    3470  118.99   110.9    4164  118.99   110.9    4858  118.99   110.9
    5552  118.99   110.9    6246  118.99   110.9    6908  118.95  110.87
  7001.2  118.86  110.78  7094.4  118.86  110.78  7187.6  118.86  110.78
  7280.8  118.93  110.85    7374  118.97  110.88  8136.1  118.99   110.9
  8898.2  118.99   110.9  9660.3  118.99   110.9 10422.4  118.99   110.9
 11184.5  118.99   110.9 11946.6  118.99   110.9 12708.7  118.99   110.9
 13470.8  118.99   110.9 14232.9  124.87  116.79   14959  134.32  126.24
   14959  134.32  113.29

Downstream Bridge Cross Section Data
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  103.64      24  103.88   24.67  103.88   24.67   97.88   34.67   97.68
  125.67   97.36  128.67   97.66  152.67   97.18  158.67   96.58  168.67   96.38
  174.67   95.78    1352   96.51    1388   96.53    2046   96.94    2082   96.96
    2719   97.35    2740   96.33    2776   94.92    3434   95.14    3470   95.15
    4128   95.37    4164   95.39    4822   95.61    4858   95.62    5194   95.73
    5371   96.75    5454   89.74    5516   89.92    5552   90.02    6210   91.89
    6246   91.99    6813   92.84    6846    93.7    6904   96.54    6908    94.6
    6951    73.7  6997.2   66.88  7001.2   66.29    7004   65.88  7090.4   68.61
  7094.4   68.72    7154   71.67    7182   77.76  7183.6   77.86  7187.6   78.12
    7201   78.98    7232   90.66  7276.8   91.59  7280.8   91.67    7359   93.29
    7370   95.83    7374   96.75  8100.1   97.17  8136.1   97.19    8414   97.35
    8651   95.73    8674   90.86  8862.2   97.69  8898.2   97.74    9614   97.35
  9624.3   96.91  9660.3   95.35    9774   90.45    9834   90.45   10334   94.11
 10386.4   96.77 10422.4   98.15 11148.5   96.18 11184.5   96.08   11614   94.92
 11910.6   95.17 11946.6   95.19   12594   95.73 12672.7   93.07 12708.7   91.85
   12714   91.67   12750   91.67   12834   98.98 13434.8    98.1 13470.8   98.04
 14196.9   96.97 14232.9   96.92   14762   96.14   14784  101.41   14798  101.01
   14826   97.76   14959  113.29

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    6813     .06    6846    .066    6951    .015    7201    .066
    7374     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          6904    7374            .2       .5
Left Levee      Station=       0      Elevation=  103.64
Right Levee     Station=   14959      Elevation=  113.29
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    6904   95.64    8414   14959   97.35

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Abutments =  2

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
       0  117.16      50    93.2
Downstream     num=       2
     Sta    Elev     Sta    Elev
       0  117.16      50    93.2

Abutment Data
Upstream     num=       2
     Sta    Elev     Sta    Elev
   14936     111   14959   126.6
Downstream     num=       2
     Sta    Elev     Sta    Elev
   14936     111   14959   126.6

Number of Piers =  24

Pier Data
Pier Station     Upstream=     694    Downstream=     694
Upstream     num=       2
    Width   Elev    Width   Elev
       36      60       36  119.42
Downstream     num=       2
    Width   Elev    Width   Elev
       36      60       36  119.42

Pier Data
Pier Station     Upstream=    1388    Downstream=    1388
Upstream     num=       2
    Width   Elev    Width   Elev
       36      60       36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
       36      60       36  119.35

Pier Data
Pier Station     Upstream=    2082    Downstream=    2082
Upstream     num=       2
    Width   Elev    Width   Elev
       36      60       36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
       36      60       36  119.35

Pier Data
Pier Station     Upstream=    2776    Downstream=    2776
```

```
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=    3470    Downstream=    3470
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=    4164    Downstream=    4164
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=    4858    Downstream=    4858
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=    5552    Downstream=    5552
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=    6246    Downstream=    6246
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=    6908    Downstream=    6908
Upstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.31
Downstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.31

Pier Data
Pier Station     Upstream=  7001.2    Downstream=  7001.2
Upstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.22
Downstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.22

Pier Data
Pier Station     Upstream=  7094.4    Downstream=  7094.4
Upstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.22
Downstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.22

Pier Data
Pier Station     Upstream=  7187.6    Downstream=  7187.6
Upstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.22
Downstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.22

Pier Data
Pier Station     Upstream=  7280.8    Downstream=  7280.8
Upstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.29
Downstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.29

Pier Data
Pier Station     Upstream=    7374    Downstream=    7374
Upstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.33
Downstream     num=       2
    Width   Elev    Width   Elev
       4      60       4  119.33

Pier Data
Pier Station     Upstream=  8136.1    Downstream=  8136.1
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
```

```
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=  8898.2    Downstream=  8898.2
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream=  9660.3    Downstream=  9660.3
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 10422.4    Downstream= 10422.4
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 11184.5    Downstream= 11184.5
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 11946.6    Downstream= 11946.6
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 12708.7    Downstream= 12708.7
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 13470.8    Downstream= 13470.8
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  119.35

Pier Data
Pier Station     Upstream= 14232.9    Downstream= 14232.9
Upstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  125.23
Downstream     num=       2
    Width   Elev    Width   Elev
      36      60      36  125.23

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
      Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
          inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.25

INPUT
Description: RGV-04, 6-foot wall applied with 10:1 SS, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  103.64      24  103.88   24.67  103.88   24.67   97.88   34.67   97.68
  125.67   97.36  128.67   97.66  152.67   97.18  158.67   96.58  168.67   96.38
  174.67   95.78    1352   96.51    1388   96.53    2046   96.94    2082   96.96
    2719   97.35    2740   96.33    2776   94.92    3434   95.14    3470   95.15
    4128   95.37    4164   95.39    4822   95.61    4858   95.62    5194   95.73
    5371   96.75    5454   89.74    5516   89.92    5552   90.02    6210   91.89
    6246   91.99    6813   92.84    6846    93.7    6904   96.54    6908    94.6
```

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    6951    73.7  6997.2   66.88  7001.2   66.29    7004   65.88  7090.4   68.61
  7094.4   68.72    7154   71.67    7182   77.76  7183.6   77.86  7187.6   78.12
    7201   78.98    7232   90.66  7276.8   91.59  7280.8   91.67    7359   93.29
    7370   95.83    7374   96.75  8100.1   97.17  8136.1   97.19    8414   97.35
    8651   95.73    8674   90.86  8862.2   97.69  8898.2   97.74    9614   97.35
  9624.3   96.91  9660.3   95.35    9774   90.45    9834   90.45   10334   94.11
 10386.4   96.77 10422.4   98.15 11148.5   96.18 11184.5   96.08   11614   94.92
 11910.6   95.17 11946.6   95.19   12594   95.73 12672.7   93.07 12708.7   91.85
   12714   91.67   12750   91.67   12834   98.98 13434.8    98.1 13470.8   98.04
 14196.9   96.97 14232.9   96.92   14762   96.14   14784  101.41   14798  101.01
   14826   97.76   14959  113.29

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    6813     .06    6846    .066    6951    .015    7201    .066
    7374     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          6904    7374           12.07      10   22.96            .2       .5
Left Levee      Station=       0       Elevation=  103.64
Right Levee     Station=   14959       Elevation=  113.29
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    6904   95.64    8414   14959   97.35

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            104.18    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.060      0.043      0.060
  W.S. Elev (ft)            104.14    Reach Len. (ft)            12.07      10.00      22.96
  Crit W.S. (ft)             89.83    Flow Area (sq ft)       55712.64   11662.26   49755.01
  E.G. Slope (ft/ft)      0.000089    Area (sq ft)            55712.64   11662.26   49755.01
  Q Total (cfs)           125000.00     Flow (cfs)             52300.35   31679.67   41019.98
  Top Width (ft)          14880.65    Top Width (ft)           6904.00     470.00    7506.65
  Vel Total (ft/s)            1.07    Avg. Vel. (ft/s)            0.94       2.72       0.82
  Max Chl Dpth (ft)          38.26    Hydr. Depth (ft)            8.07      24.81       6.63
  Conv. Total (cfs)       13247850.0    Conv. (cfs)              5542937.0   3357500.0   4347411.0
  Length Wtd. (ft)           15.17    Wetted Per. (ft)         6910.70     479.19    7507.79
  Min Ch El (ft)             65.88    Shear (lb/sq ft)            0.04       0.14       0.04
  Alpha                       2.16    Stream Power (lb/ft s)      0.04       0.37       0.03
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)    110104.20   43539.22   138247.80
  C & E Loss (ft)             0.01    Cum SA (acres)          15711.46    1985.98   17223.31


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 151.24

INPUT
Description: RGV-04, 9-foot wall applied, Bathymetric elevations translated
             from IBWC 2008 Cross-sections
Station Elevation Data    num=     451
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  101.66       3  100.51      13  100.47      29  105.14      53  105.38
   53.67  105.38   53.67   96.38   63.67   96.18  154.67    95.7  157.67   96.45
  181.67   95.97  187.67   94.47  197.67   94.27  203.67   92.77  209.98   93.17
  214.98   94.86  232.97   95.24  243.97   93.45  254.97   94.01  287.97   94.58
  372.96   94.51  456.95    94.7  576.93   94.75  643.92   95.04   769.9   95.22
   793.9   96.15   805.9   94.91  870.89   95.42  952.88   95.28  989.88   95.61
 1031.87   95.55 1134.76   95.83 1157.72   95.63 1220.03   95.82 1269.22   95.74
 1302.02   96.41  1354.5   96.82 1384.01   97.57 1400.41   97.03 1436.49   97.48
 1456.17   98.04 1488.96   97.32  1515.2   97.42 1538.16   97.06 1554.55   96.13
 1570.95   95.89 1584.07   96.43 1610.31   96.49 1718.54   96.31 1748.05   96.47
 1771.01   96.28 1807.09   96.48 1879.24   96.43 1980.91   96.53 1997.31   96.34
 2033.38   96.58 2072.74    96.5 2108.82   96.69 2154.73   96.53 2190.81    96.7
 2279.36   96.64 2321.99   96.51 2413.82   96.79 2561.41   96.57 2597.48   96.87
  2643.4   96.61  2659.8   96.77 2708.99   96.45 2725.39   96.77 2751.63   95.85
 2768.02   95.61 2777.86   94.06 2784.42   95.05  2820.5    94.4 2869.69   94.34
 2876.25   94.71 2905.77   94.35 2977.92   94.19 3017.28   94.61 3046.79   94.28
  3174.7   94.66 3194.38   94.57 3243.57    94.8 3250.13   95.06 3302.61   95.38
 3387.88   95.19 3417.39    95.4 3473.15   95.34 3486.27   95.54  3528.9   95.29
 3594.49   95.56 3630.57   95.41 3660.09   95.58 3768.32   95.65 3814.23   95.51
 3843.75   95.72 3929.02   95.58  3948.7   95.89 4011.01   95.74 4040.53   95.95
 4188.11   95.55 4227.46   95.54  4270.1    95.3 4293.05   95.61 4319.29   94.92
 4355.36   94.82 4411.12   95.37 4437.35    95.1 4473.43   95.62 4522.62   95.49
 4575.09   95.85 4594.77    95.7 4627.57   96.08 4657.08   95.98  4670.2   96.28
 4699.72   96.24 4712.84   95.82 4752.19   96.36  4814.5   95.88 4866.97   94.84
 4886.65   94.65 4948.96   94.88 5057.19   94.97 5126.06   95.27 5162.13   95.57
 5194.93   95.37 5290.03   95.59 5316.27   95.87 5358.91   95.91 5394.98   96.37
 5414.66   96.35 5437.61   96.79 5473.69   96.42 5496.65   95.38 5516.32   92.72
 5542.56   91.53 5565.52   90.94 5591.75   89.37 5673.74   89.31 5699.98   89.43
 5755.73   89.26 5834.44   89.36 5844.28   89.23 5945.94   89.35 5998.42    89.2
 6090.24   89.32  6113.2   89.97    6146   90.37 6168.95   91.07 6221.43   91.84
  6241.1   91.72 6267.34   92.16 6323.09   91.92 6349.33   92.22 6388.68   91.81
 6431.32   91.66 6480.51   92.33 6490.35   92.09 6549.38    92.1 6611.69   92.31
 6670.72   92.84 6736.31   92.64 6815.02    92.8 6844.54      93 6874.05   92.86
 6910.13   93.38 6926.53   88.78 6936.36    86.8 6942.92    87.2 6949.48   86.27
 6965.88   78.85 6972.44   73.25 6975.72   72.21  7090.4   68.61  7094.4   68.72
 7175.78   72.21 7182.34   72.91 7195.46   77.69 7215.14   86.94 7221.69   88.24
 7251.21   88.22 7274.17   89.55 7290.57   89.04 7346.33   90.76 7385.68   91.48
 7392.24   91.17 7418.48   91.93  7431.6   91.96 7441.44   92.77 7474.24   93.73
 7598.87   94.66 7621.83   94.48 7667.75   95.08 7693.98   95.18 7713.66   94.81
 7749.74   94.73 7762.86   94.94 7785.82   94.62 7838.29   94.54 7848.13   94.28
 7900.61   94.64 7923.57   94.48 7972.77   94.62    7999      95 8021.96   94.88
 8090.84   95.18 8153.15   95.19 8182.67   96.05 8205.63   96.25 8261.39   96.01
 8274.51   96.34 8294.19   96.14 8317.15   96.65 8340.11   96.23 8386.03   96.78
 8448.35   95.39 8517.23   95.37 8536.91   94.78 8579.55   94.82 8589.39   94.47
 8622.19   94.75 8674.67   93.95 8691.07   92.93 8720.59   93.25 8756.67   94.57
 8779.63   94.75 8822.27   94.61 8855.07   95.79 8868.19   95.98 8894.43   97.29
 8933.79   96.46 8960.03   96.76 8996.11   96.36 9028.91   96.62 9068.27   95.96
 9091.23      96 9150.27   96.53 9166.67    96.1 9206.03   96.77 9261.79    96.6
 9343.79   95.54 9419.23   95.64 9481.55   95.29 9576.67   95.32 9632.43    94.9
 9645.55   94.42 9661.95   95.24 9675.07   94.61 9698.03   94.53 9714.43   94.86
 9730.83   93.91 9753.79   91.28 9770.19   91.16 9789.87   89.99 9802.99   90.25
 9825.95   89.83 9835.79   90.93 9855.47   90.16 9871.87   90.96 9911.23   91.26
 9937.47   91.83 9947.31   92.41 9963.71   92.0710022.75   92.0610062.11   92.76
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10075.23   92.1410101.47   92.3810130.99   91.8210144.11   91.8710180.19   93.34
10193.31   94.8110206.43   94.4810222.83   95.1110229.39   96.0210242.51   96.08
10252.35   96.9610265.47   96.1210294.99    96.810304.83   95.9910331.07    97.3
10357.31   95.7310363.87   96.8810380.27   95.9810399.95   95.9210406.51   95.44
10445.87   96.5710458.99   95.1610481.95   94.8710495.07   94.2310518.03   94.43
10537.71   93.8310557.39   93.9910573.79   93.6410596.75   93.7110662.33   93.92
10685.28   94.1910708.23   94.8810718.07   94.4110744.29   94.6510770.52   94.01
10816.42   94.1510829.53   94.8410842.64      9410862.31    93.510918.04    93.6
10927.88   94.0310967.22    93.510980.33   94.16   11000   93.4311055.73   93.34
11078.68   92.9611111.46   92.8811131.13   93.3111147.53   93.0211183.59   92.91
 11196.7   93.31 11242.6   92.7511275.38   92.9811288.49   92.7611344.23   92.73
 11363.9   93.1411409.79   92.8211432.74   93.5211442.58   92.7311501.58    92.9
11557.32    92.911573.71   93.1911593.38   92.8411609.77   93.1211662.22      93
11757.29   93.3511767.13    93.111790.08    93.7 11816.3   93.49 11832.7   93.76
 11862.2   93.5711878.59    93.811911.38   93.72 11983.5   94.28 12058.9   94.24
12101.52   94.55 12134.3   94.3212173.64   94.49 12209.7   94.2612239.21   94.74
 12255.6   94.25 12285.1   94.8412294.94   94.2212314.61    94.612347.39   93.94
 12376.9   94.1912390.01    93.9 12406.4   94.2112435.91    94.112445.74   94.52
12458.85   93.9312465.41   94.4112478.52   93.8912508.03   93.6312544.09   94.31
12553.93    93.612563.76   94.0212593.27   93.3912616.21   93.3712635.88   93.87
12665.39   93.5912691.62    94.112737.51   95.9112750.62   96.9212757.18   96.23
12770.29   97.3812780.13   97.0712812.91   99.3612826.03   97.9912855.53   98.44
12868.64    98.112901.43   98.2412914.54   97.7412937.49   97.7912976.83   97.03
13058.79   96.7113085.01    96.813124.35   97.8613150.58   98.3513265.32   97.33
13278.43   99.6313294.83   99.7913307.94   97.4613317.77   98.6913327.61      99
13347.28   97.9313452.19   96.9413507.92    96.8 13586.6   95.9813599.71   96.17
13632.49    95.613652.16   95.9213701.34   95.7613727.56   96.6513734.12   96.28
13770.18   96.4613789.85      9713793.13   97.7413819.36   97.0513832.47   97.49
13852.14   96.9113868.53   97.4613920.99   96.9513960.33   96.9413966.88   97.27
14012.78   96.8914042.28   97.0214075.07   96.5414117.68   96.7914199.64   96.61
14225.87    96.914265.21   96.4214284.88   96.7714291.44   96.2414340.61   96.47
14373.39    96.214429.12   96.4214438.96   96.1514527.47   95.5114602.88   95.33
14632.38   95.6314724.17   95.3614747.12   95.1114766.79   95.7114776.63   94.66
14789.74   94.8114806.13   95.94 14825.8   99.5214835.64   99.5914845.46   97.84
14868.29    96.914897.64   97.9514904.17   98.66   14927   99.4514946.57  100.83
14966.14  104.6414975.92  105.0114988.97  107.2314995.49  109.8415002.02  111.04
15021.59  110.0615044.42  104.0615054.21  103.8415067.25  100.4915073.78   97.63
15086.82   96.46

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 6874.05    .066 6972.44    .015 7195.46    .066 7598.87    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      6910.13 7474.24          2853.84    2485 1923.56            .1       .3
Left Levee      Station=   53.67      Elevation=  105.38
Right Levee     Station=15002.02      Elevation=  111.04
Blocked Obstructions     num=      2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    9.01  6913.8    93.4 8392.1114981.41   96.85

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            104.17    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.060      0.050     0.067
  W.S. Elev (ft)            104.15    Reach Len. (ft)          2853.84    2485.00    1923.56
  Crit W.S. (ft)             96.73    Flow Area (sq ft)       61307.62   12536.53   55258.63
  E.G. Slope (ft/ft)      0.000078    Area (sq ft)            61307.62   12536.53   55258.63
  Q Total (cfs)           125000.00     Flow (cfs)             57817.91   26011.57   41170.52
  Top Width (ft)          14909.94    Top Width (ft)           6856.46     564.11    7489.37
  Vel Total (ft/s)            0.97    Avg. Vel. (ft/s)            0.94       2.07       0.75
  Max Chl Dpth (ft)          35.54    Hydr. Depth (ft)            8.94      22.22       7.38
  Conv. Total (cfs)       14120890.0     Conv. (cfs)             6531522.0   2938452.0   4650914.0
  Length Wtd. (ft)         2423.88    Wetted Per. (ft)         6865.70     573.10    7491.44
  Min Ch El (ft)             68.61    Shear (lb/sq ft)            0.04       0.11       0.04
  Alpha                       1.59    Stream Power (lb/ft s)      0.04       0.22       0.03
  Frctn Loss (ft)             0.25    Cum Volume (acre-ft)    110088.00   43536.45   138220.10
  C & E Loss (ft)             0.00    Cum SA (acres)           15709.55    1985.86   17219.36


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 150.78

INPUT
Description: RGV-04, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     462
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.83      12    92.5      25   93.23      40  100.33      51  101.27
      65  100.62      88  108.31     112  108.55  112.67  108.55  112.67   98.55
  122.67   98.35  213.67   98.13  216.67   98.88  240.67    98.4  246.67    96.9
  256.67    96.7  262.67    95.2  283.98    95.2  298.98   94.78  320.98   95.08
  413.98   95.44  561.97   95.44  632.96    95.9  721.96   96.05  744.96   96.37
  769.96   96.21  868.95   96.22  920.95   96.45  959.95    96.4  987.95   96.85
 1008.94   96.39 1039.94   96.41 1090.94   96.86 1121.65   96.85 1141.33   95.99
 1167.56   94.03 1213.48   92.74 1272.51   92.71 1298.75   92.95 1380.74   93.24
 1446.34   93.22 1505.37   93.58 1525.05   93.45 1570.97   93.71  1646.4   93.53
 1685.75   93.84 1718.55    93.7 1761.19   94.02  1790.7    94.5 1816.94   94.42
  1823.5   93.84  1839.9    90.1 1849.74   88.65 2240.02   88.65 2246.58   88.88
 2338.41    89.5 2400.72   90.31 2417.12   90.18 2453.19    90.7 2499.11   94.37
 2512.23   94.38 2525.35   95.73 2617.18   96.33 2646.69   95.92 2659.81   96.55
 2699.17   95.74 2718.84    96.8  2741.8   96.46  2758.2   96.82  2807.4   96.98
 2836.91   95.32 2863.15   94.93 2909.06   95.96 2945.14   96.28 2977.94   96.29
 3004.17    97.1 3017.29   96.37 3036.97   98.64 3043.53   98.73 3063.21   97.06
 3082.88   96.34 3109.12   96.43 3132.08   97.55 3155.04   96.55 3214.07      97
  3289.5   96.85 3325.58   97.15 3341.98   96.67 3391.17   96.25 3407.57   95.28
 3430.53   93.21 3453.48   92.75  3499.4   92.91 3607.63   92.78 3663.38   91.89
 3728.97   92.03 3771.61   91.74 3794.57   92.11 3824.08   91.83 3899.51   91.77
 3942.15   91.93 4027.42   91.67 4089.73   91.68 4178.28   91.88 4312.74   91.85
 4365.22   92.12 4394.74      93 4427.53   92.68 4440.65   92.96 4483.29   92.92
 4584.95   93.34  4801.4   93.34 4873.56   93.71 4909.63   94.23 4916.19   93.97
 5040.82   93.71 5047.38   93.84 5175.28   93.78 5257.27   93.99 5306.46   93.82
 5335.98   94.89  5349.1   94.67 5362.22    90.4 5378.61    86.4 5398.29   86.47
 5411.41   85.78 5440.93   86.29  5460.6    85.4 6267.38    85.4 6310.02   85.65
 6323.14   85.41 6454.32    85.4 6500.23   85.94 6526.47   85.55 6533.03    85.9
 6582.23    85.9 6608.46   85.66 6664.22   85.82 6674.05   86.45 6683.89   86.02
```

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 6703.57   86.24 6749.49   85.52 6808.52   85.68 6851.15   85.39 7041.37   85.51
 7110.24   85.39  7133.2   85.58 7188.95   85.39 7270.94   85.44 7297.18   85.61
 7349.65   85.37 7375.89    85.6 7411.96   85.51 7428.36   85.92 7497.23   85.42
 7510.35   85.76 7530.03   85.31 7562.82   85.58 7589.06   85.17 7608.74   85.53
 7641.53   85.33 7713.69   85.79    7776   85.31 7831.75   85.54 7871.11   85.33
 7900.62   85.56  7936.7   85.48 7943.26   85.93 7956.37   88.45 7966.21   87.71
 7979.33   88.39 7995.73   87.07 8008.85   87.85 8025.25   92.11  8048.2   95.34
 8061.32   96.37    8081   95.71 8123.63   96.37 8156.43   96.62 8189.23   96.53
 8212.18   96.11 8248.26   96.52 8294.18   96.39 8353.21   95.99 8379.45   95.57
  8418.8   96.65 8445.04    96.3 8490.96   96.47 8536.87    95.9 8635.26   95.85
 8654.94   97.32 8691.02   96.96 8723.81    97.3 8743.49   96.72 8779.57   96.45
 8822.08   96.61 8854.76    97.1  8880.9   96.32 8913.58   96.57 8920.11    96.3
 8949.52   96.94 8956.05   96.56  9011.6   96.75 9037.74   97.29 9083.49   96.03
 9109.63   95.97 9119.43   96.65 9148.84   96.64 9155.38    96.1 9181.52   96.08
 9207.66   95.45  9243.6   95.79 9289.35   96.85 9299.16   96.26 9318.83    98.6
 9331.94   98.42 9351.61   93.67 9358.17   90.11 9374.56   86.71 9387.68   82.64
 9397.51   77.67 9404.07   73.36 9410.62   71.62    9412   56.38    9441    56.8
    9465    57.7    9477    57.3    9488    57.5    9498    57.3    9510    56.7
    9519    56.7    9541   57.24    9550   73.26 9617.16   71.62 9623.71   73.19
 9630.27   77.59 9646.66    83.7  9656.5   89.23 9659.78   90.01 9669.61   88.45
    9686   87.56 9708.95   88.48  9731.9    88.7  9761.4   88.07 9771.24   88.64
 9790.91   88.24 9817.14   91.62 9830.25    94.6 9843.36   94.39 9856.48   92.92
 9885.98    91.3 9918.76   92.53 9938.43   95.41 9951.55   95.51  9974.5   94.19
 9987.61   93.8710020.39   93.8410026.95   94.1410046.62   97.9110059.73    98.4
10089.24   97.7210102.35    96.910128.58   96.6910158.08   96.8810187.59   97.78
10200.71   97.1910213.83   97.92 10253.2   97.3910295.84   97.8710325.37   96.82
10338.49   96.8410354.89   95.7310371.29   95.51 10404.1   96.2310430.34   96.49
10453.31   97.5410479.55   96.9810499.23   97.25 10522.2   96.3610561.56   97.07
10581.25   96.3510610.77   96.67 10656.7   95.1110679.66    96.510702.62   95.95
10728.87   93.8310755.11    93.110787.92   93.3510810.88   93.9810833.84   94.14
10856.81   95.6810886.33   95.5310896.17   94.9210915.86   95.5710935.54   95.01
10948.66   96.5210961.78   96.6910981.47   95.5211004.43   95.0211033.96   95.24
 11043.8   94.9711083.16   95.7111115.97   95.0611142.21   95.0811152.05   95.62
11171.74   94.92 11194.7   94.7711204.54   95.2511220.94   94.8311283.27   94.77
 11312.8   94.3411325.92   94.5311384.97   94.2511457.14   94.2311486.66   94.48
11499.79   94.1911552.27   94.3611608.04      9411621.16   94.2711660.53   94.01
11680.21   94.2411713.02   93.97 11732.7    94.211811.43   94.03 11867.2   94.23
 11883.6   93.9712024.67   94.1112041.07    94.4 12119.8   94.6612139.48   95.86
12152.61    94.512175.57   95.4612198.53   94.98 12221.5    95.712247.74   95.54
12260.86   95.0912326.47   95.58   12356   96.1312369.12   97.26 12388.8   96.55
12398.64   97.3512411.76      9612431.45   97.4712454.41   97.3812470.81   96.57
12477.38   95.0912500.34   94.4812520.02   96.7812526.58   96.3312552.83   97.27
12565.95   97.2412572.51   95.8812588.91   98.2312605.31   96.8912690.61   96.12
12697.17   96.3412733.25   95.7512766.06   95.5312789.02   96.1412818.55   96.07
12831.67   95.2912841.51   96.2112874.32   96.5912903.84   96.5212979.29   97.11
12998.97   96.6213015.38   96.9913035.06   96.5413094.11    96.313123.63   95.88
13149.88   96.0813192.52   95.8513267.98   94.8913310.62   93.8213382.79   93.45
13461.52   93.2113481.21    93.413546.82   95.2413573.06   95.3213628.83    94.7
13664.92   94.8713687.88   95.9113730.53   96.2113750.21   97.0913773.17   98.78
13789.57   98.6213805.98   99.3613825.66   99.4413855.18    98.613914.23   98.57
13956.88   97.8813976.56   98.79 13986.4   97.8113999.53   97.6614015.93   98.29
14038.89   97.0714055.29    97.5 14088.1   97.5314114.34   97.9914147.15   97.63
14179.95    98.514212.76   98.54   14239    98.214288.21   98.1314330.86   98.45
 14357.1   98.24 14373.5   98.4814406.31   97.6914429.27   97.9114462.08   97.12
14498.16   97.5214527.69   97.0314553.93   96.2514681.87   96.0314754.04   95.64
   14777   95.7614849.18   95.4714944.31   95.3414970.55   95.7415072.25   95.35
15095.21   95.7915101.77   95.3615150.98    95.7 15249.4   95.33 15265.8   95.58
15337.97   95.1915436.39   95.3615459.35   95.6215495.43   95.54 15518.4   96.17
15544.64   95.6315603.69   95.5815616.81   95.9115646.34    95.915659.46   95.54
 15685.7   96.5515705.39   95.6315748.03   95.4815774.28   95.79 15820.2   95.02
15856.29   95.3815862.85   94.91 15905.5   95.1115944.86   94.8815974.39   93.92
15987.51   94.5916000.63   96.3616007.19    98.116017.03    98.316026.88   96.07
16046.56   94.0816105.61   94.4116135.13   95.0216151.53   96.1616164.66   98.47
 16174.5  102.0116187.62  104.2316194.18  106.3216220.42  106.2216236.83  101.98
16253.23  101.1516263.07   97.05

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      88    .066 9318.83     .07 9410.62    .025 9623.71     .07
10059.73    .06616194.18     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9318.83 9938.43          2017.47 2485.16 3297.89             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 9318.83    98.6       T
 9938.4316263.07   95.41       T
Left Levee      Station=  112.67      Elevation=  108.55
Right Levee     Station=16194.18      Elevation=  106.32
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1825.35  2606.2   94.44 5344.23  8366.2   94.94

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            103.92    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.066      0.056      0.066
  W.S. Elev (ft)            103.89    Reach Len. (ft)          2017.47    2485.16    3297.89
  Crit W.S. (ft)             84.99    Flow Area (sq ft)       48656.99   14717.16   48224.19
  E.G. Slope (ft/ft)      0.000137    Area (sq ft)            83182.56   14717.16   50519.58
  Q Total (cfs)           125000.00    Flow (cfs)              38910.38   36497.68   49591.94
  Top Width (ft)          16072.92    Top Width (ft)           9206.16     619.60    6247.16
  Vel Total (ft/s)            1.12    Avg. Vel. (ft/s)            0.80       2.48       1.03
  Max Chl Dpth (ft)          47.51    Hydr. Depth (ft)            5.29      23.75       7.72
  Conv. Total (cfs)       10671400.0    Conv. (cfs)             3321828.0  3115852.0  4233725.0
  Length Wtd. (ft)          2467.49    Wetted Per. (ft)         9214.56     653.38    6251.75
  Min Ch El (ft)              56.38    Shear (lb/sq ft)            0.05       0.19       0.07
  Alpha                       1.92    Stream Power (lb/ft s)      0.04       0.48       0.07
  Frctn Loss (ft)             0.38    Cum Volume (acre-ft)    105354.80   42759.06   135884.60
  C & E Loss (ft)             0.00    Cum SA (acres)          15183.38    1952.10   16916.06


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 150.31

INPUT
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Description: RGV-04, Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     462
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.72   16.99   88.39   24.99   91.58   29.99   95.84   37.99   99.96
   50.99  100.94   63.98  100.16   67.98   101.9   74.98  102.81   85.98  107.64
  109.98  107.88  110.65  107.88  110.65   97.88  120.65   97.68  211.65   97.23
  214.65   97.98  238.65    97.5  244.65      96  254.65    95.8  260.65    94.3
  272.94   94.23  399.91   94.13   439.9   94.34  558.88   94.25  600.87   94.09
  707.84   94.09  751.83   94.19  791.83   94.05  881.81   94.19   922.8   93.96
 1086.76   93.78 1095.24   94.19 1180.49   94.09 1210.01   93.52  1226.4   94.34
 1246.08    91.8 1259.19   91.26 1298.54   91.49 1387.08   91.41 1432.99   91.55
 1583.83    91.5 1659.25   91.38 1675.64   91.55 1737.95   91.39 1774.02   91.53
 1911.74   91.37 1964.21   91.51  1980.6   91.25 2098.65   91.55 2108.49   92.08
 2144.56   91.45 2229.82    91.5 2252.78   91.78 2285.57   91.47  2328.2   91.66
 2357.71   91.44  2518.4   91.51 2551.19   91.99 2590.54   91.53 2600.38   94.21
 2616.77   93.11 2633.17    92.9 2741.39   93.46 2836.48   93.49 2882.39   93.24
 2941.42   93.58 2990.61   93.42  3023.4   93.61 3072.59    93.4 3154.57   93.23
 3262.78   93.15 3485.77   93.57 3538.24   93.46 3584.15   93.61 3636.62   93.49
 3666.14   93.75  3754.7   93.66 3908.86    93.8 3954.78   93.64 4007.26   93.85
  4082.7   93.68  4131.9   93.79 4256.53    93.7 4338.53   93.96 4459.88   93.94
  4522.2   94.19  4604.2   93.94 4640.27    94.5 4679.63   93.99 4751.79   94.37
 4791.15   94.26 4882.98   94.42 4909.22   94.24 4958.42    94.5 5030.58   94.41
 5086.33    94.1 5119.13   95.09 5165.05   94.28 5292.96   94.36 5329.04   94.21
 5453.68   94.31 5558.63   94.14 5565.19   94.31 5686.54   94.15 5712.78   93.97
 5830.86   94.02 5958.77   93.74 6007.97   93.81 6034.21   93.58 6103.08   93.49
 6158.84   92.41 6168.68   94.01 6191.64   95.08 6224.44   91.89 6234.28   92.78
 6250.68   86.83 6267.08   85.75 6329.39   85.72 6335.95   85.41 6414.67    85.4
 6427.79    85.9 6493.39   85.83 6545.86   85.45  6637.7   85.64 6677.06   85.94
 6693.46   85.64 6726.25   86.29 6739.37   85.95 6755.77   93.16 6768.89   96.68
 6785.29   96.55 6791.85   95.66 6818.09   95.35 6857.45   95.42 6867.29   94.74
 6890.25   94.97 6923.05   94.48 6949.28    94.9 7018.16   95.25 7037.84   95.05
 7073.92   96.47  7093.6   95.71 7116.56   96.02  7126.4   95.48 7172.31   95.52
 7201.83   95.26 7244.47   95.54 7323.19   94.62 7378.94   95.21 7395.34   94.67
 7431.42   94.93 7487.18   94.19 7539.66   94.33  7565.9   93.79 7621.65   93.64
 7674.13   92.97 7716.77   91.57 7733.17   91.86 7765.97   91.25 7785.64   91.45
 7844.68   94.21  7857.8   93.77 7887.32   94.37 7900.44   93.67 7962.76   93.89
 8015.23   93.21 8041.47   93.57 8064.43   93.25 8077.55   94.08 8097.23   93.43
 8169.39   93.43 8185.79   94.57 8198.91   93.55 8238.27   92.83 8297.31   93.22
 8326.84   94.21 8359.64   94.17 8385.88   95.48 8418.68   95.22 8435.09   96.49
 8454.77   95.69 8477.73   96.13 8484.29   95.59 8503.97   95.96 8523.65   95.28
 8595.82   95.32 8628.62   95.91 8635.18   95.35 8664.71   95.06 8707.35    95.7
 8713.91   95.48 8805.76   95.92 8835.28   97.41 8851.68   96.22 8877.92   96.01
 8917.29   96.42 8943.53   95.44 8976.33   95.22 9009.13   93.96 9028.82   94.79
 9041.94    91.9 9055.06   85.97 9074.74   86.76 9110.82   86.97 9133.78    86.5
 9192.83   86.59 9235.47      88 9245.31   88.66    9265   86.89  9297.8   85.96
 9320.76   86.57 9360.12   86.81 9389.65   85.74 9412.61   90.08 9422.45   90.86
 9442.13   90.79 9471.65   91.54 9507.74   92.93  9530.7   91.08 9550.38   87.58
 9566.78   87.45  9579.9   88.47 9593.02   91.86 9602.86   93.06 9615.98    92.7
 9701.27   93.14 9724.23   93.01 9734.07   93.54 9776.72   92.69 9832.48   92.56
 9868.57   92.17 9911.21   92.45 9940.73   92.29 9989.94   92.9210022.74   92.67
10111.31   92.6610153.95   92.4410170.35   92.8210212.99   92.6110275.32   93.17
   10295   93.71 10327.8   93.3510340.92   93.9610386.85   94.9210416.37   95.08
10439.33   94.6310485.26   95.6610518.06   94.6910567.26   96.1110619.75   95.11
10639.43   95.2810652.55   94.3310714.88   94.09 10744.4   94.6110800.16   94.34
10836.25   94.7810849.37   94.4310875.61   95.2410914.97   95.5310934.65   94.93
 10960.9   95.3111013.38   95.0111052.74   95.0511095.22   96.2911108.25   95.76
11153.85      9611170.13   96.3711212.47    96.211222.24   95.6411245.04   96.32
11258.07   95.6211290.63   95.5111316.69   95.8711378.57   95.3811407.88    94.6
11427.56   95.4811460.36   94.93   11503   95.5411522.68   94.67 11552.2   95.66
11581.72   91.4111627.64   88.7111644.04   87.0511657.16   87.6511673.56   86.81
11696.52   86.4611726.04   85.4411762.12   86.23 11781.8   81.6411788.36   81.03
11804.76   82.7511817.88   78.4211827.72   72.2711834.28   70.7711844.28   63.67
11854.28   63.5711874.28   63.7711894.28   63.7711904.28   63.2711914.28   63.57
11924.28   64.2711934.28   64.8711954.28   64.2711964.28   64.5711965.48   70.77
11972.04   70.9411981.88   74.8911991.72    76.911998.28   80.4212014.68   82.91
 12027.8   93.3512047.48   94.2512057.32   90.0112067.16   94.0512086.84   94.63
12113.08   94.13 12142.6    92.9   12159   93.0712188.52   91.9912244.28   90.92
12260.68   90.8712300.04   89.7312342.68   89.9512362.36   90.7412408.28    91.5
12424.68   91.1812464.04   92.2612483.72   93.3112506.68   91.6312532.92   91.46
12542.76   92.47   12569   92.0712575.56   93.4912591.96   94.6712608.36   94.59
 12618.2   95.6412641.17    95.812657.56   96.9712664.12   99.4412677.25   99.11
12693.64   95.9412729.72   96.9712755.96   94.7212772.37   94.3812788.77   96.23
12798.61   95.0212811.73   94.9912854.37   99.2512880.61   99.7912916.69  100.03
12933.09  100.7312965.89   99.7912982.29  100.7313001.97  100.1813018.37   100.6
13034.77   99.6413064.29  101.6213087.25  101.7613133.17  101.2213149.57  102.13
13159.41  101.3213179.09  102.8713185.65  102.3813208.61   104.113218.45  105.98
13241.41  105.4813254.53  106.6913267.65  106.3813287.33   99.0913303.73   97.96
13329.97     10213349.65  103.4613356.21  101.5113369.33  101.0813382.45    99.6
13411.97  100.8113425.09    98.713461.17   96.9413490.69   94.9613513.65   95.44
13546.45   94.4213566.13   95.1513595.65   95.2213605.49   94.6413631.73   94.42
13690.77   94.8113720.29   94.5613756.37   95.2513766.21      9514025.33   95.95
14071.25   96.4114153.25   96.7114172.93   97.1414258.21   96.6814291.01   97.17
14327.09   96.6914336.93   95.2714366.45    96.514376.29    97.414412.37   97.59
14451.73    97.314471.41   96.5614582.93   96.1114678.05   95.4114707.57   94.94
14792.85   94.6614809.25   95.3314851.89   94.2314868.29   94.9514887.97    94.9
14917.49   96.4814943.73    96.214999.49    93.415009.33    95.215015.89    93.7
15035.57    93.115101.17   93.4815147.09   94.6715170.05   94.7615209.41   93.79
15258.61   93.3215455.42   93.0115563.66   93.17 15671.9   93.55 15688.3   94.49
15740.78   94.4315760.46   94.9815832.62   94.92 15934.3   95.4516045.82   95.02
 16131.1   95.2816203.26   95.67 16229.5    96.316242.62   95.9616288.54   96.48
16409.89   96.8416495.16   96.9516590.26   97.3716600.09   97.66 16662.4   97.58
16714.87    97.916721.43   98.2916750.94   97.9316800.13   96.0216819.81   93.63
16842.76   93.71   16869   97.7916878.83   97.3416885.39   95.2116901.79   93.15
16914.91   92.7916944.42   93.0716996.89   92.9917010.01   93.8417016.56   95.78
17029.68   96.8917046.08  104.6817072.31   103.817085.43  101.0817095.27  100.46
17111.66   96.4617226.44   96.46

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .09 11552.2    .06611817.88    .01511991.72    .066 12027.8    .102

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       11552.212047.48           881.09  1506.5  1723.2             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
12047.4817226.44   94.25       T
Left Levee      Station=  109.98      Elevation=  107.88
Right Levee     Station=17046.08      Elevation=  104.68
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  101.4111540.28    95.612665.9217067.04   99.46
```

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	103.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.090	0.053	0.102
W.S. Elev (ft)	103.49	Reach Len. (ft)	881.09	1506.50	1723.20
Crit W.S. (ft)	91.80	Flow Area (sq ft)	89756.73	11708.78	22250.31
E.G. Slope (ft/ft)	0.000176	Area (sq ft)	89756.73	11708.78	23540.82
Q Total (cfs)	125000.00	Flow (cfs)	77670.06	35270.13	12059.81
Top Width (ft)	16857.99	Top Width (ft)	11441.55	495.28	4921.16
Vel Total (ft/s)	1.01	Avg. Vel. (ft/s)	0.87	3.01	0.54
Max Chl Dpth (ft)	40.22	Hydr. Depth (ft)	7.84	23.64	4.52
Conv. Total (cfs)	9412219.0	Conv. (cfs)	5848382.0	2655762.0	908076.3
Length Wtd. (ft)	1175.79	Wetted Per. (ft)	11448.36	512.25	4926.65
Min Ch El (ft)	63.27	Shear (lb/sq ft)	0.09	0.25	0.05
Alpha	2.99	Stream Power (lb/ft s)	0.07	0.76	0.03
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	101350.00	42005.24	133081.00
C & E Loss (ft)	0.00	Cum SA (acres)	14705.23	1920.30	16493.29

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 149.66*

INPUT
Description: RGV-04, 9-foot wall applied.
Station Elevation Data num= 466

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.32	8.49	91.15	17.09	93.04	26.26	96.38	31.07	98.95
37.48	100.37	45.04	100.61	59	100.17	71.13	102.62	80.48	106.43
84.22	107.2	108.22	107.44	108.89	107.44	108.89	98.44	118.89	98.24
209.89	97.36	212.89	98.11	236.89	97.63	242.89	96.13	252.89	95.93
258.89	94.43	271.76	94.35	408.16	94.14	451.12	94.29	545.25	94.28
624.05	94.07	786.22	94.15	896.93	94	969.89	93.95	1084.37	93.86
1134.51	94.21	1162.9	93.9	1178.67	94.3	1197.6	93.02	1342.54	92.67
1377.39	92.82	1458.59	92.52	1489.3	92.88	1509.79	91.45	1610.81	91.49
1837.92	91.38	1888.39	91.47	1904.16	91.34	2008.13	91.42	2027.18	91.74
2061.87	91.42	2117.35	91.35	2131	91.59	2165.13	91.53	2182.2	91.94
2199.26	91.55	2266.91	91.4	2363.1	91.55	2404.06	91.44	2453.02	91.97
2490.87	91.58	2500.34	92.9	2516.1	92.32	2537.17	92.18	2571.3	92.64
2605.43	92.66	2625.91	94.86	2642.98	96.19	2656.63	95.83	2677.11	93.52
2704.42	93.19	2771.61	93.27	2828.39	93.53	2875.71	93.42	2907.25	93.56
3079.86	93.45	3154.95	93.56	3284.65	93.56	3342.68	93.76	3393.88	93.69
3434.83	93.94	3497.13	93.85	3619.14	94.78	3690.82	94.04	3735.19	94.66
3762.5	94.65	3786.38	94	3878.54	93.55	3973.55	93.43	4038.96	93.22
4093.43	93.2	4213.12	93.4	4348.99	93.54	4380.48	93.44	4462.57	93.69
4500.43	93.48	4619.56	93.73	4721.28	93.63	4768.6	93.84	4817.66	93.89
4891.64	93.64	4923.19	94.15	4967.37	93.78	5080.66	93.9	5114.81	93.75
5245.01	93.83	5319.74	93.75	5352.27	93.9	5422.21	93.75	5449.53	94.08
5463.19	93.69	5507.6	94.39	5541.75	94.02	5592.98	93.74	5647.63	93.81
5702.27	93.55	5778.19	93.56	5811.58	93.4	5869.68	93.48	5893.54	93.08
5923.32	93.04	5932.78	93.84	5954.87	94.33	5986.42	92.66	5995.89	93.09
6011.66	90.07	6027.44	89.53	6087.38	89.59	6093.69	89.43	6169.41	89.34
6182.03	89.57	6245.13	89.53	6295.6	89.36	6421.81	89.57	6437.58	89.41
6469.13	89.71	6481.75	89.54	6497.52	93.13	6510.14	94.88	6532.23	94.37
6595.33	94.25	6604.8	93.91	6626.88	94.03	6658.43	93.77	6683.67	93.95
6768.85	94.09	6803.56	94.73	6822.49	94.32	6926.6	94.14	6967.62	94.28
7043.34	93.8	7096.97	94.01	7112.74	93.72	7147.45	93.85	7201.09	93.48
7251.57	93.63	7324.64	93.14	7380.92	92.91	7421.93	92.27	7437.71	92.41
7469.26	92.1	7488.18	92.19	7544.98	93.71	7587.63	93.25	7608.12	94.11
7625.21	95.68	7635.46	95.65	7652.53	94.27	7672.6895.63695		7683.27	95.45
7696.93	93.58	7707.17	92.89	7734.51	92.82	7761.83	91.08	7768.98	91.21
7792.56	90.28	7819.89	90.31	7857.46	89.44	7873.1	90.04	7885.72	89.55
7923.58	89.27	7980.37	89.39	8008.78	90.29	8040.33	90.46	8065.57	91.65
8096.55	91.51	8112.91	92.55	8160.23	91.85	8179.16	92.03	8229.75	91.57
8257.07	92.23	8299.07	92.32	8315.14	91.85	8366.37	91.62	8403.94	91.65
8431.26	92.82	8448.34	93.08	8468.83	93.97	8482.5	93.85	8497.86	94.4
8513.64	93.96	8576.75	94.12	8601.99	93.69	8656.69	93.35	8665.09	93.49
8684.03	94.87	8696.65	93.21	8709.27	89.47	8762.91	89.25	8785	89.01
8841.8	89.2	8882.11	90.03	8892.28	90.62	8923.09	90.26	8942.77	89.49
8964.86	89.81	9002.72	89.93	9031.12	89.48	9053.21	91.81	9062.68	92.26
9087.03	92.05	9114.36	92.89	9144.72	93.39	9166.8	92.6	9185.73	90.67
9201.51	90.46	9214.13	91.11	9236.22	93.5	9271.47	93.48	9291.96	94.03
9326.11	93.67	9336.36	94.1	9352.97	93.9	9380.77	94.24	9404.67	95.43
9414.92	95.3	9428.58	93.3	9452.48	93.38	9466.15	93.95	9483.23	90.66
9490.06	89.81	9517.38	88.98	9541.29	89.25	9572.02	89.2	9602.77	89.67
9616.43	89.27	9660.83	89.78	9694.98	89.54	9712.06	90	9776.96	89.84
9787.2	90.15	9835.01	90.27	9862.35	90.01	9902	90.36	9944.31	90.38
9990.36	91.0210018.75		91.0910040.84		90.8610084.34		91.5810116.57		91.02
10163.9	92.5510193.64		93.2210233.32		93.1310245.94		92.3410279.03		91.44
10296.1	91.8110313.18		91.3810398.57		92.4510412.23		93.41 10449.8		92.85
10477.13	93.3310498.37		93.35 10517.3		92.9910562.51		93.5710610.33		93.43
10630.9	93.6110671.76		94.4310684.29		94.1610743.82		94.2110793.94		93.9
10815.88	94.4110832.19		94.1710862.82		94.810917.29		94.8310934.31		94.47
10944.53	94.7311009.21		92.9811033.04		93.1311046.66		93.811082.94		93.75
11111.34	94.4311132.71		91.8211148.32		91.5111177.83		89.6511187.33		89.68
11201.17	87.9111237.19		87.0411254.01		87.511263.31		87.1411277.56		84.67
11280.9484.6984811294.18			84.8111303.68		81.9711315.55		77.0711322.79		72.51
11345.9768.5793511359.76			67.2111366.23		59.4311409.21		60.4311442.06		60.13
11446.18	60.7411447.66		64.0311455.75		66.911466.14		72.5111474.39		73.9
11488.09	77.7411499.4978.71619		11508.3		80.3111524.47		91.1411532.21		93.97
11537.72	94.8911548.73		95.2811558.53		93.0711568.32		95.0411587.92		95.45
11614.04	95.0911643.43		94.1811676.94		93.8511690.12		93.3511719.76		93.39
11744.67	92.5411800.18		91.5211842.63		91.5811894.33		92.1811924.28		92.11
11950.33	92.5911960.21		92.4611983.06		93.0812005.92		92.3812032.04		92.5
12041.84	92.9912067.96		92.712074.49		93.2512116.95		93.8212139.82		93.35
12156.13	93.9512162.67		95.2412175.74		95.1612192.06		93.5412227.98		93.93
12254.1	93.3112270.44		93.6612286.77		94.8812296.57		94.2612309.63		94.62
12342.29	97.4612352.08		97.8412414.13		98.0712431.23		98.5412463.11		97.94
12479.44	98.3512499.04		98.0612515.36		98.2512531.69		97.812561.08		99.22
12569.57	99.3312629.66		99.0712645.99		99.5512655.79		99.1512671.68		100.09
12691.43	100.0312714.57		102.2612734.25		100.9912750.49		101.8112763.55		101.54
12783.14	97.9412799.47		97.38 12825.6		99.3612845.19		100.0612851.72		99.09
12877.85	98.1612907.24		98.73 12920.3		97.6612956.22		96.7312985.61		95.7
13008.47	95.9313041.13		95.4913060.72		95.8513090.11		95.8413099.91		95.53
13159.15	95.3613175.62		96.0413214.21		95.4613259.92		95.6113406.19		95.79

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13517.91   95.8413570.88   96.1613623.58   96.1113664.86   96.3913705.93   95.91
 13719.1   96.4913738.86    95.913782.42   96.3813818.35   96.1113828.14    95.4
13867.33   96.5313942.44   96.3313962.03   95.9614025.43   95.83 14038.6   95.61
14137.41   95.3814197.16      9514282.06      9514298.39   95.3414340.84   94.81
14376.77   95.1614406.16   96.0314432.28   95.93 14487.8   94.6114497.59   95.56
14504.12   94.8114523.72   94.44 14568.9   94.6214591.96   94.3914605.13   94.93
14634.75   95.3614657.61   95.3114745.78    94.515033.33   93.6615059.68   93.74
15157.26   93.6615173.59   94.0715225.84   94.0415245.43   94.3115317.28   94.13
   15422   94.4315494.46   94.0515520.81   94.2615589.98   94.0715626.21   94.36
15686.29   94.3915712.42   94.7415725.48   94.5915777.72   94.9215929.24   94.95
15962.18   94.8416051.12    94.916084.05   95.2216143.42   95.1516189.46   95.26
16202.19   95.5516231.57   95.3816280.54   94.5116300.14    93.416322.99   93.45
16349.11   95.47 16358.9   95.2416365.43   94.1816381.76    93.2 16429.9   93.05
16449.66   93.3516456.25    92.916466.13    93.6 16482.6   93.4316496.03   95.61
16509.09   96.6516525.41  101.8716538.53  101.4316550.01   99.7616558.21   97.76
16615.59   97.76

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .09 7635.46     .1211111.34    .06611201.17    .01511488.09    .066
11548.73    .102

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      11111.3411548.73           881.09  1506.5  1723.2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       011111.34   94.43       T
11548.7316615.59   95.28       T
Left Levee      Station=  108.89      Elevation=  107.44
Right Levee     Station=16525.41      Elevation=  101.86
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 5948.36 6506.02   94.23 7672.9810667.81   93.66

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 149

INPUT
Description: RGV-04, 9-foot wall applied, Bathymetric elevations translated
             from IBWC 2008 Cross-sections
Station Elevation Data    num=     462
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   93.92      19    95.1      25   98.41      31  100.34      55  100.17
      67  102.32      77   106.4      81  107.08     105  107.32  105.67  107.32
  105.67   98.32  115.67   98.12  206.67   97.47  209.67   98.22  233.67   97.74
  239.67   96.24  249.67   96.04  255.67   94.54  257.99    94.5  416.99   94.15
  495.99   94.31  562.98   94.28  615.98   94.02  699.98   94.11  848.98    94.1
  886.98   94.17  938.98   93.85  987.98   93.78 1016.98   93.94 1081.98   93.95
 1150.64   94.23 1163.75   94.45 1239.15   94.01 1248.98   94.17 1288.32   93.91
 1324.38    94.1 1380.11   93.83 1399.78   93.52 1412.89   94.29 1429.28   94.24
 1442.39   91.87 1448.95    91.4 1504.68    91.5 1560.41   91.41 1645.64   91.51
 1678.42   91.34 1871.84   91.46 1927.57   91.32 1957.07   91.45 2032.47   91.22
 2045.58   91.69 2078.36   91.29 2094.75   92.26 2104.59   91.34 2111.14   91.63
 2137.37    91.3 2248.82   91.45 2268.49   91.61 2307.83   91.38 2347.16   92.02
 2379.94   91.69 2435.67   91.44 2468.45   92.17 2478.29   91.85 2501.23   92.03
  2520.9   96.32 2537.29   98.91  2550.4   98.19 2570.07   93.56  2596.3    92.9
 2612.69   92.84 2648.75   93.25 2720.86    93.5 2747.09   93.39 2868.38   93.73
 2956.88   93.71    3029   93.94 3153.57   93.69  3209.3   93.97 3258.47    93.9
  3297.8   94.32 3337.14   94.14  3373.2   94.28  3432.2   95.22 3448.59   95.69
 3474.82    95.9 3497.77   95.55 3543.66   94.35 3560.05   94.48 3586.27   95.54
  3612.5   95.52 3628.89   95.12 3635.44    94.3 3668.22   93.78 3723.95   93.31
 3792.79   93.21 3878.02    92.7 4028.88   92.68 4045.29   92.84 4137.13   93.03
 4206.02   92.78 4248.67   93.03 4271.63   92.85 4343.79   93.03 4406.12    92.9
 4435.64   93.18 4530.77   93.01  4625.9   93.34 4652.14   93.11 4878.49   93.44
 4911.29   93.24 4947.37   93.37 5108.11   93.32 5131.07   93.49 5196.68   93.44
 5206.52   93.29 5232.76   93.99 5245.88   93.23 5255.72    94.4 5262.28   93.93
 5288.53   94.81 5308.21   94.75 5321.33   94.04 5370.53   93.46 5423.02   93.69
  5475.5    93.3 5495.19   93.41 5580.48   93.24 5603.44   93.44 5652.64   93.47
  5659.2   93.16 5678.88   93.66 5701.85   93.67 5780.57   93.28  5826.5    93.5
 5954.43    93.2  6092.2   93.31 6252.94   93.08 6387.43   93.08 6462.88   92.89
 6495.68   93.14 6554.73   92.91 6590.81   93.02 6754.83   93.01 6830.28   92.77
 6915.56   92.77 6991.01   93.03 7033.66   92.63 7115.66   92.97 7223.92   92.92
  7243.6   93.22 7266.56   93.01 7286.24   92.22 7305.92   94.52 7322.33    97.6
 7332.17   97.49 7348.57   94.67 7368.25   97.63 7378.09   97.34 7391.21   93.78
 7401.05   92.54  7427.3   92.07  7443.7   90.31 7453.54   88.55  7476.5   87.86
 7483.06   87.12  7509.3   87.19 7525.71   86.01 7545.39   85.44  7627.4    85.8
 7666.76   85.54 7686.44   86.37 7712.68   86.39 7752.05   88.11 7775.01   87.79
 7784.85    88.5 7804.53   88.89 7827.49   88.11  7860.3    88.1 7873.42   88.54
 7902.94   87.84 7919.34   88.14 7929.18   89.14 7952.15   89.07 7984.95   88.44
 8001.35    88.7 8034.15   87.67 8070.24    87.7 8083.36   88.33 8096.48   89.92
 8112.88   90.35 8132.56   92.03 8145.69    91.1 8175.21   91.69 8204.73    91.9
 8247.38    91.8 8273.62    92.1 8290.02   91.81 8312.98    92.4 8329.38   93.65
 8339.22   94.95 8349.06   94.81 8365.46   92.71 8378.59   91.89 8417.95   91.51
 8460.59   91.55 8470.43   91.82 8513.08   91.81 8529.48   92.09 8549.16   93.09
    8559   94.05 8568.84   93.98  8591.8   92.82 8601.64   93.06 8660.69   93.05
 8709.89   93.77 8726.29   93.17 8752.54   94.06 8768.94   93.68 8805.02   94.15
 8834.54   93.44 8850.95    93.8 8860.79   93.41 8877.19   94.39 8903.43   94.13
 8923.11   95.12 8955.91   94.23 8965.75   95.09 8995.28   94.54  9008.4   95.32
 9031.36   98.18  9041.2   97.93 9054.32   93.98 9077.28   94.19 9090.41   95.44
 9106.81   89.05 9113.37   87.43 9139.61   85.61 9162.57   86.09 9192.09   85.97
 9221.62   86.49 9234.74   85.68 9277.38   86.89 9303.62   86.91 9310.18   86.42
 9326.58   87.33 9336.43   87.07 9369.23    87.4 9388.91   86.98 9398.75   87.51
 9444.67   87.81 9470.92   87.04 9480.76   87.28 9503.72   86.94 9536.52   87.34
 9549.64    86.9 9566.04   87.14 9654.61   87.09 9684.13   87.51 9720.22   87.32
 9746.46   88.21 9775.98   89.84  9789.1   90.92 9808.79   91.49 9825.19   91.08
 9871.11   88.68 9887.51    89.5 9903.91   88.54 9917.03   88.53 9946.56   89.31
 9966.24   90.13 9985.92   90.43 9999.04   92.1810018.72   92.0410035.12   90.81
10048.25   90.6810061.37   91.2910100.73   91.0510123.69   91.3110143.37   91.95
 10189.3   91.8410235.22    92.6 10271.3   92.5410327.07   91.9410350.03   91.91
10402.38   92.74 10431.8   94.0410461.23   93.6510484.11   94.0510500.46   93.47
10510.27   94.0910536.43   93.2110559.31   90.9410572.39   90.7810595.28   91.18
10608.36   92.3110627.97   91.9310634.51   92.7110670.48   93.2110680.29   92.01
10693.36   92.8710716.25    92.110726.06   89.0610739.14   88.2610758.75   89.06
10768.56   87.3510778.37   88.0810794.72   84.3210807.82   78.4210817.63   72.15
10824.18    70.710828.18    55.610840.18    55.610852.18    55.810865.18    55.9
10879.18    55.910890.18    56.110901.18    55.910913.18    55.910923.18    55.8
10931.18    57.610951.81    70.710961.62   71.83 10964.9   73.2810974.71   74.94
10991.08   75.5311000.89    77.111030.34   94.3111036.89   95.9411049.98    96.3
11066.34      9611099.07   96.3811167.79   94.9911177.63   95.2611190.75   94.73
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11220.26   95.3811253.05   93.7711282.57   93.3611394.06   93.0811407.18   92.88
11449.81   93.2911459.65   92.7411489.16   92.8811531.79   93.5411564.59   93.46
11580.98   92.6111607.22   92.5111630.17   91.1311643.29   90.7811682.64   91.33
11708.88   90.7111738.39   91.0211777.74   93.5411797.42    93.511840.05   96.66
11869.56   95.9611922.03   96.1511928.59   96.3711971.22   95.9912020.41   95.88
12036.81   96.0212046.64   96.6312066.32   96.98   12086   96.8412154.86   96.99
12167.98    97.612187.65   96.9612210.61   98.5512230.28   96.43 12243.4      97
12256.52   96.6912286.03   96.8212345.06   96.6512364.74   96.7512495.91    96.4
 12545.1   96.5912620.52   96.3412653.31   96.0912669.71   97.3312676.27   96.31
12682.83   96.87 12718.9   96.1312761.53   96.2412804.16    96.112899.26   96.05
12932.05   95.7612955.01   95.8913033.71   95.6613063.23   95.8813115.69   95.58
13125.53   95.7113181.28   95.5713197.68   94.9113210.79   96.1313230.47   95.07
13240.31   95.6513315.73   95.5213361.64   95.6613404.27   95.3613515.77   95.36
13528.89   94.9813597.75   94.9113627.26   95.1313679.73   95.0313745.32   95.33
13873.21   95.4213902.73   95.6413965.03   95.7113987.99   95.95 14033.9   95.61
14056.85   95.8714079.81   95.2314086.37   96.3514092.92   95.9714119.16   96.07
14151.95    95.814184.75   95.9614283.12    95.414332.31   95.4914335.59   95.24
14388.06   94.9414420.85   94.9214456.93   94.5614496.28   94.4814519.23   94.17
14545.47   94.2714594.66   93.9414617.61   93.9814656.96   93.6614729.11   93.64
14817.65   93.2814837.33   93.4714866.84   93.2314906.19   93.4214978.33   92.95
15004.57   93.4715050.48   93.2715073.43   92.9415109.51   93.3715145.58   93.06
15260.35   93.3415355.45   93.1615381.69   92.85 15411.2   93.01   15444   92.75
15483.35   92.7515532.54   92.5315565.33   92.7915670.27   92.6615683.38   92.82
15739.13   92.8215785.04   93.2115840.79   93.1315876.86   93.3315909.66   93.04
15929.33   93.6715935.89   92.7715945.73   94.1915962.12   93.4715971.96   95.18
15988.36   96.3916004.75   99.05

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 7368.25     .1210670.48     .0710817.63    .02510931.18     .07
11049.98    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     10670.4811049.98          1249.78 1505.93 1342.39             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      010670.48   93.21       T
11049.9816004.75    96.3       T
Left Levee      Station=  105.67      Elevation=  107.32
Right Levee     Station=16004.75      Elevation=   99.04
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1429.86 2525.07   94.24 7382.54 9015.21    97.3

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            103.25    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.075      0.058      0.066
  W.S. Elev (ft)            103.23    Reach Len. (ft)          1249.78    1505.93    1342.39
  Crit W.S. (ft)             87.32    Flow Area (sq ft)       94214.98   10361.17   33973.63
  E.G. Slope (ft/ft)      0.000090    Area (sq ft)           100345.80   10361.17   42153.73
  Q Total (cfs)           125000.00     Flow (cfs)            76945.52   21849.99   26204.49
  Top Width (ft)          15899.08    Top Width (ft)         10564.81     379.50    4954.77
  Vel Total (ft/s)            0.90    Avg. Vel. (ft/s)           0.82       2.11       0.77
  Max Chl Dpth (ft)          47.63    Hydr. Depth (ft)           8.92      27.30       6.86
  Conv. Total (cfs)       13158240.0    Conv. (cfs)            8099742.0   2300060.0   2758440.0
  Length Wtd. (ft)          1367.44    Wetted Per. (ft)       10578.16     405.12    4960.63
  Min Ch El (ft)              55.60    Shear (lb/sq ft)           0.05       0.14       0.04
  Alpha                        1.61    Stream Power (lb/ft s)     0.04       0.30       0.03
  Frctn Loss (ft)              0.09    Cum Volume (acre-ft)    97268.41   41255.75   130172.50
  C & E Loss (ft)              0.03    Cum SA (acres)          14260.12    1890.04   16097.51


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 148.34*

INPUT
Description: RGV-04, 9-foot wall applied.
Station Elevation Data    num=     466
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
        0   94.57    14.6   97.34   27.94  100.37   42.68  100.11   49.57  100.55
    60.38  102.65      73  107.06      97   107.3   97.67   107.3   97.67    98.3
   107.67    98.1  198.67   97.36  201.67   98.11  225.67   97.63  231.67   96.13
   241.67   95.93  247.67   94.43  345.48   94.16  473.04   94.24  480.12   93.76
   488.22   94.25  513.52   94.29  553.01   94.07  655.26   93.93  715.99   94.02
   796.99      94  837.48   93.67  870.02   93.75  921.39   93.65  998.44    93.8
  1071.94   93.83 1091.97   94.14 1126.25      94 1161.18   94.14 1223.39   93.79
   1249.1   94.16 1266.24   92.75 1288.15   92.66 1484.38   92.65 1534.41   92.55
  1561.34   92.63 1611.37    92.5 1709.07   92.54 1774.78   92.42  1786.2   92.67
  1814.77   92.45 1829.06   92.92  1866.2   92.35 1903.79   92.24 1949.96   92.52
  2014.76   92.34 2049.03   92.67 2126.17   92.41 2154.74   92.74  2183.3   92.64
  2200.45   94.77 2214.73   96.08 2226.15   95.74  2243.3   93.46 2280.44   93.23
   2315.5   93.46 2374.71   93.43 2438.63   93.04 2488.65   92.06 2503.27   92.26
  2542.52    92.1 2584.84   92.41 2627.17   92.34 2646.41   92.52 2704.12   92.59
  2719.52   92.75 2746.45   92.39 2784.92   92.38 2815.71   92.53 2854.19   92.44
  2865.73   92.91 2877.27   92.65  2911.8   92.71 2977.31   93.22 2988.85   92.92
   3008.1   93.73 3046.57   93.15 3085.04    93.1 3106.07   93.67 3131.22   94.93
  3181.24    92.9 3227.42   92.44    3339    92.4 3383.18   92.22 3446.73   92.17
  3514.65   92.22 3554.47   92.37 3608.99    92.4 3662.21   92.26  3706.2   92.49
  3843.42   92.37 3869.14   92.53 3952.05   92.51 4034.95    92.6 4057.82   92.47
  4143.17    92.5 4185.49   92.62 4255.09   92.66 4283.67   92.56  4455.2    92.7
  4474.07    92.8 4540.97   92.64 4563.83   93.01 4575.27   92.64 4612.44   93.47
  4641.02   93.05  4683.9   92.69 4729.65   92.87 4775.38   92.65 4866.87   92.65
  4952.63   92.85 5041.25   92.75 5082.01    92.9 5192.77   92.73 5282.08   92.84
  5324.41   92.76 5432.13   92.82 5497.55   92.71 5528.33   92.78 5635.88   92.68
  5664.47   92.86 5715.93   92.72 5747.38    92.8 5890.01    92.9 5956.07   92.78
  6036.21   92.79 6096.15   92.96 6133.32   92.74 6204.78   92.87 6336.29   92.86
  6353.44   92.47 6370.59   93.62  6384.9   95.16 6393.47   95.11 6407.76    93.7
 6423.8495.15327 6433.49   95.16 6444.92   93.45  6453.5   92.88 6476.38   92.88
  6490.23   92.26 6497.92   90.94 6501.77   91.42 6524.97   90.35 6547.84   90.35
  6579.29    89.5 6605.66   89.45 6650.76   89.65 6685.07   89.47 6702.22   89.91
  6725.09   89.99  6759.4   90.75 6779.41   90.54 6805.13   91.16 6825.14   90.75
  6853.74   90.73 6865.17   90.94  6890.9   90.49 6913.77   91.01 6933.78   90.86
  6948.08   90.44 6976.66   90.48 7005.25   89.76  7036.7    89.8 7059.57   90.91
  7073.86   91.08 7091.01   91.86 7102.45   91.36 7153.91   91.64 7228.24   91.57
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 7248.25   91.97 7271.12   93.27 7279.69   93.02 7293.98   91.89 7355.93   91.39
 7386.71   91.68 7422.63   91.65 7436.93   91.82 7462.65   92.91 7491.24   92.64
 7536.76   92.96 7551.28   92.83 7594.15   92.89 7608.45   92.55 7631.32   92.92
 7645.62   92.69 7677.06   92.84 7702.79   92.47 7725.66   92.45 7739.96   92.92
 7762.82   92.71 7779.98   93.17 7808.56   92.73 7817.14   93.18 7842.87   93.01
 7854.31    93.4 7874.32   94.82 7882.89   94.69 7894.33   92.71 7914.33   92.81
 7925.78   93.43 7940.07   90.22 7945.79    89.4 7968.66   88.47 7988.67   88.69
 8014.39    88.6 8040.13   88.84 8051.56   88.47 8088.72   89.07 8117.31   88.81
  8131.6   89.28 8234.52   89.48 8257.39   89.12 8285.98   89.09 8314.56    89.3
 8340.29   89.18 8417.48   89.11 8448.65   89.37 8474.66   89.23 8497.53   89.66
 8534.69   91.09 8551.85   91.32 8566.14   91.08 8606.16   89.85 8620.45   90.27
 8648.72   89.74 8689.06   90.62 8706.21   90.77 8717.65   91.64  8734.8   91.56
 8749.09   90.94 8771.97   91.17 8806.27   91.09 8843.43   91.56 8883.46   91.52
 8906.51   91.74 8954.92   91.84 9003.53   91.48 9023.54   91.53 9069.16   91.99
  9094.8   92.67 9120.45   92.55 9140.39   92.94 9154.64   92.79 9179.69   93.38
 9205.92   91.34 9237.27   91.15 9248.67   91.58 9264.34   91.61 9283.57   94.07
 9302.81   94.36 9318.71   91.98 9334.62   89.13 9345.2986.05899 9350.52   85.15
 9364.15   83.79 9370.96   81.84 9377.78   80.93 9396.37   75.17 9405.06   69.08
 9409.62   67.12 9412.39   58.82 9418.39   58.82  9452.9   60.95  9459.8   60.61
  9487.4   61.47 9493.61   62.39 9525.38   64.98 9543.48   68.74 9559.33   68.55
 9566.12   67.47 9583.59   67.44 9591.02   68.04 9609.13   72.87 9622.71    78.7
 9636.29    79.1 9643.8481.19987 9647.61    81.1 9656.66   78.13 9667.98   76.99
 9674.77   77.11 9699.67   79.44 9706.46   81.76 9731.35   87.48 9742.67   88.35
  9763.6   92.45 9781.14   94.45 9799.25      95  9827.4   94.51 9844.28   94.69
 9852.72   94.32 9872.43   95.08 9892.13    94.5 9903.38   93.68 9940.38   93.83
 9959.68   94.3310004.71   93.4410030.03   92.1610063.81   91.8510097.58   91.93
10122.91   91.5810142.62   92.2210196.09    91.4 10218.6   91.3810243.93   90.58
10269.27   90.6810280.52   91.3810305.85   91.3910322.74   91.1210356.51   91.42
10387.47   91.4310435.37   90.7610460.65   90.79 10494.3   89.7810510.02   89.61
10557.16   90.1210588.59   89.1710623.95   88.9810671.09   90.1110694.66   90.23
10745.73   91.5610809.64   91.3110823.71   91.5610891.26   91.5210955.99   91.27
 10978.5      9111012.28   91.4511057.31   90.4911091.09    90.211107.97   90.71
11116.41   90.4211127.67   90.9511155.82   90.3711167.07   90.7411178.33   92.03
11189.59   95.1611195.22   95.8211213.22   96.1211223.36   96.6511248.69   95.88
11259.95   96.1111276.84   95.8511313.42   96.39 11327.5   96.78 11347.2   96.75
11358.45   96.1411378.16   96.2311403.49   95.9411431.63   96.1811507.62   95.91
11558.28   96.0111594.87   95.82 11620.2   95.8811653.98   95.6411682.12   95.85
   11699   95.5311719.99   95.4911739.64    96.3 11747.5   95.8611755.36   96.22
11865.05   96.2511887.57    96.611904.46   96.4411941.05    96.611969.19   96.39
11980.45   96.0412000.15   96.3612011.41   96.0112031.11   96.1212059.25   95.77
12078.96   96.0312101.47    95.8 12126.8   95.9312143.69    95.612191.53   95.55
12214.05   95.8212245.01   95.1712270.34   95.3912323.81   95.3512352.49    95.2
12372.13   94.7912387.84   95.3612411.42   94.77 12423.2   95.0312523.64   94.72
12568.55    94.712667.18   94.2612700.95   94.35 12753.2   94.1912779.75   94.56
12802.26   94.53 12827.6   94.7912841.67   95.4312851.41   95.0212900.78   95.19
12954.25   95.0713007.72   95.4613047.13    95.3 13100.6    95.413114.67   95.62
13142.82   95.1613170.96   94.9913213.18    95.213249.76   95.13 13318.9   95.39
 13373.9   95.2213407.38   95.48 13428.9   95.0413436.76   95.66 13452.4   95.33
13517.14   95.3413534.03   95.8113590.31   94.7113612.83   94.7713663.49   94.51
   13686   94.6713702.89   95.5513731.39    95.513747.93   95.24 13781.7   95.44
13837.46   95.4213897.09   95.2413955.31   94.8613986.75   94.9214026.55    94.7
14073.17   94.6714120.31   94.4114220.75    94.3 14248.9    94.114336.39   93.89
14371.74   93.7114418.88   93.64 14505.3   93.1214536.74   93.3114591.74   93.11
14619.23    92.914662.45   93.1314705.66   92.9414772.38   93.0714907.48   93.11
14988.52   92.9515098.86    93.215208.62   93.2115222.69   93.6615231.14   93.07
15253.66   93.3115321.21   93.1315349.93   93.2215428.15   93.1815439.41    93.3
15581.72   93.3415621.01    93.215644.57   93.5215652.43   93.0715664.22   93.78
15678.64   93.6715684.27   92.8815701.16    94.415712.41   96.2715718.04   98.18
15734.92   99.88

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .105 9302.81    .066 9364.15    .015 9799.25    .06611223.36    .095

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9302.81 9799.25          1249.78 1505.93 1342.39             .1       .3
Left Levee      Station=   97.67      Elevation=   107.3
Right Levee     Station=15734.92      Elevation=  99.875
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 9280.55   94.37 9794.61 11235.8   94.9511941.05   16000    96.6

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 147.68

INPUT
Description: RGV-04, 9-foot wall applied, Bathymetric elevations translated
             from IBWC 2008 Cross-sections
Station Elevation Data    num=     454
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   95.23      13   99.75      22  100.49      38     100      51  101.98
      65  107.03      89  107.27   89.67  107.27   89.67   98.27   99.67   98.07
  190.67   97.28  193.67   98.03  217.67   97.55  223.67   96.05  233.67   95.85
  239.67   94.35  256.98   94.29  334.97   94.03  371.97   94.19  460.96    94.2
  463.96   95.31  467.96   93.21  471.96   95.14  475.96   94.19  500.95   94.28
  539.95   93.88  620.94   93.91  640.94   93.79  700.93   93.93  780.93    93.9
  820.92   93.24  979.91   93.66  1061.9   93.72 1082.53   94.11 1102.21   93.87
 1161.26   93.85 1184.22   93.98 1253.11   93.72 1269.51   93.95 1312.16   93.72
 1335.12   93.85 1377.77   93.55 1433.53   93.67  1489.3   93.57 1528.67   93.65
 1577.87   93.56 1627.08   93.12 1666.44   93.61 1712.37   93.28  1807.5    93.4
 1876.39   93.21 1912.48   93.31    1942   93.62 1978.08   93.65 2053.53   93.22
 2083.06   92.55  2109.3   91.02  2125.7   90.44 2138.82    90.8 2171.63   90.48
 2207.71   91.09  2243.8    90.8  2260.2    91.1  2309.4   91.38 2322.53   91.73
 2345.49   91.08 2378.29   90.87 2404.54   91.11 2437.34   90.84 2447.18   91.65
 2457.02   90.98 2525.91   91.69 2542.31   91.54 2552.15   90.72 2568.56   91.79
 2601.36   90.65 2634.16   91.65 2673.53   94.32 2699.77   92.26 2716.17   91.68
 2755.54   91.37 2768.66   91.55 2824.43    91.6 2850.67    91.8 2942.52   91.64
 3034.37   91.83 3126.22   91.72 3175.43   92.02 3204.95   91.91 3290.24   91.84
 3359.13   92.04 3421.46   91.88 3536.27   91.75 3572.35   91.92 3683.89   91.86
 3818.38   92.11 3870.87   91.99 3939.76   92.13 4005.37    91.9 4028.33   92.05
 4107.06   91.98 4159.54   92.08 4238.27   92.03 4336.68   92.31 4484.29   92.24
 4507.25   92.39 4543.34   92.22 4635.18   92.52 4690.95   92.34 4717.19   92.47
 4792.64   92.39 4841.84   92.61 4861.52   92.51 5025.54   92.78 5058.34   92.71
 5123.94   92.96 5150.19   92.79 5169.87   92.95 5268.28   92.78 5337.16   92.75
 5343.72   92.94 5399.49    92.7 5471.65   92.74 5517.58   93.38 5537.26   94.16
 5543.82   93.05  5547.1   94.37 5553.66   93.63 5589.74   93.49  5596.3   93.75
 5635.67   93.32 5688.15   93.56 5707.83   93.35 5734.07   93.62 5789.84   93.24
 5799.68   93.44 5865.29   93.32 5917.77   92.62 5927.61   92.13 5947.29   92.33
 5976.81   91.85 6019.46   91.92 6088.34   91.41 6160.51   91.25 6199.87   91.75
```

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 6216.27   90.93  6245.8   91.58 6275.32   91.25 6301.56   91.54 6337.65   91.48
 6377.01   91.89 6390.13   92.46 6429.49   92.87 6468.86   92.07 6550.86   91.51
 6600.07   91.48 6629.59   91.22 6665.67   91.24 6691.91   91.49 6764.08   91.41
 6855.93   91.18 6878.89   91.31 6921.53    91.2 6980.58   91.31 7013.38   91.13
 7078.99   91.27 7197.08    91.1 7206.92   91.26    7243   91.08  7275.8   91.28
 7321.73   90.99 7367.65   91.07 7377.49   90.88 7410.29   91.12 7495.58   91.04
 7518.54   91.17 7597.27    91.2 7613.67   90.94 7649.75   91.22 7685.84   90.98
  7692.4   91.14  7774.4   91.33 7823.61   92.44 7830.17   93.31 7849.85   91.72
 7866.25   91.83 7885.93   90.76 7902.34   91.26 7918.74   95.23 7935.14   95.52
 7938.42    94.8 7948.26   88.33 7971.22   77.75 7981.06   71.21 7987.62    70.7
 7996.61   62.04 8006.61   62.84 8016.61   63.84 8026.61   64.14 8046.61   66.04
 8056.61   65.34 8066.61   66.04 8076.61   66.54 8096.61   67.04 8105.61   68.84
 8125.39    70.7 8135.23   72.28 8151.64   74.02 8177.88   81.59    8191   80.83
 8200.84   81.25 8210.68   79.12 8220.52   79.29 8246.76   75.88 8273.01   79.21
 8289.41   85.75 8292.69   86.59 8305.81   85.85 8312.37   86.54 8322.21   89.57
 8328.77   88.66 8341.89   81.87 8358.29   78.94 8368.13   79.03 8404.22    82.7
 8414.06   86.75  8423.9   88.58 8433.74   89.07 8450.13   91.03 8466.53   89.13
 8502.61   90.86 8522.28   92.88 8548.52   93.69 8581.32   92.94 8600.99   93.14
 8610.83   92.32 8633.79   94.03 8656.75   93.19 8669.86   91.75 8686.26   91.85
 8719.06   92.85 8735.46   93.65 8751.85   92.79 8761.69    92.8 8774.81   91.85
 8787.93   91.56 8797.77   90.66 8817.44   90.04 8833.84   90.61  8856.8   90.18
 8896.15   90.54 8925.67   89.89 8948.63   91.21  8968.3   91.08 8978.14   90.46
 9010.94   89.69 9037.17   89.78 9050.29   88.77 9066.69   88.15 9096.21   88.14
 9109.32   89.58 9138.84   89.98 9158.52   89.37 9197.87   89.56 9210.99    89.2
 9233.95   89.35 9270.02   88.81 9319.22   89.05 9332.33   88.39 9381.53   88.45
 9437.28   88.96 9443.84   88.39  9466.8   87.67 9499.59      87 9568.46   86.65
 9597.98   87.04 9607.82   86.74 9643.89   86.42 9699.64   86.75 9725.88   86.58
 9742.28   87.04 9761.96   86.62 9794.75   86.67 9820.99   86.97 9834.11   86.39
 9847.22   86.73 9896.42   86.65 9922.65   86.01 9962.01   85.9810014.48   84.11
10053.84  83.4710073.51   84.4510083.35   83.8610096.47   84.7310106.31   84.05
10129.27   83.6110142.38   84.24 10155.5   86.1610162.06    88.410168.62   91.77
10175.18    93.610198.14   96.0310207.97    96.510237.49   95.0510250.61   95.48
10270.29    94.910312.92   96.0510329.32   96.8510352.28   96.8510365.39    95.6
10388.35   95.7110417.87    95.210424.43   95.5710450.66   95.7410539.21   95.36
10552.33    95.610572.01   95.3510598.24   95.5310640.88   95.0610670.39   95.26
10703.19   95.1610709.75   94.8610742.54   95.3710762.22   94.8310785.18   94.87
10857.33   96.0410890.12   96.3510955.71    96.310981.95   97.0711001.63   96.79
11044.26   97.1211077.06   96.7211090.17   96.0111113.13   96.6611126.25   95.96
11149.21   96.3111168.88   96.21   11182   95.7511204.96   96.1911224.64   96.23
 11231.2   95.7611260.71   96.0811280.39   95.4611306.63   95.6711336.14   95.35
11362.38   95.7811398.45   94.6311411.57   94.5911427.97   95.1911490.28   95.06
11546.03   94.67 11614.9   94.3811641.14   94.3811716.57   94.0611723.13    93.9
11837.91   93.5511890.39   93.1511929.74   93.3311995.33   92.9912021.57   94.15
 12047.8    94.112077.32   94.6512093.72   95.9412103.56   95.1412146.19   95.05
12162.59   95.2812211.78   95.25 12224.9   95.0912260.98   95.2612287.21   95.66
12333.13   95.2512395.44   95.4212411.83   95.8612444.63   94.9212477.43   94.56
12493.82   94.7912516.78   94.5512526.62   94.7912569.25   94.5812588.93   94.82
12621.73   94.7512684.04   94.9412736.51   94.7612752.91   95.2312779.15   94.83
12798.82   95.1612805.38   94.6712880.81   94.8712900.49   95.7512939.84    94.6
12966.08   93.6212992.32   93.8613051.35   93.5813077.58   93.9113097.26   95.66
13113.66   95.4113136.62   95.5513149.74    95.313189.09   95.8713248.12   95.93
13294.04   95.8313323.55   95.9513330.11   95.3113339.95   95.73 13395.7   95.54
13415.38   95.6213474.41   95.3513546.56   95.3713569.52   95.1713625.27   95.16
13654.79   94.99 13700.7   95.01 13733.5   94.7113789.25   94.6513825.32   94.31
 13861.4   94.3313904.03   93.9513953.23   93.7814018.82   93.3314156.56   92.86
14231.99   92.9114268.06   92.8214343.49   92.9414428.76   92.8614500.91   92.98
14546.83   92.8114579.62   93.0314628.81   93.0814723.92   93.6514750.16    93.6
14809.19   93.8914841.99   93.8914851.82   93.6414858.38   94.5214868.22   94.54
14878.06   93.38 14904.3   93.8814927.25   93.6814946.93   93.8314983.01   93.58
15071.55   93.6615107.63   93.4515120.75   93.6115186.34   93.4115202.74   93.56
   15288   93.3415386.39   93.3815399.51   93.6715406.07   92.2315415.91    92.1
15425.75   93.2815438.86   96.3315445.42   99.59 15465.1  100.71

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .105 7935.14    .066 7987.62    .015 8105.61    .066 8548.52    .095

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7935.14 8548.52          1070.14    1752 1559.36             .1       .3
Left Levee      Station=   89.67      Elevation=  107.27
Right Levee     Station= 15465.1      Elevation=  100.71
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   45.07 7932.39    95.5 8536.3410203.94   93.7410203.9410970.14    96.5
11024.23 15549.3    96.3

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            102.93    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.105      0.058      0.095
  W.S. Elev (ft)            102.88    Reach Len. (ft)          1070.14    1752.00    1559.36
  Crit W.S. (ft)             89.24    Flow Area (sq ft)       57588.82   14292.84   49374.13
  E.G. Slope (ft/ft)      0.000199    Area (sq ft)            57588.82   14292.84   49374.13
  Q Total (cfs)           125000.00    Flow (cfs)             43412.82   41202.81   40384.36
  Top Width (ft)          15375.43    Top Width (ft)           7845.47     613.38    6916.58
  Vel Total (ft/s)            1.03    Avg. Vel. (ft/s)            0.75       2.88       0.82
  Max Chl Dpth (ft)          40.84    Hydr. Depth (ft)            7.34      23.30       7.14
  Conv. Total (cfs)       8859293.0    Conv. (cfs)             3076856.0  2920222.0  2862215.0
  Length Wtd. (ft)         1469.66    Wetted Per. (ft)         7850.44     631.51    6919.95
  Min Ch El (ft)             62.04    Shear (lb/sq ft)            0.09       0.28       0.09
  Alpha                       2.97    Stream Power (lb/ft s)      0.07       0.81       0.07
  Frctn Loss (ft)             0.26    Cum Volume (acre-ft)    92791.88   40370.83   127547.00
  C & E Loss (ft)             0.00    Cum SA (acres)          13731.91    1855.72   15731.67


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 147.34*

INPUT
Description: RGV-04,
Station Elevation Data    num=     452
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    94.5   14.38   98.05   25.88   98.56   37.39  100.15   55.36  101.04
    71.9  106.85    95.9  107.09   96.57  107.09   96.57   97.09  106.57   96.89
  197.57   96.77  200.57   97.52  224.57   97.04  230.57   95.54  240.57   95.34
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  246.57   93.84   287.9   93.91  337.66   93.71  368.37   94.16  391.66   93.74
  465.34   93.69   468.3   94.58  472.24    92.9  476.19   94.44  480.13   93.68
  504.78   93.74  543.24   93.44  623.12   93.51  780.91   93.41  820.35   92.88
  977.16   93.22 1069.55   93.32  1087.7   93.59 1150.45   93.35 1165.39   93.55
 1204.24   93.38 1225.15   93.47    1264   93.23 1314.78   93.31 1365.58   93.22
 1401.44    93.3 1446.25   93.23 1491.07   92.87 1526.92   93.24 1568.76      93
  1655.4   93.08 1718.15   92.89 1751.02   92.98 1777.91   93.24 1810.77   93.28
 1879.49   92.93 1906.39   92.39 1930.29   91.17 1945.23   90.69 1957.18   90.97
 1987.06   90.69 2019.93   91.19  2052.8   90.97 2067.73   91.23 2108.79   91.48
 2124.51   91.72 2145.42    91.2 2175.29   91.04  2199.2   91.24 2229.08   91.02
 2238.04   91.66    2247   91.12 2309.75   91.59 2324.69   91.45 2333.65    90.8
  2348.6   91.65 2378.47   90.78 2408.35   91.63 2444.21   93.84 2468.11    92.3
 2483.04   91.92  2518.9   91.69 2530.85   91.82 2577.91   91.81 2610.26   91.56
 2689.21   91.44 2772.87   91.59 2856.53    91.5 2901.35   91.74 3005.92    91.6
 3068.67   91.76  3133.3   91.72 3165.65   92.04 3230.01   91.94 3262.87   92.08
 3397.51   92.12 3429.86   92.25 3597.52   92.35 3657.28   92.14 3688.68   92.36
  3742.6   92.24 3769.55    92.3 3872.01   92.25 3959.04   92.54 4093.49   92.54
  4114.4   92.67 4147.28   92.55 4254.84   92.75 4281.72   92.63 4314.15   92.81
 4335.71   92.61 4373.47   92.92 4395.04   92.77 4421.99      92 4443.56   91.87
 4586.48   92.07 4616.35   92.02  4676.1   92.22 4700.01   92.08 4734.73   92.38
 4745.51   92.87 4767.08   92.79 4799.42   91.88 4876.28   91.98 4927.08   91.76
  4992.8    91.8 5034.64   92.31 5052.56   92.93 5058.54   92.04 5061.53    93.1
  5067.5   92.51 5100.36    92.4 5106.34    92.6  5142.2   92.26    5190   92.45
 5207.92   92.28 5263.15   93.26 5300.89   93.55 5333.24   92.65  5354.8   93.06
 5399.14   92.64  5408.1   92.25 5426.03   92.42 5452.92   92.06 5491.76   92.15
 5570.49   91.73 5620.23   91.69 5656.08   92.09 5671.02   91.42 5697.92   91.94
 5724.81   91.69 5748.71   91.93 5781.58    91.9 5817.43   92.24 5829.38   92.69
 5865.23      93 5901.09   92.37 5975.77   91.94 6080.35   91.72 6104.25   91.92
 6169.98   91.88 6253.64    91.7 6274.55   91.81 6313.39   91.73 6367.17   91.84
 6397.05   91.69 6456.81   91.79 6564.37   91.66 6573.33    91.8 6606.19   91.59
 6636.07   91.76  6677.9   91.56 6758.57   91.64 6799.86   91.48 6928.87    91.6
 6943.81   91.39 6976.67   91.59 7015.52   91.51 7090.21   91.67 7135.03   92.54
    7141   93.23 7158.93   91.96 7173.87   92.05 7191.79   91.19 7206.74   91.69
 7221.67   95.04 7236.61   95.46 7239.93   94.79  7249.9   88.47 7258.49   83.69
 7273.14   77.06 7283.11   71.39 7285.0771.18929 7289.75   70.71 7295.99   65.71
 7298.85   60.53 7320.54    62.3 7339.29   63.38 7353.06   64.57  7363.9   64.17
 7379.73   65.02 7389.18    67.2 7399.19   67.91 7417.03   71.43 7420.2171.58426
 7438.47   72.47 7456.76   74.63 7466.93   75.52 7495.38   82.12 7509.61   81.85
 7520.27   82.32 7530.94   80.75 7541.61   81.09 7570.06   77.97 7598.52   80.46
  7616.3   85.55 7619.86   86.23 7634.08   85.68 7641.19    86.3 7651.86   88.84
 7658.97   88.18  7673.2   82.83 7690.98   80.67 7701.65   80.75 7740.77   83.88
 7751.44   87.11 7762.11   88.66 7772.78   89.21 7790.55   90.89 7808.33   89.55
 7822.16    89.9 7847.45      91 7868.77   92.89 7897.22   93.77 7937.53    93.1
 7955.25   92.95 7966.13   92.23 7991.52   93.49 8016.91   93.25 8031.41   92.23
 8049.54   92.22 8085.82   92.94 8103.95   93.58 8122.08   92.92 8132.96   92.94
 8147.47    92.2 8161.98   91.94 8172.86   91.22 8194.61   90.73 8212.75   91.15
 8238.14   90.78 8281.66   91.04  8299.690.75969  8314.3   90.53 8339.69   91.55
 8361.45   91.44 8372.33   90.94  8408.6   90.36 8437.61   90.43 8452.12   89.62
 8470.25   89.11  8502.9   89.08  8517.4   90.22 8550.04   90.51  8571.8   90.01
 8615.32   90.14 8629.83   89.86 8655.22   89.96 8695.11   89.51 8749.52   89.68
 8764.02   89.13 8818.43   89.19 8880.08   89.62 8887.33   89.18 8912.72   88.63
 8948.98   88.08 9025.15   87.76 9057.79   88.08 9068.67   87.84 9108.56   87.54
 9170.21   87.76 9199.23    87.6 9217.37   87.97 9239.13    87.6 9275.39   87.62
 9304.41   87.85 9318.92   87.35 9333.42   87.59 9387.83   87.55 9416.83   87.04
 9460.36   87.03 9518.39   85.55 9561.91   85.06 9583.67   85.86 9594.55   85.38
 9609.06   86.07 9619.94   85.51 9645.33   85.18 9659.83   85.69 9674.34   87.21
 9681.59      89 9688.85   91.69  9696.1   93.18 9721.49   95.09 9732.36   95.47
 9765.01   94.29 9779.52   94.65 9801.28   94.19 9848.42   95.08 9866.56   95.75
 9891.95   95.74 9906.45   94.73 9931.84   94.85 9964.49   94.45 9971.74   94.74
10000.75   94.8810098.67   94.5710113.18   94.7810134.94   94.6110163.95   94.75
10211.11    94.410243.74   94.5610280.01   94.4810287.27   94.2210323.53   94.61
10345.29   94.1410370.68    94.210450.47   95.1710486.73   95.4910559.27   95.65
10588.29   96.3510612.29    96.110657.19   96.4310693.46   96.0810707.96    95.5
10733.35   96.0110747.86   95.4510773.25   95.7410795.01   95.6510809.52   95.27
10834.91   95.6210856.67   95.6510863.92   95.2810896.56   95.5210918.32   95.02
10947.34   95.2710979.97   94.9911008.99   95.2411048.88   94.3411063.39   94.32
11081.53    94.811150.43   94.7511212.09   94.4611317.27    94.211407.94   93.75
11563.15   93.3311608.21   92.9511615.33   93.1511686.46   92.9911708.96   92.73
11737.97   93.6611766.98   93.5711799.63   94.2111817.76   95.1111828.64   94.47
11875.79   94.1811902.21   94.6411970.96   94.4212006.53   94.7612031.74   95.29
 12065.8   95.0312151.43   95.1912169.55   95.5412205.82   94.81 12242.1   94.52
12260.22    94.712285.61   94.4812296.49   94.6612343.64   94.44 12365.4   94.63
12401.67   94.5412480.68   94.5812528.61   94.3912546.74   94.7812575.76   94.44
12597.51   94.6812604.77   94.2912688.18   94.3512709.95   95.0412753.46   94.08
12782.48   93.28 12811.5   93.4712876.78   93.2912905.79   93.56 12933.5   95.45
12971.08   95.6312985.58   95.42 13029.1    95.813111.31   95.8513145.16    95.7
 13177.8   95.8113185.05   95.2913195.93   95.6113257.59   95.4213279.35   95.47
13344.63   95.2513424.42   95.1413544.11    94.813594.88   94.7813628.13   94.49
13637.62   94.63 13692.8    94.413732.69    94.113786.97   93.9913952.93   93.03
14009.82   92.8614107.03   92.7114197.12   92.7814218.45   92.6614275.35   92.73
14400.02    92.514438.93   92.5714536.13   92.4414557.47   92.7114628.59   92.92
14664.16   93.27 14685.5   92.9914704.46   93.4114755.45   93.2114820.73   93.42
   14857   93.4214867.87   93.2214875.12   93.93   14886   93.9414896.89   93.01
 14925.9   93.4514951.28   93.2714973.05   93.3715012.95   93.1115110.86   93.14
15150.76   92.9515165.27   93.08 15237.8   92.9815255.94   93.1415350.23   93.15
15441.76   93.2415473.54   93.42 15480.8   92.2515491.68   92.1115502.56   93.01
15517.06   95.7915524.31    97.915546.08  100.79 15554.6  100.5615558.54   99.27
15577.55   99.2715586.08   99.88

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .105 7236.61    .066 7283.11    .015 7417.03    .066 7966.13    .095

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7236.61 7897.22          1070.14    1752 1559.36             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 7236.61   95.46       T
Left Levee      Station=   96.57      Elevation=  107.09
Right Levee     Station=15546.08      Elevation= 100.786
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1890.99 7205.97   92.97 7903.61 9776.25   93.81

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 147.01*

INPUT
Description: RGV-04,
```

Station Elevation Data num= 453

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.76	15.76	96.35	28.37	96.67	40.97	100.17	60.68	100.25
71.71	103.74	78.8	106.67	102.8	106.91	103.47	106.91	103.47	96.91
113.47	96.71	204.47	96.38	207.47	97.13	231.47	96.65	237.47	95.15
247.47	94.95	253.47	93.45	294.75	93.6	343.82	93.37	374.1	94.17
397.06	93.29	469.71	93.18	476.52	92.58	480.41	93.74	484.3	93.16
508.61	93.2	546.53	93	625.3	93.1	780.9	92.93	819.79	92.52
974.41	92.78	1077.2	92.93	1115.18	93.08	1150.22	92.91	1177.81	92.98
1221.59	92.86	1274.21	92.95	1314.63	92.9	1355.07	92.63	1387.41	92.86
1425.14	92.72	1503.31	92.77	1559.91	92.57	1613.82	92.86	1643.47	92.9
1705.46	92.65	1729.72	92.24	1764.76	90.94	1775.54	91.14	1802.5	90.9
1832.14	91.28	1861.79	91.15	1875.27	91.36	1926.48	91.7	1945.35	91.32
1972.3	91.21	1993.87	91.36	2020.82	91.2	2028.9	91.68	2036.99	91.27
2093.59	91.48	2115.15	90.87	2128.63	91.51	2155.58	90.9	2182.53	91.62
2214.88	93.35	2236.44	92.34	2282.27	92.01	2335.49	92.03	2364.67	91.32
2435.9	91.23	2511.37	91.35	2586.83	91.28	2627.27	91.46	2721.6	91.35
2778.2	91.47	2817.06	91.4	2836.51	91.57	2865.69	92.25	2923.75	92.12
2953.4	92.24	3074.85	92.31	3104.04	92.51	3123.49	92.38	3155.55	92.5
3191.6	92.4	3201.32	92.67	3309.19	92.37	3337.52	92.67	3386.15	92.49
3410.47	92.59	3500.55	92.46	3609.9	92.84	3629.36	92.71	3721.56	92.95
3770.42	92.83	3857.97	92.87	3901.75	93.16	3921.2	92.79	3955.26	93.46
3974.71	93.05	3999.03	91.4	4018.49	91.21	4147.41	91.37	4174.36	91.32
4228.26	91.48	4271.42	91.46	4281.15	91.84	4290.87	92.84	4310.33	92.73
4324.92	91.61	4339.51	90.97	4393.02	91.02	4454.67	90.83	4513.96	90.85
4551.7	91.24	4567.87	91.7	4573.26	91.04	4581.34	91.39	4616.38	91.46
4648.72	91.2	4718.91	91.32	4757.83	93.14	4791.88	93.68	4821.06	91.93
4840.51	92.85	4880.51	92.66	4888.6	92.37	4904.77	92.51	4929.02	92.27
4964.07	92.39	5035.09	92.09	5079.96	92.14	5112.3	92.43	5125.77	91.9
5150.04	92.31	5174.29	92.13	5195.85	92.32	5225.51	92.31	5257.85	92.59
5268.63	92.92	5300.97	93.14	5333.31	92.68	5433.94	92.3	5495.02	92.19
5516.58	92.35	5575.88	92.35	5651.35	92.21	5753.77	92.37	5780.72	92.24
5891.16	92.29	5900.89	92.18	5954.38	92.32	5969.39	92.09	5996.34	92.25
6034.08	92.12	6071.81	92.26	6144.09	91.89	6260.47	91.99	6273.95	91.84
6303.59	91.96	6338.64	91.89	6406.01	92.02	6446.45	92.63	6451.84	93.16
6468.01	92.2	6481.48	92.26	6497.65	91.62	6511.13	92.11	6524.61	94.86
6538.08	95.39	6541.45	94.79	6547.58	91.64	6560.23	82.96	6585.15	71.56
6591.88	70.73	6598.2	66.66	6598.6565.46946		6601.09	59.01	6614.25	60.25
6644.67	61.93	6659.51	63.1	6671.2		63 6688.25	63.78	6698.43	67.78
6709.22	68.96	6725.4	73.76	6734.8173.83974		6744.28	73.92	6765.87	75.29
6771.26	76.24	6782.23	77.01	6812.88	82.65	6839.71	83.39	6851.2	82.38
6865.67	82.84	6893.36	80.06	6924.03	81.72	6947.02	85.86	6962.35	85.52
6970.02	86.07	6981.51	88.1	6989.18	87.7	7004.51	83.79	7023.67	82.4
7035.16	82.47	7077.33	85.06	7088.83	87.47	7100.32	88.75	7130.97	90.76
7150.13	89.97	7165.03	90.06	7192.29	91.14	7215.27	92.9	7245.92	93.86
7277.1	93.44	7309.5	92.75	7321.43	92.13	7336.87	92.36	7360.25	93.31
7377.07	93.32	7404.42	92.5	7435.6	92.76	7472.45	93.52	7492.31	93.04
7504.23	93.08	7536.03	92.32	7547.95	91.79	7571.79	91.43	7591.66	91.69
7619.48	91.38	7667.16	91.54	7688.7291.31699		7702.93	91.17	7730.76	91.9
7754.59	91.79	7766.51	91.41	7806.26	91.03	7838.04	91.08	7853.94	90.47
7873.81	90.07	7909.58	90.02	7925.47	90.86	7961.24	91.05	7985.09	90.65
8032.77	90.73	8048.67	90.51	8076.49	90.56	8120.2	90.2	8179.82	90.31
8195.7	89.88	8255.32	89.94	8322.88	90.28	8330.82	89.97	8398.38	89.16
8481.83	88.88	8517.6	89.12	8560.64	88.71	8640.79	88.76	8672.58	88.63
8692.46	88.9	8716.3	88.58	8776.3	88.58	8787.83	88.72	8803.73	88.31
8849.05	88.55	8879.24	88.45	8927		88 8958.71	88.08	9022.29	87
9069.99	86.65	9093.82	87.27	9105.75	86.9	9121.64	87.4	9133.57	86.98
9161.39	86.74	9177.28	87.14	9193.17	88.27	9209.07	91.61	9217.02	92.75
9244.84	94.16	9256.75	94.45	9292.53	93.52	9308.42	93.81	9332.27	93.48
9383.93	94.1	9403.8	94.64	9431.62	94.63	9447.51	93.87	9475.33	93.99
9511.1	93.69	9519.05	93.92	9584.35	94	9658.13	93.78	9674.03	93.96
9729.66	93.96	9781.33	93.74	9817.09	93.86	9856.84	93.79	9864.78	93.59
9904.52	93.85	9928.36	93.45	9974.09	93.62	9992.28	93.8610083.35		94.62
10162.83	9510194.62		95.6310220.93		95.3910270.12		95.7410309.87		95.44
10325.76	94.9910353.58		95.3510369.48		94.95 10397.3		95.1810437.03		94.8
10488.7	95.0810496.65		94.810532.41		94.9710556.25		94.5810588.05		94.86
10623.81	94.6410655.61		94.7110699.31		94.0510715.21		94.0410735.08		94.42
10810.59	94.44 10852.3		94.310993.39		94.0311092.74		93.611200.47		93.39
11249.83	93.1911262.82		93.3111294.01		93.1511312.19		92.711319.99		93.05
11340.77	92.4911348.57		92.8511382.34		92.7311397.94		92.8911418.72		92.41
11434.31	92.911454.38		93.1611501.86		93.17 11541.8		94.2811553.73		93.79
11577.19	93.7611597.97		93.2611623.95		93.5911634.34		94.0111644.74		93.65
11657.72	93.9511709.67		93.7111748.64		94.211766.82		94.8611813.59		94.68
11907.41	94.9511927.27		95.2311967.02		94.7112006.76		94.4712026.62		94.6
12118.02	94.312141.87		94.4312247.41		94.2412268.19		94.2612317.54		94.01
12340.57	94.3412372.37		94.0512396.21		94.2112404.15		93.912495.55		93.83
12519.4	94.3312533.16		94.1712598.88		92.9412630.68		93.0912722.79		93.02
12746.17	93.6612764.36		95.3212805.53		95.7212839.69		95.5512896.84		95.89
12902.04	95.7912977.37		95.5713032.04		95.6713039.99		95.2713051.92		95.49
13119.47	95.313143.32		95.3213244.94		95.1313273.51		94.9113325.47		94.92
13416.39	94.5813447.56		94.6913489.05		94.5513525.49		94.2513535.89		94.56
13569.65	94.1613596.35		94.15 13632		93.913699.54		93.7713709.93		93.55
13785.27	93.413798.25		93.21 13855.4		92.9813881.38		92.7613943.72		92.59
14050.24	92.5514076.21		92.7114148.95		92.6914172.32		92.514234.67		92.56
14267.95	92.3814371.28		92.1314413.92		92.22 14432.1		92.1114484.05		92.11
14507.44	92.414520.42		92.04 14543.8		92.4614587.97		92.514621.74		92.72
14637.32	93.1 14660.7		93.2414684.08		92.5614704.87		93.2914736.04		92.92
14760.73	92.8114872.01		92.9614883.92		92.814891.87		93.3314903.79		93.34
14915.71	92.6414947.51		93.0114999.17		92.9115042.89		92.6315169.86		92.48
15245.19	92.4615289.27		92.5515362.09		92.915442.62		93.0515547.58		93.17
15555.53	92.2815567.45		92.12 15582.9		93.1315595.89		95.4315603.68		96.15
15616.67	98.4615627.06		100.8615634.93		100.2615644.11		100.4115651.98		97.83
15690.01	97.8315696.56		99.3415707.06		99.06				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.105	6538.08	.066	6547.58	.015	7192.29	.066	7245.92	.095

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
6538.08 7245.92 1070.14 1752 1559.36 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	6538.08	95.39	T
7245.9215707.06		93.68	T

Left Levee Station= 103.47 Elevation= 106.91
Right Levee Station=15627.06 Elevation= 100.862
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
1698.22	6545.04	92.87	7233.51	9243.83	93.87

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 146.67*

INPUT
Description: RGV-04,
Station Elevation Data num= 456

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.03	17.14	94.65	30.85	94.78	44.56	100.19	55.71	100.24
59.14	99.15	65.99	99.46	72.85	102.3	77.99	103.15	85.71	106.55
109.71	106.79	110.38	106.79	110.38	96.79	120.38	96.59	211.38	96
214.38	96.75	238.38	96.27	244.38	94.77	254.38	94.57	260.38	93.07
260.43	93.07	301.6	93.3	349.97	93.04	379.83	94.17	402.46	92.83
549.83	92.56	627.48	92.7	780.88	92.44	819.22	92.15	971.67	92.33
1003.77	92.45	1084.85	92.53	1100.07	92.48	1183.01	92.58	1219.06	92.38
1247.89	92.49	1347.23	92.46	1401.67	92.25	1449.73	92.48	1490.34	92.51
1531.42	92.36	1553.05	92.08	1584.29	91.2	1617.93	91.11	1644.36	91.38
1670.79	91.32	1715.82	91.72	1745.28	91.44	1788.53	91.49	1812.55	91.38
1850.25	91.51	1889.44	91.28	1896.65	90.95	1908.67	91.37	1932.69	91.03
1956.72	91.6	1985.56	92.87	2004.78	92.38	2023.69	92.5	2045.63	92.33
2093.08	92.24	2119.09	91.09	2182.59	91.03	2249.86	91.1	2317.14	91.06
2353.19	91.18	2437.28	91.11	2522.38	91.14	2539.72	91.43	2565.74	92.47
2578.74	92.28	2752.2	92.5	2778.21	92.77	2795.55	92.55	2830.25	92.71
2856.27	92.59	2864.94	93	2934.32	92.61	2977.68	92.7	2986.35	92.99
3029.71	92.74	3133.78	92.68	3155.46	92.95	3168.46	92.82	3229.18	93.11
3246.52	92.92	3328.71	93.23	3372.27	93.1	3424.31	93.12	3441.65	93.38
3450.32	93.11	3489.34	93.52	3506.69	92.97	3537.05	93.99	3554.39	93.34
3567.4	91.45	3576.07	90.8	3593.41	90.55	3780.42	90.73	3818.9	90.73
3827.57	91.3	3836.24	92.82	3853.58	92.66	3866.59	91	3879.6	90.05
3927.3	90.15	3982.26	89.89	4035.11	89.91	4068.75	90.16	4083.17	90.48
4095.18	90.26	4126.41	90.31	4155.25	90.14	4217.82	90.23	4239.5	91.76
4252.52	93.02	4265.53	93.62	4282.87	93.82	4308.88	91.22	4326.23	92.63
4343.57	92.78	4369.09	92.5	4436.37	92.62	4499.68	92.46	4568.51	92.76
4580.53	92.39	4602.16	92.67	4623.78	92.57	4669.43	92.73	4707.87	93.15
4736.71	93.27	4765.54	92.98	4855.25	92.71	4909.7	92.67	4989.67	92.82
5049.06	92.73	5140.36	92.89	5164.39	92.8	5262.84	92.84	5271.51	92.7
5319.21	92.9	5327.89	92.6	5390.25	92.69	5423.88	92.85	5455.12	92.67
5488.33	92.29	5592.07	92.39	5648.76	92.2	5700.8	92.4	5721.82	92.36
5757.86	92.73	5762.67	93.08	5777.08	92.44	5803.51	92.05	5815.53	92.54
5827.54	94.67	5839.56	95.33	5845.96	93.79	5849.16	92.03	5861.97	82.24
5877.99	75.18	5887.2	71.74	5894.957	0.28156	5900.41	67.62	5903.34	57.5
5917.44	58.89	5928.02	59.17	5940.36	60.2	5950.06	60.48	5965.96	61.64
5991.836	2.28204	5996.78	62.53	6007.69	68.36	6013.47	68.61	6019.25	70.02
6030.82	74.8	6036.6	76.49	6049.47	6.22646	6056.84	75.83	6079.98	76.66
6085.76	77.85	6097.52	78.51	6106	79.48	6130.38	83.18	6159.14	84.46
6171.47	84.01	6186.97	84.79	6198.54	83.97	6216.66	82.16	6236.13	82.4
6249.54	82.97	6274.19	85.5	6290.62	85.35	6298.84	85.83	6311.16	87.37
6319.38	87.22	6335.81	84.75	6356.36	84.13	6377.82	84.5	6392.27	85.38
6413.88	86.24	6426.21	87.84	6438.54	88.83	6471.39	90.62	6507.9	90.21
6525.25	90.67	6561.76	92.91	6594.63	93.94	6642.66	93.34	6676.73	92.04
6693.51	91.91	6718.94	93.11	6750.01	93.46	6766.97	92.85	6800.87	92.93
6840.94	93.45	6875.5	93.21	6923.04	92.35	6948.96	92.12	6970.57	92.23
7000.82	91.98	7052.67	92.05	7077.84	91.89471	7091.57	91.81	7121.82	92.24
7147.74	92.15	7165.33	91.85	7203.92	91.7	7238.48	91.73	7277.38	91.03
7316.27	90.95	7333.55	91.5	7372.44	91.58	7398.37	91.28	7450.22	91.31
7497.76	91.17	7545.29	90.9	7610.11	90.94	7627.39	90.62	7651.28	90.56
7765.67	90.95	7804.57	90.54	7882.95	90.06	7938.52	89.99	7977.41	90.16
8024.21	89.8	8111.36	89.77	8145.94	89.65	8167.55	89.83	8193.48	89.56
8258.71	89.44	8275.66	89.58	8288.54	89.27	8337.82	89.47	8394.32	89.26
8422.58	89	8457.07	89.13	8498.86	88.61	8578.06	88.25	8603.98	88.68
8616.95	88.42	8634.23	88.74	8647.2	88.44	8677.45	88.31	8694.72	88.58
8712.01	89.32	8737.94	92.33	8781.15	93.42	8820.04	92.76	8837.33	92.98
8863.26	92.77	8891.57	92.79	8941.04	93.54	8971.29	93.51	8988.57	93
9018.82	93.14	9057.71	92.94	9066.36	93.09	9137.37	93.19	9217.59	92.99
9234.88	93.14	9295.37	93.18	9351.56	93.08	9433.66	93.11	9462.28	92.95
9476.4	93.18	9511.44	92.76	9561.16	92.87	9580.94	93.11	9660.04	93.56
9766.38	94.36	9800.96	94.91	9829.56	94.68	9877.58	95.04	9926.27	94.8
9943.55	94.48	9973.8	94.7	9991.09	94.44	10035.8	94.611	10064.55	94.32
10120.73	94.51	10129.04	94.321	10168.26	94.411	10194.19	94.141	10236.39	94.49
10302.22	94.171	10349.74	93.761	10388.64	94.031	10487.84	94.141	10669.52	93.85
10761.89	93.451	10894.68	93.271	10968.14	93.01	10996.4	93.151	11016.17	92.44
11024.65	92.951	11047.25	92.071	11055.72	92.621	11092.45	92.511	11109.41	92.78
11132.01	92.111	11148.96	92.641	11222.41	92.581	11247.83	93.511	11278.81	93.12
11304.32	93.11	11326.92	92.361	11355.17	92.761	11366.47	93.381	11377.77	92.83
11391.89	93.291	11448.38	93.011	11473.81	93.61	11490.75	93.641	11510.53	94.51
11561.37	94.331	11581.15	94.521	11626.34	94.561	11684.99	94.911	11702.61	94.69
11771.43	94.431	11793.02	94.511	11823.28	94.351	11874.92	94.311	11903.16	94.13
11920.11	94.24	12033.1	93.9	12055.7	93.931	12109.36	93.631	12134.41	93.89
12168.98	93.66	12194.9	93.731	12203.54	93.521	12302.93	93.31	12328.86	93.62
12343.81	93.551	12415.28	92.591	12449.86	92.71	12521.78	92.751	12550.02	92.63
12575.44	93.091	12586.74	93.851	12595.21	95.191	12646.06	95.811	12677.13	95.56
12702.55	95.591	12739.27	95.891	12744.92	95.741	12801.42	95.61	12826.84	95.42
12886.29	95.531	12894.93	95.251	12939.82	95.38	12959.6	95.241	13033.04	95.1
13117.79	95.021	13148.85	94.681	13216.65	94.591	13304.21	94.341	13338.11	94.53
13355.06	94.271	13383.23	94.321	13422.85	94.011	13434.15	94.491	13476.52	93.99
13538.67	93.671	13566.91	93.721	13612.11	93.551	13623.41	93.261	13648.83	93.36
13705.33	93.21	13719.45	92.941	13781.59	92.761	13809.84	92.481	13835.25	92.53
13877.62	92.311	13993.44	92.391	14021.68	92.621	14055.59	92.531	14100.78	92.59
14126.2	92.331	14193.99	92.39	14205.3	92.151	14357.83	91.74	14388.9	91.88
14408.67	91.71	14465.17	91.721	14473.64	92.241	14479.29	91.861	14490.59	92.19
14504.71	91.641	14530.14	92.21	14578.16	92.221	14614.88	92.521	14631.82	93.05
14657.25	93.21	14682.67	92.121	14705.27	93.181	14719.39	93.11	14739.16	92.56
14764.59	92.411	14787.19	92.541	14809.78	92.391	14887.01	92.491	14899.97	92.39
14921.57	92.741	14934.54	92.271	14969.11	92.581	15025.28	92.451	15103.55	92.05
15168.52	92.021	15182.65	92.131	15210.89	91.931	15254.31	92.01	15292.8	91.94
15340.74	92.131	15419.92	92.621	15507.48	92.911	15583.75	92.971	15621.61	92.92
15630.26	92.31	15643.22	92.131	15660.02	92.711	15674.14	94.851	15682.62	94.42
15696.74	97.581	15702.39	99.981	15708.03	100.941	15719.84	100.041	15733.61	100.26
15741.48	96.71	15745.41	96.391	15802.46	96.391	15808.36	97.02	15812.3	98.65
15828.03	98.23								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	5839.56	.07	5887.2	.025	5996.78	.07	6079.98	.085
6377.82	.066								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
5839.56	6594.63	1070.14	1752 1559.36	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	5839.56	95.33	T
6594.631	5828.03	93.94	T

```
Left Levee      Station=  110.38      Elevation=  106.79
Right Levee     Station=15708.03      Elevation= 100.938
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 2102.12 4286.86   92.22 6581.76 8766.49    93.3

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 146.34*

INPUT
Description: RGV-04,
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.29   18.52   92.95   33.34   92.89   48.15  100.21   60.19  100.11
    63.9   98.52   71.31   98.67   78.71  101.89   84.27  102.56   92.61  106.52
  116.61  106.76  117.28  106.76  117.28   96.76  127.28   96.56  218.28   95.62
  221.28   96.37  245.28   95.89  251.28   94.39  261.28   94.19  267.28   92.69
  267.86   92.69  308.44   92.99  356.13    92.7  385.55   94.18  407.87   92.38
  434.25   92.23  553.12   92.12  629.66   92.29  780.87   91.95  818.66   91.79
  968.92   91.89 1003.97   92.05  1092.5   92.14 1100.41   92.06 1137.92   92.16
 1195.62   92.14 1245.14   91.93  1321.3   92.16 1376.38   91.93 1403.81   91.45
 1433.36   91.32 1479.79    91.5 1519.33   91.85 1526.95   91.65  1637.4   91.58
 1678.15   91.02 1709.81   91.16 1730.91   91.58 1756.23   92.38 1789.73    92.8
 1850.66   92.46 1873.51   90.85 2047.45   90.84 2079.11    90.9  2227.7   90.88
 2242.93   91.28 2265.78   92.68  2277.2   92.44 2391.46   92.66 2402.88   92.84
 2429.54   92.69 2452.39   93.02 2467.62   92.72 2498.09   92.91 2520.94   92.79
 2528.55   93.34 2589.49   92.81 2627.57   92.91 2635.19    93.3 2673.26      93
  2692.3   93.16 2711.35   92.96 2764.66    92.9  2783.7   93.23 2795.13   93.03
 2848.45   93.38 2863.68   93.14 2913.19   93.43  2966.5   93.56 2974.12   93.37
 3019.82   93.32 3035.06    93.7 3042.67   93.34 3076.94   93.87 3092.17   93.14
 3118.84   94.53 3134.07   93.62  3145.5   91.08 3153.11   90.21 3168.34    89.9
 3366.37   89.99 3373.99   90.76  3381.6   92.79 3396.84    92.6 3408.26    90.4
 3419.68   89.14 3461.58   89.29 3480.62      89 3556.26   88.96 3636.45   89.17
 3661.78   89.08 3716.73   89.15 3735.77   91.18  3747.2    92.9 3758.63   93.73
 3773.86   93.95 3796.71   90.51 3811.94   92.42 3827.17   92.72 3849.58   92.62
 3941.42   92.96 3964.28   92.82 4009.97   93.13 4035.28   92.87 4054.28   93.03
 4113.36   93.14 4147.12   93.38 4242.27    93.3 4276.55   93.12 4287.98   93.27
 4329.86   93.14 4394.61   93.29 4402.22   93.19 4526.96   93.42  4581.2   93.31
 4634.53    93.4 4642.14   93.21 4684.03   93.47 4691.66    93.1 4746.42   93.26
 4783.04   93.48 4832.56    92.7 4859.21   92.82 4923.68   92.78 4973.46   92.58
 5019.17   92.77 5069.28   92.83 5114.36   92.53 5130.48   94.48 5141.03   95.26
 5147.51   94.08 5150.75   92.42 5163.72   81.51 5179.92   74.53 5189.25   71.92
 5196.14   70.75 5202.61   68.57 5205.58   55.98 5209.6756.40394 5220.63   57.54
 5231.92   57.63 5245.09   58.89 5255.44   59.03  5263.9   59.75 5283.66   60.67
 5302.8261.21894  5305.3   61.29 5316.94   68.94 5323.12   69.23 5329.29   71.07
 5341.63   77.26  5347.8   79.21    536478.21996  5369.4   77.73  5394.1   78.04
 5400.27   79.46 5421.87   80.64 5434.21   82.35  5458.9   84.71 5478.58   85.53
 5491.73   85.63 5508.28   86.73 5520.62   86.04 5536.05   84.36 5554.56   84.37
 5560.74   83.92 5601.36   85.13 5618.89   85.18 5640.81   86.64 5649.58   86.74
 5667.12   85.71 5711.95   86.08 5727.38   86.86 5750.44   87.42 5770.57   88.38
    5786   89.54 5811.81   90.49 5832.27   90.88 5850.78   90.37 5869.29   90.76
 5903.22   92.71 5943.33   94.03 5955.54   93.79 5979.95   93.78 5995.22   93.47
 6013.53   92.41 6050.16   91.45 6065.42    91.9 6077.63   92.92  6111.2    93.9
 6129.52   93.19 6135.63   93.37 6166.15   93.09 6209.44   93.38 6246.77   93.35
 6298.13   92.91 6334.02   92.86 6382.16   92.58 6438.18   92.55 6466.9592.40681
 6489.68   92.59 6540.88   92.51 6559.89   92.34 6581.25   92.45 6638.92   92.38
 6680.94      92 6722.96   91.89 6741.62   92.13 6783.64   92.11 6811.66   91.92
 6867.67    91.9 6953.64   91.59 6999.42   91.68 7040.41   91.56 7084.88   91.28
 7158.14   91.55 7225.29   91.61 7335.17   91.12  7395.2   91.11 7437.23    91.2
 7469.47   91.13 7487.78    90.9 7515.26   90.95 7619.29   90.68 7642.63   90.76
 7683.13   90.48 7719.76   90.47 7741.13    90.3 7759.43    90.5 7783.86   90.12
 7826.59    90.4 7872.37   90.18 7887.63   90.27 7918.16      90 7957.84   90.18
 8000.57   89.86 8052.45   89.96 8064.66   89.78 8114.14   90.09 8193.51   89.87
 8230.85   90.38 8258.86    91.9 8305.54   92.39 8347.56      92 8388.21   92.13
 8424.83    91.9 8488.93   92.48 8529.62   92.14 8562.19   92.28 8604.33   92.19
 8690.38   92.38 8777.06    92.2 8827.74   92.39 8876.58   92.36 8963.79   92.46
 9010.87   92.42  9041.4   92.24 9056.65   92.48 9102.44   92.06 9114.65   92.27
 9148.22   92.13 9169.59   92.37 9221.48   92.49 9255.06   92.68 9369.94   93.71
 9419.88   94.28  9438.2   93.98 9490.08   94.36 9561.34   93.97  9612.7   93.93
    9661   94.06 9692.06   93.85    9777   93.96 9822.78   93.67 9877.72   94.11
 9902.14   94.04 9944.87   93.6210000.18   93.47 10042.2   93.6410097.48    93.7
10149.37   93.86 10179.9   93.7810231.78   93.8410329.46   93.7310445.44   93.23
10462.35    93.3 10588.9   93.15 10646.9   92.9410662.15   93.2710668.26   92.91
10686.58   92.8510698.79   93.1410720.15   92.1810729.31   92.8610753.72   91.66
10762.88    92.410802.56   92.2910820.88   92.6810830.04   92.0810845.29   91.82
10863.61   92.3810894.13   92.0710942.96      9210970.43   93.0510979.58   92.51
11031.46   92.4311055.87   91.4511086.39   91.9211098.59   92.75 11110.8   92.02
11126.06   92.6311138.26   92.2811150.47   92.5111187.09    92.311214.56   93.06
11232.87   93.0911254.23   94.1711309.16   93.9711330.52   94.2711379.35   94.29
11442.71    94.611461.74   94.43 11489.4    94.511559.42   94.42 11647.9   94.19
11678.41   93.9411696.73   94.0511757.76   93.8611818.79   93.56 11843.2   93.61
11901.18   93.2511928.24   93.4512002.93   93.1312062.92      93 12110.3   92.78
12154.47   92.9212181.94   92.5912231.68   92.2512346.73   92.4712377.24   92.25
12404.71   92.5112416.91   93.2712426.07   95.0612462.69   95.7512481.01   95.93
12514.57   95.5812542.04   95.5212581.71   95.8812587.81   95.6812648.84    95.5
12654.95   95.7212676.31   95.2812740.54   95.3912749.88   95.2312798.37   95.29
12819.74   95.1212899.08   94.9512926.55   95.0212990.63    94.9 13024.2   94.46
13097.44   94.3913115.75   94.5413137.11   94.2813192.04   94.0913228.66   94.38
13246.98   94.0313268.34   94.1413320.21   93.7713332.42   94.4113338.53   94.06
13356.84   94.22 13378.2   93.7613445.33   93.4313475.84   93.5213509.42   93.27
13524.67   93.3313536.88   92.9713564.34   93.1613607.06   92.9513625.38      93
13640.64   92.6613707.77   92.5313738.29   92.21 13756.6    92.513765.75   92.29
13811.53   92.0413854.25   92.1713896.98   92.1213936.65   92.2313967.16   92.54
14003.79    92.414052.62    92.514080.08   92.1714153.32   92.2214165.53   91.89
14330.31   91.3614363.89   91.5314385.25   91.2814446.28   91.3214455.44   92.02
14461.53   91.5214473.75   91.97   14489   91.2314516.47   91.9414568.35   91.94
14608.02   92.3214626.33      9314638.54   92.8414653.79   93.1614669.05   92.08
14681.26   91.6914705.68   93.0614720.93   92.9414742.29    92.214769.76   92.02
14794.17   92.1614818.59   91.9314888.77   92.0314916.01   91.9714939.36   92.14
14953.37    91.914980.32   92.14 15051.4   91.9915135.95   91.5315206.14   91.47
15221.41   91.6215251.92   91.3915267.18   91.4915340.42   91.4115444.18   92.03
15477.74   92.3515572.35   92.7615654.74   92.8315695.65   92.6715718.99   92.14
15737.14    92.3 15752.4   94.2815761.55   92.6915776.81    96.715782.92   99.82
15789.01  101.0115804.76   99.8115823.12  100.11 15833.6   95.3715838.85   94.95
15914.92   94.9515922.78   95.7915928.03   97.9715949.01   97.41

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5141.03     .07 5202.61    .025 5316.94     .07 5943.33    .085
```

```
  6111.2    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5141.03 5943.33          1070.14    1752 1559.36             .1       .3
Left Levee      Station=  117.28      Elevation=  106.76
Right Levee     Station=15789.01      Elevation= 101.014
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1863.45 5103.84   92.51

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 146

INPUT
Description: RGV-04, Extended block obstruction, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     452
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.56   35.82      91   51.74  100.23   64.68   99.97   68.66   97.89
   76.62   97.88   84.58  101.49   90.55  101.97   99.51  106.49  123.51  106.73
  124.18  106.73  124.18   96.73  134.18   96.53  225.18   95.25  228.18      96
  252.18   95.52  258.18   94.02  268.18   93.82  274.18   92.32   275.3   92.31
  315.29   92.69  362.28   92.37  391.28   94.19  413.27   91.93  439.27   91.74
  518.25   91.58  639.23   91.91  783.21   91.46  877.19   91.38  966.17   91.45
 1004.17   91.64 1100.15   91.74 1152.27   91.82  1214.6   91.76 1250.68   91.52
 1280.21    91.6 1322.85   91.97 1329.41   91.66 1388.46   91.76 1424.55   91.65
 1447.51   91.11 1473.75   91.08 1529.52   91.94 1555.76    93.1 1608.25   92.67
 1627.93   90.62 1933.02   90.62 1946.14   91.13 1965.82   92.89 1975.66    92.6
 2074.08   92.86 2083.92   93.09 2106.88   92.88 2126.56   93.28 2139.68   92.89
 2165.93   93.12 2185.61   92.98 2192.17   93.67 2244.66      93 2277.46   93.13
 2284.02   93.62 2316.82   93.25 2333.22   93.44 2349.63   93.18 2395.55   93.11
 2411.95   93.51 2421.79   93.25 2467.72   93.65 2480.84   93.35 2523.49   93.73
 2569.41   93.89 2575.97   93.64 2615.34   93.52 2628.46   94.01 2635.02   93.58
 2664.54   94.22 2677.66   93.32 2700.63   95.06 2713.75    93.9 2723.59   90.71
 2730.15   89.61 2743.27   89.24 2913.85   89.25 2920.41   90.22 2926.97   92.76
 2940.09   92.53 2949.93   89.79 2959.77   88.22 2995.86   88.42 3012.26   88.02
 3212.36   88.02 3215.64   88.06 3232.04    90.6 3241.89   92.78 3251.73   93.85
 3264.85   94.08 3284.53    89.8 3297.65   92.21 3310.77   92.66 3346.86   92.81
 3409.18   93.31 3428.87   93.18 3468.23   93.55 3491.19   93.35 3579.76   93.63
 3612.57   93.52 3668.33   93.73 3697.86   93.53  3707.7   93.74 3743.78    93.6
 3799.55   93.77 3806.11   93.65 3917.64   93.96 3960.28   93.83 4006.21   93.96
 4012.77   93.73 4048.85   94.05 4055.42    93.6 4117.74    93.9 4134.14   94.13
 4176.79    93.1 4199.75   93.26 4225.99   93.11 4268.64   93.21 4298.16   92.96
 4337.53   93.15 4373.61   92.93 4419.53   92.91  4442.5    95.2 4449.06   94.38
 4452.34   92.81 4465.46   80.78 4481.86   73.89 4504.82   69.52 4507.82   54.47
 4523.82   56.18 4535.82   56.08 4549.82   57.58 4560.82   57.58 4569.82   58.33
 4580.82   58.78 4590.82   59.48 4601.82   59.48 4613.82   60.04  4626.2   69.52
 4632.76   69.85 4639.32   72.13 4652.44   79.73    4659   81.93 4665.56   81.65
 4681.96   79.64 4708.21   79.41 4714.77   81.07 4737.73   81.81 4750.85   83.28
 4763.97   84.08 4777.09   85.61 4819.74   87.63 4829.58   88.67  4842.7   88.11
  4859.1   86.39 4878.78   86.15 4885.35   85.44 4898.47   85.54 4924.71   84.72
 4947.67   85.02 4983.76   86.42 4996.88   86.58 5013.28   87.56 5046.08   87.66
 5062.48   88.34 5082.16   88.61 5108.39   88.54 5124.79   89.69 5157.58   90.48
 5173.98   91.28 5193.65   90.53 5213.33   90.85  5249.4   92.76 5292.03   94.11
 5305.15   93.86 5331.38   93.95 5347.78   93.59 5367.45   92.24 5383.85   92.01
 5406.81      91  5423.2   91.37 5436.32   92.72 5452.72   93.24 5472.39   94.35
 5492.07   93.54 5498.63   93.75 5531.42   93.26 5580.61   93.32 5639.64   93.59
 5656.03   93.46 5711.78   93.52 5734.74   93.24 5856.07   92.98 5879.02   93.17
 5905.26   92.91 5954.45   92.83  5977.4   93.05 6062.67   93.02 6252.86   92.48
 6315.17   92.48 6377.48   92.24 6426.67   92.37 6518.49      92 6597.19   92.28
 6656.22   92.27 6669.34   92.46  6738.2   92.44 6787.39   92.19 6931.68   92.26
 6951.35      92 6980.87   92.07 7072.69    91.7 7115.32    91.7 7161.23   91.44
 7200.58   91.41 7223.54   91.16 7243.21   91.42 7269.45   91.01 7295.68   91.01
 7315.36   91.33 7364.55   91.11 7380.94   91.29 7413.74      91 7456.37   91.24
 7502.28   91.11 7558.02   91.49 7571.14   91.29 7610.49   91.53 7676.08   91.37
 7735.11   91.49  7767.9   91.36 7790.85   91.59 7800.69   91.32 7849.88    91.4
 7866.28    91.2 7918.75   91.41  7958.1      91 8026.96   91.39 8063.04   91.24
 8105.67   91.42 8220.44   91.45  8243.4   91.57  8338.5   91.41 8390.97   91.65
 8443.44    91.6  8495.9   91.78 8587.72   91.74 8620.52   91.52 8636.91   91.79
 8653.31   91.46  8686.1   91.36 8699.22   91.62 8735.29   91.38 8758.25   91.62
    8814   91.63 8850.07    91.8 9027.15   93.61 9046.83   93.27 9102.57   93.68
 9204.23   93.38 9286.21   93.51 9302.61   93.38 9394.43   93.35 9410.83   93.48
 9460.02   93.17 9519.04   93.74 9545.28    93.7 9591.19   93.09 9755.15   93.35
  9810.9   93.58  9843.7   93.52 9899.44   93.6510004.38   93.5710128.99   93.02
10138.83   93.1510233.93    93.110276.56   92.8910283.12   93.0310345.43   92.81
10361.82   93.2510368.38   92.8110388.06   92.7610401.18   93.1410424.13   91.92
10433.97   92.76 10460.2   91.2410470.04   92.1710512.67   92.0710532.35   92.57
10542.19   91.8410558.58   91.5210578.26   92.1210611.05   91.5510663.51   91.41
10693.02    92.610702.86   91.7910758.59   91.7610784.82   90.5510817.61   91.09
10830.72   92.1210843.84   91.2110860.23   91.9710873.34   91.5310886.46   91.83
 10925.8    91.610955.31   92.5210974.98   92.5310997.93   93.8311056.95   93.62
 11079.9   94.0311132.36   94.0311191.37   94.3311220.88   94.1711250.39   94.39
11342.19   94.3111391.37   94.0611420.88   94.0811453.66   93.7611473.34   93.86
11538.91   93.6311604.48   93.2211630.71   93.28   11693   92.8711706.12   93.05
11866.77   92.55 11938.9   92.1411965.13    92.311994.64   92.0312056.93   91.89
12112.67   91.9712171.69   92.1912204.47   91.8612220.87   92.1812233.98   91.94
12247.09    92.712256.93   94.9312296.27   95.8112315.95   96.0512352.01   95.59
12381.52   95.4512424.14   95.88 12430.7   95.6312496.27    95.412502.83   95.67
12525.78   95.1312597.91   95.25 12630.7   95.0812656.92    95.212679.88      95
12765.12   94.8112794.63   94.9112863.48   94.7912899.54   94.23   12952   94.24
12965.12   94.4912978.23    94.2 12997.9   94.3813020.85   94.0613079.87   93.85
13119.21   94.2213138.89   93.7913161.84   93.9213217.57   93.5313230.69   94.34
13237.25    93.913256.92    94.113273.31   93.3813279.87   93.53   13352    93.2
13384.78   93.3213420.85   93.0113437.24   93.1113450.36   92.6813479.86   92.96
13525.76   92.7313545.44    92.813561.83   92.3913633.96    92.313666.75   91.93
13686.42   92.3113696.25   92.0513745.43   91.7613791.33   91.9513837.24   91.92
13843.79   92.1213879.86   92.0713912.64   92.4513951.99   92.2814004.45    92.4
14033.95      9214083.13   92.0914092.97   91.8314112.64   92.0514125.76   91.64
 14302.8   90.9814338.87   91.1814361.82   90.8714427.39   90.9314437.23   91.81
14443.78   91.19 14456.9   91.7614473.29   90.83 14502.8   91.6814558.54   91.66
14601.16   92.1214620.83   92.9514633.95   92.7414650.34   93.1214666.73   91.76
14679.85   91.2514706.08   92.9414722.47   92.7714745.42   91.8414774.93   91.62
14801.16   91.7814827.39   91.4714902.79   91.5614984.76   91.5315001.15   91.74
15079.84   91.5215168.36   91.0115243.77   90.9315260.17   91.1115292.95   90.84
15309.35   90.9915388.03   90.8815499.51   91.6615535.57   92.0715637.21   92.61
15725.73    92.715778.19   92.3715814.26   91.8815830.65    93.715840.49   90.96
15856.88   95.8215863.44   99.6615869.99  101.0915889.67   99.5915912.62   99.96
15919.17   96.3815925.73   94.0315932.29   93.5116027.37   93.51 16037.2   94.56
16043.76   97.2816069.99   96.58
```

```
Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066  4442.5     .07 4504.82    .025 4613.82     .07 5292.03    .085
 5856.07    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4442.5 5292.03          2057.24 1788.32 1279.38             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  4442.5    95.2       T
 5292.0316069.99   94.11       T
Left Levee      Station=  124.18      Elevation=  106.73
Right Levee     Station=15869.99      Elevation=  101.09
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1541.41 3752.11   93.16

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            102.11    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.066      0.065     0.067
  W.S. Elev (ft)            102.09    Reach Len. (ft)          2057.24    1788.32   1279.38
  Crit W.S. (ft)             89.73    Flow Area (sq ft)       29667.93   17028.61  84783.71
  E.G. Slope (ft/ft)      0.000097    Area (sq ft)            39362.86   17028.61  101771.70
  Q Total (cfs)           125000.00    Flow (cfs)              23753.92   27807.27  73438.81
  Top Width (ft)          15945.81    Top Width (ft)           4318.32     849.53  10777.96
  Vel Total (ft/s)            0.95    Avg. Vel. (ft/s)            0.80       1.63      0.87
  Max Chl Dpth (ft)          47.62    Hydr. Depth (ft)            6.87      20.04      7.87
  Conv. Total (cfs)       12688150.0    Conv. (cfs)             2411146.0  2822582.0  7454419.0
  Length Wtd. (ft)         1584.95    Wetted Per. (ft)         4325.74     876.06  10789.40
  Min Ch El (ft)             54.47    Shear (lb/sq ft)            0.04       0.12      0.05
  Alpha                       1.28    Stream Power (lb/ft s)      0.03       0.19      0.04
  Frctn Loss (ft)             0.12    Cum Volume (acre-ft)    85924.55   37208.84  113664.00
  C & E Loss (ft)             0.00    Cum SA (acres)          12984.84    1708.62   14148.10


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 145.67*

INPUT
Description: RGV-04,
Station Elevation Data    num=     441
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.77   39.79   91.14   52.36   95.65   57.47   98.22   64.82   99.28
   71.84   99.12   76.26   97.69   85.11   97.58  100.58  101.39  110.53  105.75
  134.53  105.99   135.2  105.99   135.2   95.99   145.2   95.79   236.2   95.71
   239.2   96.46   263.2   95.98   269.2   94.48   279.2   94.28   285.2   92.78
   320.8   92.94  367.39   92.72  396.15   93.87  417.95    92.4  518.47    92.2
  639.54   92.42  680.24    92.4  784.74   92.11  891.86   92.03  966.14   92.15
 1057.17    92.4 1125.45   92.37 1155.66   91.45  1202.6   91.57 1305.24   91.38
  1416.6   91.54  1478.1   91.56 1502.05   91.37 1546.97   91.46 1588.64   91.69
 1596.52   91.47 1667.37   91.59 1710.67   91.49 1738.22   91.17 1769.71    91.2
 1836.63   91.69 1868.11   92.51  1931.1   92.18 1954.71   90.85 2139.79   91.05
 2166.85   90.98 2228.35   91.09 2243.11      91 2320.79    91.1 2336.53   91.44
 2360.14    92.8 2439.89   92.94 2452.19   93.13 2462.03   92.68 2501.85   92.78
  2529.4   92.64 2553.01   92.94 2568.76    92.7 2585.03   92.92 2623.87   92.91
 2631.74   93.38 2688.34   93.13 2698.17   94.23 2712.94   94.29 2737.53   92.69
 2749.83    91.2 2762.13   91.35  2776.9   90.96 2875.78   90.85 2895.45   91.12
 2907.26   90.94 2962.37   91.23 2978.11   91.01 3037.64   91.41 3059.77   91.32
 3094.21   91.52 3123.72   91.22 3155.24   91.77 3163.11   91.51 3198.54   91.72
 3214.28   91.19 3241.84   92.36 3257.58   91.56 3269.39   89.31 3277.26   88.64
    3293   88.51 3327.89   88.87 3369.71   89.02 3441.04   88.69 3497.68   88.75
 3505.55   89.42 3513.43   91.13 3529.17   91.02 3540.97   89.22 3552.78    88.2
 3578.78   88.35 3615.76   88.03 3684.55   88.02 3704.23   88.11 3792.79      88
 3812.46   88.17  3859.8   88.18 3879.48   89.87  3891.3   91.31  3903.1      92
 3918.85   92.12 3942.46    89.3  3958.2   90.96 3973.95   91.31 4019.09   91.33
  4048.6   91.62 4107.63   91.65 4162.88   91.88 4257.68   91.95 4301.96   92.13
 4336.08   91.99 4402.98   92.23 4424.95   92.11 4471.69   92.34 4511.04    92.3
 4543.02   92.64 4557.77   91.18 4577.45   90.85 4619.27   91.56 4638.95   91.61
 4697.98    90.9  4715.2   90.96 4759.44    91.5 4764.35   91.38  4808.4   91.97
 4816.27   91.82 4842.97   92.12 4889.65   92.26 4914.22   91.98 4924.05    92.3
 4963.36   92.37 5014.96   91.55 5054.27   91.79 5088.67   92.46 5125.52   91.84
 5157.47   92.31 5196.78   91.73 5213.97   91.93 5233.63   91.26 5248.37    91.9
 5270.48   90.92 5280.32    90.9 5295.0790.08029 5314.71   90.67 5331.91   92.31
 5354.18   88.39 5365.96   85.73 5383.5579.44789 5390.72   78.26 5400.01   78.65
 5415.49   77.64 5427.87   72.56 5437.24   70.82 5472.97   67.62 5473.8666.28741
 5479.76   57.45 5491.11    58.6 5499.61   58.55 5509.54   59.56 5517.34   59.58
 5538.61   60.87 5554.92   61.27  5563.7   67.61 5573.01   69.36 5582.31   74.44
 5586.96   75.91 5603.24    74.6 5621.85   74.75 5626.51   75.94 5642.79    76.7
 5667.1179.04396 5700.94   80.85 5707.92   81.57 5717.22   81.23 5728.85   80.13
  5742.8   80.02 5775.37   79.18 5791.65   79.44 5826.55   81.03 5838.18   82.16
 5861.44   83.17 5873.06   84.09 5905.62   85.54 5917.25   86.78 5952.13   89.06
 5968.79 89.1521 5980.03    89.7 6005.61   91.82 6030.2493.12363 6035.84   93.42
 6070.77   93.27 6085.33   93.01 6102.79   92.09 6117.35   91.91 6137.74    91.2
 6152.29   91.41 6163.94   92.29 6195.96   93.35 6248.37   92.78 6329.55   93.74
 6382.15   93.99 6428.87   93.63 6469.82   93.69 6509.28   93.43 6539.4893.41734
 6580.26   93.18 6623.93   93.08 6675.86    93.3 6724.16   93.29 6737.33   92.98
  6750.5   92.15 6772.46   91.55 6816.35   91.32 6888.85   91.31  6939.3    91.4
 6991.99   91.17 7043.16   91.39 7124.68   91.24 7185.18   91.48 7246.96   91.47
  7258.6   91.61 7319.74   91.64 7363.41   91.46 7474.99    91.4 7492.55   91.55
 7508.97   91.29 7540.85   91.37 7571.59   91.14 7654.54   91.06 7750.62   90.82
 7768.08   91.01 7795.52    90.7 7832.14   91.03 7875.81   90.97 7890.36   91.11
 7919.48   90.96 7957.32   91.17 7998.08   91.15 8047.57    91.5 8059.22   91.39
 8094.15   91.62 8204.79    91.7 8263.01   91.55 8321.24   91.52 8367.82   91.64
 8402.76   91.34 8463.89   91.57 8495.92   91.46 8533.77   91.57 8669.31   91.41
 8740.47   91.09 8787.05    91.2 8833.64   91.04 8880.21   91.11 8961.73   90.91
 8990.85   90.72  9005.4   90.86 9049.07    90.4 9060.72   90.53 9092.74   90.34
 9113.12   90.46 9162.62   90.39 9226.94   90.75 9257.68   91.24 9292.81   92.77
 9351.85   93.05 9369.32   92.81 9411.36   92.93 9424.54   93.94 9437.71   93.18
 9509.06   93.07 9617.74   93.11 9648.48   92.91 9692.48   92.97 9736.15   92.74
 9788.55   93.09 9811.84   93.04  9852.6   92.52 9995.35   92.5410076.78   92.45
10126.27   92.5410219.43   92.2710271.98   92.0310298.32    92.110482.74   91.68
10542.59   91.6710571.71   91.8710592.08   91.1310600.82   91.72 10624.1   90.65
10632.84   91.2410670.69   91.1610688.16   91.5110711.45   90.8410728.92   91.22
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10758.03   90.81 10804.6   90.63 10830.8   91.2910839.54   90.7310889.01   90.61
 10912.3   89.7610941.41   90.1410953.05   90.84 10964.7   90.2410979.25   90.76
10990.89   90.4111027.21   90.6111037.46   90.4811063.66   90.9911081.12      91
 11101.5   91.8611153.89   91.7211174.27      9211220.84      9211273.23    92.2
11299.43   92.0911325.63   92.2411407.13   92.1811450.79   92.0211506.09   91.98
11532.16   92.2711571.68   93.8711619.97   93.6711663.28   93.6611718.58   93.23
11742.92   93.4211887.82   92.9511936.88   92.6711960.17   92.7511986.37   92.54
12041.67   92.4112143.55    92.512172.66   92.2312198.85    92.212210.49   92.65
12219.23    94.112271.63   94.7712329.84   94.2312367.68   94.43 12373.5   94.25
12431.71   93.9612457.91   93.7112521.95   93.7212594.72   93.62 12670.4   93.71
 12696.6   93.8512757.72    93.912789.73   93.58 12959.2   93.4712984.76   93.69
13002.23   93.44 13022.6   93.5413072.08    93.313083.73   93.8613089.55   93.57
13108.48   93.9313112.89   93.3713152.39   93.3713169.97   93.0513220.53   93.13
13278.75   92.6913304.94   92.8713363.16   92.7413377.71   92.4613441.75   92.37
13470.86   92.1613488.32   92.4513540.71   92.0313581.46   92.1713660.06   92.27
13689.16   92.4913710.04   92.4113770.67    92.513796.86   92.2213866.72   92.25
13878.36   91.9814035.54   91.5514067.56    91.714087.94   91.5114146.15   91.57
14154.89   92.13 14160.7   91.6914175.47   92.1814184.25   91.49 14213.1   92.08
14262.58   92.0814300.42   92.3714317.88   92.9214344.08   93.0114370.28   91.75
14393.57   92.8614408.12   92.7414428.49   92.0614454.69   91.8114477.98   91.83
14509.18   91.59 14592.6   91.3714640.98   91.1414655.53   91.2314725.39   90.94
14803.98   90.3714869.23   90.1914885.49   90.2915000.96      9015097.97   90.56
15129.98   90.8215220.22   91.1715290.76   91.2415303.93   91.4615321.49   92.23
15352.23   92.59 15377.4   93.5315391.95   95.2315400.69   93.6915415.24   96.97
15421.07   99.5415426.88  100.5115439.67   97.9515449.79   97.5115476.51   97.75
15484.14   95.3715491.78    93.815499.42   93.4515529.24   93.6515539.47   95.05
 15562.5   94.8115585.53   93.6515610.12      9315621.56    93.6 15629.2   95.39
15659.74    95.1

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5331.91     .07 5400.01    .025 5517.34     .07 6035.84    .085
 6675.86    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5331.91 6035.84             2076  870.68  188.51             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5331.91   92.31       T
 6035.8415659.74   93.42       T
Left Levee      Station=   135.2      Elevation=  105.99
Right Levee     Station=15426.88      Elevation=100.5133
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 3241.84 3918.85   92.12

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 145.5

INPUT
Description: RGV-04 (end wall), RGV-01 (begin wall), new cross-section,
             Bathymetric elevations translated from IBWC 2008 Cross-sections,
             Section along left levee updated with 2017 survey
Station Elevation Data    num=     471
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   93.53   35.11   93.66   70.22   95.81   94.79   103.6   98.42  103.65
  100.85  103.67  101.61  103.92  102.43  104.19  103.07   104.4  103.74  104.62
  113.96  104.77  116.21  104.79     127   104.9  134.12   104.9  140.52   99.78
  144.24    99.7  156.99   96.56     166   94.33  166.01   94.33  233.64   93.48
  268.11   94.05  271.88   93.12  275.99    92.1  276.39   92.08   276.7   92.07
  285.81   91.74  285.86   91.74  315.78   91.32  376.33   91.01  436.88   91.42
  497.43   91.31  557.98   90.67  618.54   90.38  679.09   90.12  739.64   89.71
  747.62   91.23  790.27   91.71  796.83    92.1  816.52   91.58  826.36   92.14
  842.77   91.94  852.61   91.32  862.45   91.66   888.7   91.55  898.54   92.27
  908.38    91.6  931.35   92.77  941.19    91.6  960.87   91.99  980.56   91.63
 1003.52   93.17 1016.65   92.28 1052.73   92.89 1078.98   92.04 1101.95   92.36
 1111.79   91.86 1131.47   91.84 1141.31   92.23    1161   91.97 1206.93   92.29
 1229.89   92.78  1246.3   93.94 1252.86   93.61  1262.7   91.59 1279.11   87.19
 1321.76   87.16 1387.37   86.94 1407.06   87.25 1426.74   86.93 1439.86   87.21
 1472.67   87.26 1489.07   87.06 1515.32   87.25 1557.97   87.02 1580.94   87.44
 1636.71   86.97 1666.24   87.34 1679.36   86.93 1715.45   87.07 1794.19   86.94
 1810.59   87.34 1889.33   87.23 1895.89   88.58 1925.42   89.38 1931.98    89.1
 1984.47   88.99 1991.03   89.19 2036.96   89.38 2066.49   89.22 2092.73   89.34
 2158.35   89.25 2207.56   89.59 2227.24   89.47 2299.42   89.69 2365.03   89.66
 2433.93   89.45 2476.58   89.86 2499.54   89.72 2561.88   89.81 2584.84   89.47
 2597.97   89.71 2630.77   89.62 2663.58   89.78 2706.23   89.62  2745.6   89.83
 2784.97   89.74 2837.46   90.22  2847.3   89.93 2883.39   90.82 2899.79   91.99
  2932.6   92.84 2952.28   93.83 2978.53   96.34 2988.37   95.35 2998.21   95.35
 3014.62   88.75 3031.02   86.68 3040.86   86.92 3053.99   86.56 3076.95   86.65
 3109.76   86.31 3172.09   86.29 3277.07   86.38 3349.25   86.29  3391.9   86.34
 3418.14   86.55 3424.71   86.33 3464.07   86.51 3487.04   86.19 3506.72   86.58
 3532.97   86.73  3562.5   86.31 3585.46   86.43 3601.86    86.9 3621.55   86.39
 3719.97   86.35 3772.46   86.53 3821.67   86.32 3864.32   86.54 3890.57   86.35
 3988.99   86.49 4018.52   86.43  4038.2   86.76 4067.73    86.4 4097.25   86.88
 4146.46   86.77 4169.43   87.41 4172.71   87.87 4182.55    91.8  4192.4   92.58
  4225.2   92.07 4307.22   92.01 4320.35   91.86 4349.87   92.16 4369.56   91.94
 4389.24    92.2 4412.21    91.9 4431.89   92.09 4454.86   91.84 4507.35   92.17
 4513.91   91.93 4543.44   92.03 4599.21   91.92 4641.86   92.19 4654.98   91.89
 4697.63   92.04 4753.39   91.68    4819   92.02 4845.24   92.54 4864.92   94.33
  4868.2   94.13 4878.04   90.58 4887.88   88.74 4897.72    84.2 4904.28   83.01
 4920.68   81.58 4930.52   77.15 4940.37   70.39 4943.65   68.96 4946.65   53.91
 4962.65   55.62 4974.65   55.52 4988.65   57.02 4999.65   57.02 5008.65   57.77
 5019.65   58.22 5029.65   58.92 5040.65   58.92 5052.65   59.48 5127.34   68.96
 5130.62   69.27 5137.18   74.54 5140.46   75.85 5153.58   77.15 5173.27   82.07
 5186.39   88.34 5192.95   89.08 5212.63   87.69 5248.71    86.7 5265.11   87.13
 5274.95   86.84 5288.07   87.72 5307.76   87.54 5356.96   87.45 5442.25   88.28
 5471.77   88.38 5491.45   88.74 5527.53   88.88 5573.46   89.26 5625.94   89.16
 5662.02   88.89 5675.15      89 5740.75   88.57 5793.23   88.77 5812.91   88.64
 5904.76   88.64 5937.56   88.52 5967.08   88.76 6009.73   88.33 6049.09   88.15
 6121.25   88.13 6150.77    88.6  6180.3   88.74 6219.66   88.68  6229.5   89.02
 6314.78   88.95 6360.71   89.86 6373.83   90.69 6390.23   92.95 6400.07    95.3
 6409.91   95.79 6432.87    95.7 6445.99   93.95 6459.11   94.18 6485.35   95.39
 6534.56   95.02 6570.64   93.94 6583.76   94.55 6632.96   95.33 6688.73   95.04
 6714.97   95.42 6747.77   95.58 6774.01   95.24  6859.3   95.52 6869.14   95.26
 6915.06   95.05 6931.46   95.47 6938.02    95.2  6957.7   95.52  6974.1   95.12
 7023.31   95.66 7065.95   95.27 7085.63   95.76 7111.87   95.29 7144.67   95.67
 7167.64   95.63  7190.6   94.93  7239.8   94.56 7246.36   94.25 7295.56   94.67
 7328.37   94.28 7393.97   94.68 7416.93   94.24 7475.97   93.95  7505.5   93.98
 7564.54   93.65  7587.5   93.74 7633.42   93.56 7728.55   93.36 7758.07   93.52
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 7807.27   93.28 7856.48   93.21 7889.28   93.39 7941.76   92.81 7974.56   92.69
 8092.65   92.71 8132.01   92.51 8171.38   92.76  8184.5   92.49 8253.38   92.51
 8296.02   92.16 8302.58   92.57 8322.26   92.15 8355.06    92.7 8394.42   92.41
 8407.54   93.11 8430.51    91.9 8453.47   91.98 8469.87   91.73 8486.27   92.38
 8512.51   91.73 8532.19   91.55 8542.03   92.79 8564.99   92.34 8591.23   92.41
 8604.35   92.73 8617.47   92.43 8630.59   93.14 8673.24   93.39 8686.36   92.97
 8706.04   93.38  8712.6   93.06 8751.96   92.97 8807.72   93.42  8860.2   93.51
  8925.8   93.32 8935.65   93.49 8965.17    93.3 9014.37   93.56 9040.61   93.47
 9057.01   93.87 9070.13   93.39 9096.37   93.56 9139.01   93.44 9171.81   94.43
  9207.9   93.24 9234.14   92.81 9270.22   92.89 9286.62   93.51  9306.3   93.65
 9345.66   93.54 9362.06   93.85 9401.42   93.91  9421.1   94.36 9430.94   93.86
 9447.34    91.4 9467.03   90.41 9476.87   90.61 9489.99   91.92 9509.67   92.02
 9529.35   91.52 9555.59   91.73 9588.39    91.2 9621.19   91.42 9673.67   90.63
 9693.35   91.35 9703.19   90.89 9722.88   90.73 9745.84   91.27 9762.24   90.66
 9788.48    90.4  9850.8   90.48 9913.12   90.14 9991.85   89.9210044.33   89.99
10050.89   89.6710067.29   89.9510086.97   89.7610168.97   89.8610185.37   90.11
10231.29   90.1110244.42   90.2810287.06    90.110300.18   90.2110352.66      90
10365.78   90.1810418.26   89.7910441.22   89.9110490.42   89.7310552.75   89.75
10598.67   89.3810690.51   89.3810742.99   88.9810785.63   88.86 10874.2   88.22
   10907   88.1710982.44   87.6311116.93   87.1311126.77   86.9711346.54   86.97
11362.94   87.7511379.34   90.3611399.02   92.4411415.42   95.19 11451.5   94.03
11461.34   93.1811477.74   93.14 11517.1   93.57 11533.5   93.4511543.34   93.92
11559.74   93.7711576.15   94.5311585.99    94.311595.83   95.0811605.67   94.44
11641.75   95.0411720.47      9511746.71   95.4411753.27   95.0611782.79   95.07
11802.47   94.8211828.71   94.9711871.36   94.6211917.28    94.711933.68   94.47
11950.08    94.811976.32   93.2312064.88   93.1712091.12   92.9612104.25   93.17
12146.89   93.0112245.29   93.1312314.17   92.9212333.85    93.112366.66   92.86
12432.26   92.8512448.66    92.7 12474.9   92.8812494.58   92.69 12573.3   92.92
12609.38   93.3812655.31    92.912694.67   93.2712714.35   93.0812799.63   93.61
12822.59   93.6612829.15   93.2812861.95   93.28 12937.4   93.5212960.36   93.25
13009.56   93.4113025.96   93.1913153.88   93.0813170.29   92.8913209.65   92.93
13288.37   92.2713350.69   91.8813373.65   92.3213386.77   91.8613429.42   91.85
13458.94   91.4513524.54   91.3113534.38   92.4113540.94   92.22 13547.5   90.62
13567.18   89.0913590.14   89.4113665.58   89.3913698.39   89.2913760.71    89.5
13800.07   89.8613839.43   89.9913885.35   90.3313911.59   90.3513937.83   90.63
13987.04   90.5714013.28   90.7914039.52   90.3914052.64   90.48 14059.2   91.34
14065.76   90.1814072.32   91.3514078.88   90.5314105.12   90.7814118.24   90.62
14160.88   90.6714167.44   90.3714285.53   90.1214423.29   90.3414442.97   90.52
14534.82   90.7314557.78   90.5214600.42   89.6614606.98   89.0614610.26   89.89
14623.38   90.8814633.22   93.24 14652.9   95.4614662.74   97.1114672.58   99.74
14695.54   99.51

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4930.52    .066 4943.65    .015 5130.62    .066 5904.76    .088

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      4887.88 5186.39          1658.45 1444.91 1082.27             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4887.88   88.74       T
 5186.3914695.54   88.34       T
Left Levee      Station=     127      Elevation=   104.9
Right Levee     Station=14672.58      Elevation=   99.74

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.93    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.066      0.038      0.085
  W.S. Elev (ft)            101.90    Reach Len. (ft)          1658.45    1444.91    1082.27
  Crit W.S. (ft)             84.69    Flow Area (sq ft)       55172.43   10261.36   96024.78
  E.G. Slope (ft/ft)      0.000047    Area (sq ft)            58778.09   10261.36   96745.06
  Q Total (cfs)           125000.00    Flow (cfs)              43527.64   27418.10   54054.26
  Top Width (ft)          14557.67    Top Width (ft)           4750.01     298.51    9509.15
  Vel Total (ft/s)            0.77    Avg. Vel. (ft/s)            0.79       2.67       0.56
  Max Chl Dpth (ft)          47.99    Hydr. Depth (ft)           11.62      34.38      10.10
  Conv. Total (cfs)       18278130.0    Conv. (cfs)             6364832.0   4009214.0   7904088.0
  Length Wtd. (ft)         1369.34    Wetted Per. (ft)         4756.66     320.43    9515.70
  Min Ch El (ft)             53.91    Shear (lb/sq ft)            0.03       0.09       0.03
  Alpha                       3.20    Stream Power (lb/ft s)      0.03       0.25       0.02
  Frctn Loss (ft)             0.07    Cum Volume (acre-ft)    81129.66   36255.44   110371.80
  C & E Loss (ft)             0.00    Cum SA (acres)          12523.13    1666.71   13807.09


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 145.2

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections, Section along left levee updated with
             2017 survey
Station Elevation Data    num=     473
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.67   35.09   92.76   70.19   94.02  110.14   96.79  115.12  103.98
  115.54  103.98  118.23  104.01  118.74  104.02  118.95  104.09  120.28  104.53
  120.46  104.59  121.57  104.96  124.79  104.99   149.6  105.24   150.1  105.24
   151.6  105.23  151.61  100.23  151.68  100.23  161.61  100.03  176.57    96.3
  178.62   95.79  228.38   94.79  255.71   94.24  257.66    94.2  259.72   94.15
  266.03   94.03  271.73   93.91  278.73   93.77  283.74   93.67  286.72    93.6
  288.67   93.52  297.48   93.34  301.76   93.26  331.92    93.1  392.53   93.16
  453.14   93.23  513.75   93.31  574.36   93.42  634.96   93.54  695.57   93.62
  756.18    93.7   779.9   94.79  793.02   95.11  838.95   94.74  865.19    95.1
  881.59   94.82  894.71   95.16  914.39   95.01  937.35   96.25  950.47      96
  966.88   96.37 1006.24   96.26 1025.92   96.62 1032.48   95.72 1052.16   94.92
 1084.96   94.99 1101.36    94.4 1117.77   94.74 1140.73   95.96 1183.37   94.83
 1193.21   95.53 1206.33   95.18 1219.45   95.63 1229.29   95.03 1258.81   95.36
 1268.66   95.85 1301.46   95.09 1324.42    95.9  1344.1   95.27 1363.78   96.17
 1373.62   95.05  1393.3   94.61 1406.42   95.04 1412.98   94.42 1439.23   94.85
 1455.63   95.45 1468.75   94.37 1488.43   94.17 1494.99   94.65 1504.83   93.71
 1524.51   94.62 1537.63   94.13 1570.44    93.9 1583.56   94.96 1599.96   93.45
 1639.32   93.69    1659   93.33 1678.68   93.48  1691.8   94.16  1724.6    93.1
 1741.01   94.13 1750.85   93.24 1790.21   94.18 1819.73   92.88 1836.13   93.11
 1845.97   94.52 1859.09   93.38 1895.18   93.06 1927.98   93.57  1941.1   93.03
 1970.62   93.24 1983.74   92.87 2042.79   92.69 2062.47   93.32 2075.59   92.86
 2114.95   93.11 2144.48    92.6 2167.44   92.91  2190.4   92.62 2226.48   90.27
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 2265.85   89.98 2328.17   90.57 2338.01   90.03 2360.98   90.02 2370.82   90.48
 2416.74   90.37 2433.14   88.93 2442.98   90.43 2472.51   91.29 2479.07    90.9
 2502.03   91.21 2534.83    92.3 2544.67   89.86 2551.23   90.14 2557.79   92.07
 2626.68   92.08 2652.92   92.62 2659.48   92.45 2734.93   92.53 2744.77   92.82
 2764.45   92.53 2797.26   92.71 2813.66   92.47 2859.58    92.7 2875.99    92.5
 2957.99   92.98 2980.96   92.53 2997.36   93.15 3003.92   92.31 3013.76   93.97
 3030.16   95.94 3043.28   96.16 3049.84   93.23 3059.68   94.08  3072.8   89.58
 3085.93    87.1 3099.05   86.51 3118.73    87.1 3128.57   86.76 3144.97   87.56
 3151.53   87.06 3171.21   86.85 3177.77    88.3 3194.18   88.82 3213.86   86.58
 3230.26   86.84 3249.94   86.55  3272.9   87.07 3282.74    86.3 3295.87   87.08
 3345.07   87.16 3358.19    87.6 3371.31   87.18 3492.68   87.15 3499.24   87.35
 3574.69   87.39 3604.21   87.58 3735.43   87.45 3755.11   87.68 3899.44   87.65
 3942.09   87.89 3951.93   87.71 4060.18   87.83 4079.86   87.71 4129.06   87.91
 4178.27   87.83 4227.47   87.99  4306.2   88.06 4325.88   88.35 4348.84   88.12
 4394.77   88.07 4427.57   88.23 4434.13   88.67  4457.1   88.15 4493.18   88.35
 4529.26    88.8 4598.15   88.37 4653.91   88.51 4676.88   88.32 4775.28   88.38
 4794.97   88.68 4817.93   88.38 4857.29   88.61  4906.5   88.48 4978.66   88.58
 5014.75   88.76 5060.67   88.55 5086.91   88.95 5103.31   88.77 5149.24   88.88
 5178.76    88.6 5247.65   88.92 5267.33   88.65 5287.01   88.93 5329.65   88.58
 5352.62   89.28 5385.42   89.08 5428.06   89.11 5496.95   89.48 5519.91   89.14
 5562.56   89.31 5647.84   89.18 5693.77   89.26 5703.61   89.74 5719.98   89.42
 5739.62   89.71 5759.26   89.53 5831.27   89.51 5886.91   89.83 5932.73   89.74
 5994.92   90.08 6014.56   89.88 6047.29   90.27 6053.84   90.61 6070.21   89.02
 6086.57   89.88 6093.12   89.68  6119.3   90.36 6142.22   90.41 6165.13   91.66
 6181.49   88.61 6204.41   87.53  6217.5   84.57 6240.41   78.69 6260.05   68.82
 6263.32   68.64 6270.68   67.86 6326.36   64.48 6336.94   59.17 6372.43   61.04
 6381.27   61.25 6386.44   64.44 6391.93   65.34 6400.16   68.65 6433.52   68.61
  6436.8   68.99 6449.89   77.06 6453.16   77.81 6462.98   74.71 6469.53   73.58
 6476.08   73.81 6482.62   75.79 6495.71   82.24 6502.26   84.07 6512.08   84.25
 6528.45   86.55 6538.27   85.84 6580.82   84.57 6616.82   85.47 6633.19   85.57
 6646.28   84.79  6692.1   83.27 6724.83   83.49 6747.75   82.91  6777.2   84.34
 6800.12   86.51  6826.3   89.81 6842.67   92.54 6881.94   94.28 6901.58   94.14
 6934.32   95.56 6947.43   95.82 6973.67   95.62  6983.5    94.8  6999.9   94.64
 7019.58   94.93 7072.06    95.3 7078.62    94.4 7088.46   94.43 7101.58   94.93
 7134.37      95 7180.29   95.58 7196.69   95.29 7249.17   95.45 7272.12   95.23
 7285.24   95.47 7347.56   95.33 7380.36   95.56  7390.2   95.37 7429.55   95.62
 7491.87   95.24 7537.79   95.16 7547.62   95.34 7613.22   95.05 7619.78   95.29
  7649.3   94.85 7708.33   94.94 7724.73   94.81 7800.17   94.98 7813.29   94.76
 7836.24   95.02 7852.64   94.79 7888.72   94.78 7901.84   94.49 7931.36   94.55
 7960.88    94.3 8019.91   94.21 8065.83   93.81 8072.39   93.93 8147.82   93.67
 8190.46   93.94 8206.86   93.62 8239.66   94.16 8262.62   93.75 8285.58   93.74
 8292.15   93.23 8338.07   92.76 8361.03   91.99 8397.11   91.65 8423.35   91.13
 8439.76   92.15  8449.6   92.22    8466   88.68 8472.56    87.9 9102.36    87.9
 9217.17   88.03 9253.25   88.22 9335.26   88.16  9361.5   87.92 9404.14    87.9
 9820.73    87.9 9856.82   90.58  9909.3   90.95 9932.26   91.46 9951.94   90.74
 9971.62    90.9 9981.47   91.4510017.55   91.2710043.79   91.8910089.71   91.89
10122.52    91.410132.36   92.1610155.32   91.5710165.16   92.1510188.12   92.32
10201.24   91.9810230.76    92.410237.32   92.0810260.29   92.2210266.85   91.84
10289.81    92.510299.65   91.7910312.77    91.710339.01   92.3310355.41   92.16
10365.25   92.5410384.93   92.38 10391.5   91.8710450.54   92.1610460.38    91.6
10509.58   91.6210565.35   90.3110611.27   90.1910686.72   90.2610735.92   89.55
10778.56   89.5710817.92   89.8110850.73   89.7110932.73   90.1610962.26   91.26
10975.38   90.7710981.94   91.1711008.18   91.0711014.74   91.6411040.98      91
11093.46   90.0411119.71   89.0511136.11    88.811145.95   86.9711496.93   86.97
11503.49    87.1 11536.3   95.58 11569.1   95.4411605.18   96.0311637.98   95.79
11647.82   96.1211680.63   95.7111729.83   95.6711746.23   96.2411759.35   95.78
11769.19   96.1811782.31   95.1711792.15   95.9211815.12   95.2111821.68   95.58
11838.08   95.1111854.48   95.5211861.04   95.02   11884   95.1811897.12   94.75
11923.36   94.9211936.49   94.6511975.85   94.4711992.25   94.6912011.93   94.28
12031.61   92.8412057.85   92.8812080.82   92.4812156.26   92.6512175.94   92.36
12254.67   92.1112385.88   92.5712408.84   92.7912412.12   93.7512421.96   99.67
12425.24  100.5612441.64   99.7912454.76   93.4412461.32    92.412500.68   92.41
12563.01   92.7212674.54   92.8112789.35   93.0812825.43   93.0112871.35   93.16
12956.64      9313032.08   93.2413094.41   93.1113182.97    93.213232.18   93.59
13291.22   93.3513363.39   93.4513376.51   92.8513383.07   93.2813412.59   92.44
13448.67    91.913468.35   92.05 13527.4   91.87 13576.6    91.913586.44   91.56
   13593   90.48 13625.8   89.6713724.21   89.6713822.62   89.1213855.42   89.31
13917.75   89.0813980.07   89.3813996.47   88.8414019.43   88.7414045.67   89.37
14055.52   89.2314081.76   89.7414144.08   90.0414163.76   90.3214186.72   90.23
14249.05   89.0714275.29   88.9214301.53    89.4 14324.5   89.08 14357.3      90
 14390.1   89.7914413.06   89.2814442.58   89.0114514.75   88.9714531.15   90.51
14554.11   93.5314573.79   97.7914596.75   98.8214613.16      9914619.72   98.16
14629.56   94.44 14639.4   93.3714698.44   93.37

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 6240.41    .066 6263.32    .015 6433.52    .066 6449.89    .088

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6204.41 6528.45           920.68 1243.87  995.11             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6204.41   87.53       T
 6528.4514698.44   86.55       T
Left Levee      Station=   150.1      Elevation=  105.24
Right Levee     Station=14613.16      Elevation=      99
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1455.63 3043.28   95.45

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.85    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.066      0.051     0.088
  W.S. Elev (ft)            101.84    Reach Len. (ft)           920.68    1243.87    995.11
  Crit W.S. (ft)             91.21    Flow Area (sq ft)       61614.32    9847.92  85477.07
  E.G. Slope (ft/ft)      0.000060    Area (sq ft)            61832.21    9847.92  86035.60
  Q Total (cfs)           125000.00    Flow (cfs)             50373.23   21291.51  53335.25
  Top Width (ft)          14546.83    Top Width (ft)           6052.80     324.04    8169.99
  Vel Total (ft/s)            0.80    Avg. Vel. (ft/s)            0.82       2.16      0.62
  Max Chl Dpth (ft)          42.67    Hydr. Depth (ft)           10.18      30.39     10.46
  Conv. Total (cfs)       16158740.0    Conv. (cfs)             6511742.0  2752351.0  6894642.0
  Length Wtd. (ft)          1004.51    Wetted Per. (ft)         6058.09     335.71    8187.02
  Min Ch El (ft)              59.17    Shear (lb/sq ft)            0.04       0.11      0.04
  Alpha                        1.94    Stream Power (lb/ft s)      0.03       0.24      0.02
  Frctn Loss (ft)              0.05    Cum Volume (acre-ft)    78833.68   35921.92  108101.10
  C & E Loss (ft)              0.00    Cum SA (acres)          12317.48    1656.39   13587.47


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
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CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 145

INPUT
Description: RGV-01. Bathymetric elevations translated from IBWC 2008
Cross-sections, Section along left levee updated with 2017 survey
Station Elevation Data num= 441

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	92.18	22.92	91.61	31.9	92.25	42.86	91.31	62.8	91.81
77.75	97.65	94.65	103.5	98.19	103.53	100.02	103.55	100.53	103.72
101.57	104.07	102.45	104.36	102.86	104.5	125.84	104.73	130.91	104.78
132.91	104.78	142.09	99.6	142.93	99.58	143.86	99.35	155.69	96.4
155.88	96.39	156.26	96.38	210.79	95.29	237.1	94.76	239.13	95.26
241.1	95.76	246.67	95.64	253.13	95.51	257.89	95.42	265.15	95.27
269.33	94.23	271.39	93.71	272.6	93.69	280.07	93.54	283.18	93.48
283.55	93.49	323.12	93.43	363.12	93.53	403.11	93.22	483.11	93.6
526.1	93.43	563.1	93.58	645.09	93.44	685.09	93.62	764.08	93.44
893.07	93.32	966.07	93.55	1044.06	93.62	1086.06	93.83	1176.05	93.62
1202.2	95.83	1228.43	95.39	1238.27	96.36	1248.11	94.66	1257.95	95.82
1267.78	95.81	1284.18	94.9	1300.58	95.53	1316.97	94.8	1326.81	92.94
1349.77	91	1392.4	90.67	1435.03	90.68	1454.71	91.03	1500.62	90.71
1536.69	90.98	1576.05	90.68	1605.56	90.96	1644.91	90.76	1703.94	90.76
1740.02	90.93	1812.16	90.94	1825.28	90.72	1890.87	91.02	1940.06	90.95
1972.85	91.38	1999.09	91.05	2058.12	91.25	2064.68	91.04	2107.31	91.24
2126.99	91.08	2159.78	91.27	2205.69	91.29	2271.28	91.12	2395.9	91.55
2458.21	91.14	2530.36	91.56	2536.92	91.32	2576.27	91.19	2635.3	91.4
2700.89	91.42	2750.08	91.74	2855.02	91.9	2891.09	91.71	2973.08	92.02
2979.64	92.35	2992.76	91.75	3032.11	92	3133.77	92.08	3163.29	93.14
3209.2	93.1	3255.11	93.33	3271.51	93.85	3284.63	92.44	3294.47	92.69
3320.7	92.15	3376.45	92.17	3435.48	92.35	3448.6	92.73	3458.44	92.37
3504.35	92.8	3533.86	92.79	3546.98	93.1	3573.22	92.98	3586.34	93.25
3599.45	96.68	3619.13	96.74	3635.53	93.52	3645.37	92.97	3651.92	91.38
3661.76	87.67	3668.32	86.52	3684.72	87.18	3704.4	86.29	3773.26	86.37
3901.16	86.31	3920.84	86.44	4009.38	86.26	4052.02	86.73	4081.53	86.32
4117.6	86.53	4127.44	87.3	4137.28	86.82	4166.79	86.54	4193.03	87.18
4222.54	87.38	4252.06	86.55	4297.97	87.06	4317.64	86.67	4330.76	87.25
4360.28	86.51	4416.02	87.43	4438.98	88.14	4494.73	88.57	4530.8	88.33
4553.76	87.79	4589.83	87.59	4661.98	87.73	4773.47	88.36	4802.99	87.99
4871.85	88.21	4914.48	88.03	4940.72	88.28	4986.63	88.03	5025.98	88.15
5058.78	87.95	5085.01	88.47	5124.36	88.1	5147.32	88.41	5183.39	88.42
5235.86	88.14	5298.17	88.62	5340.8	88.57	5360.48	88.35	5389.99	88.49
5399.83	88.81	5416.23	88.48	5435.9	88.64	5478.53	88.49	5491.65	88.72
5544.12	88.52	5583.47	88.62	5599.87	89.03	5678.57	88.79	5704.81	89.16
5737.6	89.17	5763.84	88.88	5832.7	89.05	5849.1	89.33	5901.57	89.11
5921.24	89.48	5937.64	89.33	5963.88	89.67	6016.35	89.61	6058.98	90.47
6065.54	89.66	6078.65	86	6098.33	85.75	6104.89	85.22	6150.8	86.55
6160.64	87.14	6186.87	87.19	6222.94	86.06	6242.62	85.8	6265.58	84.8
6288.53	85.04	6314.75	86.01	6347.51	86.81	6354.06	86.44	6376.99	87.23
6413.02	87.98	6432.67	88.01	6458.88	88.52	6485.08	88.55	6491.63	89.13
6521.11	89.41	6553.87	88.35	6566.97	89.24	6593.18	88.77	6606.28	89.22
6619.38	88.9	6671.79	88.77	6688.17	88.42	6720.93	88.53	6740.58	88.99
6753.68	89.85	6770.06	90.21	6786.44	91.09	6799.54	91.17	6809.37	89.89
6835.57	89.14	6848.67	90.09	6878.16	91	6907.64	90.07	6930.57	88.97
6937.12	89.77	6953.49	89.56	6963.32	88.03	6979.7	87.75	6999.35	89.84
7012.46	88.93	7028.83	86.93	7041.94	86.86	7061.59	84.41	7087.79	84.48
7110.72	86.52	7127.1	82.5	7136.93	80.77	7156.58	79.48	7182.79	81.12
7208.99	77.39	7228.65	75.77	7235.2	75.76	7245.02	77.13	7254.85	80.39
7267.95	81	7287.61	83.1	7297.43	80.23	7307.26	75.52	7313.81	71.06
7323.64	68.37	7333.64	67.4	7343.64	66.9	7363.64	66.1	7383.64	65.1
7403.64	64	7423.64	63.4	7443.64	63.9	7453.64	66.7	7480.87	68.37
7484.14	68.76	7503.8	82.06	7520.17	91.14	7523.45	92.03	7582.41	91.73
7628.27	91.35	7651.2	91.37	7683.96	91.85	7742.92	94.19	7782.22	95
7792.05	94.53	7831.36	94.33	7847.73	94.78	7877.22	94.21	7893.59	94.34
7916.52	93.79	7975.48	93.54	8001.69	93.82	8037.78	93.87	8047.62	93.02
8057.46	90.6	8073.87	88.94	8106.67	88.55	8198.54	89.25	8237.91	88.97
8277.28	89.44	8382.27	89.95	8408.52	89.8	8470.86	90.05	8552.88	89.97
8598.82	89.71	8611.94	90.16	8625.06	89.85	8648.03	90.01	8671	89.62
8710.37	89.8	8753.02	89.78	8772.71	90.02	8831.76	90.23	8838.33	90.09
8874.42	90.54	8985.97	91.19	9081.12	91.97	9117.21	92.18	9205.79	91.97
9235.32	92.18	9310.78	91.97	9389.53	91.88	9491.24	91.14	9550.29	90.39
9589.67	90.26	9606.07	89.95	9638.88	89.87	9684.81	89.37	9734.03	89.12
9786.52	88.3	9816.05	88.24	9839.02	87.9	9907.92	87.9	9930.89	88.66
9957.14	92.46	9973.54	91.9610035.88		91.8610045.72		91.5410055.57		94.49
10058.85	94.5810065.41		92.3210111.34		92.4710190.09		92.3510199.93		92.58
10222.9	9210341.01		91.77 10377.1		91.3710396.79		91.6210409.91		91.19
10452.57	90.910482.09		90.9210524.75		90.1910564.12		90.4810646.14		89.69
10688.8	89.4810708.48		89.9510800.35		89.210829.88		89.4910846.28		89.11
10869.25	89.4310915.18		89.3410934.87		89.6510970.96		89.2411013.61		89.48
11079.23	89.2211105.48		88.6811164.54		88.1811217.03		88.3311236.72		87.97
11253.12	88.4911269.53		87.9311597.62		87.9311630.43		89.1611643.56		91.71
11659.96	94.2811679.65		94.311689.49		93.7711696.05		94.311725.58		94.45
11771.51	93.9411781.36		93.6111787.92		94.2511804.32		94.0111830.57		94.16
11883.07	93.8111896.19		93.9311984.78		93.47 12050.4		93.4 12119.3		92.9
12152.11	92.2812181.64		92.2212332.56		90.7812371.93		90.6612424.43		90.86
12522.86	91.9712575.35		92.312627.85		92.2512683.63		92.6612696.75		92.5
12739.4	92.8112755.81		92.7112801.74		92.95 12808.3		93.7412811.59		92.49
12818.15	93.9612821.43		92.7312841.11		93.3212854.24		92.5412896.89		92.77
13064.22	92.513097.03		92.7713123.28		92.5513211.87		92.69 13257.8		92.53
13277.48	92.77 13326.7		92.6413497.31		92.6813546.52		92.7913569.49		93.04
13602.3	92.5913605.58		93.4313612.14		92.4713615.42		93.2213628.55		92.86
13684.32	92.9213782.75		92.6713841.81		91.7613854.93		91.813917.27		91.01
13959.92	90.2614028.83		89.6614061.63		89.2114123.97		88.7 14222.4		88.22
14304.43	88.3914366.76		88.1314393.01		88.3314438.95		88.3414448.79		89.06
14461.91	91.6214484.88		93.2414501.29		96.514520.97		99.1514540.66		99.36
14543.94	98.6914557.06		93.3414662.05		93.34 14671.9		93.9414678.46		96.86
14685.02	98.1214714.55		97.4214744.08		93.9314770.33		92.0914796.57		91.56
14839.23	92.13								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	7061.59	.066	7307.26	.015	7484.14	.066	7520.17	.088

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
7110.72 7523.45 1054.14 1745.3 2394.82 .1 .3
Left Levee Station= 132.91 Elevation= 104.78
Right Levee Station=14540.66 Elevation= 99.36
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev

1238.27 3596.62 92.3611984.7814494.65 92.92

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	101.80	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.02	Wt. n-Val.	0.066	0.048	0.088	
W.S. Elev (ft)	101.78	Reach Len. (ft)	1054.14	1745.30	2394.82	
Crit W.S. (ft)	90.90	Flow Area (sq ft)	78709.19	11389.80	73951.03	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)	78709.19	11389.80	73951.03	
Q Total (cfs)	125000.00	Flow (cfs)	62359.20	21888.55	40752.24	
Top Width (ft)	14701.01	Top Width (ft)	6972.50	412.73	7315.78	
Vel Total (ft/s)	0.76	Avg. Vel. (ft/s)	0.79	1.92	0.55	
Max Chl Dpth (ft)	38.38	Hydr. Depth (ft)	11.29	27.60	10.11	
Conv. Total (cfs)	17881320.0	Conv. (cfs)	8920518.0	3131170.0	5829630.0	
Length Wtd. (ft)	1726.60	Wetted Per. (ft)	6978.24	424.90	7331.08	
Min Ch El (ft)	63.40	Shear (lb/sq ft)	0.03	0.08	0.03	
Alpha	1.82	Stream Power (lb/ft s)	0.03	0.16	0.02	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	77348.45	35618.70	106273.70	
C & E Loss (ft)	0.00	Cum SA (acres)	12179.83	1645.87	13410.58	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 144.7

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
IBWC 2008 Cross-sections, Section along left levee updated with
2017 survey
Station Elevation Data num= 463

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.97	35.12	91.98	70.24	91.99	113.27	93.05	156.29	95.64
158.86	103.7	165.4	103.76	166.39	103.77	167.71	104.21	167.94	104.29
169.03	104.65	169.23	104.72	188.69	104.92	197.31	105	199.32	105
205.04	99.21	209.35	99.13	217.06	97.2	225.39	95.13	227.02	95.54
229.4	96.13	233.69	96.05	241.43	95.9	244.74	95.83	253.47	95.66
260.94	93.8	262.34	93.45	273.85	93.23	274.53	93.22	322.29	92.76
383.77	93.85	445.25	94	506.74	94	568.22	93.31	629.71	92.99
691.19	92.95	752.68	92.91	769.96	94.01	796.2	94.67	809.32	94.1
815.87	94.7	835.55	94.32	842.11	94.73	861.79	94.47	917.54	94.91
963.45	94.93	970.01	94.59	999.53	95.32	1012.65	95.09	1032.32	95.42
1042.16	96.12	1058.56	95.15	1071.68	95.54	1081.52	95.04	1091.36	95.42
1137.27	95.51	1160.23	95.38	1166.79	95.85	1173.35	95.29	1222.54	95.7
1242.22	95.29	1288.13	95.19	1327.49	95.62	1350.44	96.96	1360.28	96.34
1379.96	95.97	1393.08	96.33	1416.04	96.02	1448.83	96.11	1461.95	95.95
1478.35	95.1	1494.75	93.57	1511.14	90.64	1530.82	90.78	1560.34	91.42
1612.81	90.9	1639.05	91.17	1671.84	91.23	1694.8	90.9	1743.99	90.75
1753.83	91.14	1770.23	90.83	1783.35	90.99	1803.03	90.49	1819.42	90.92
1891.58	90.67	1904.69	90.86	1934.21	90.52	1970.29	90.86	1996.52	90.6
2003.08	90.9	2035.88	90.83	2049	90.57	2071.95	90.81	2098.19	90.8
2134.26	90.42	2147.38	90.56	2180.18	90.38	2239.21	90.35	2258.89	90.58
2275.29	90.43	2344.16	90.75	2367.11	90.38	2383.51	90.77	2419.59	90.68
2455.66	90.89	2481.9	90.72	2511.42	90.8	2534.37	91.09	2606.52	91.14
2649.16	91.02	2698.35	91.16	2731.15	91.51	2754.1	91.3	2767.22	91.66
2839.37	91.57	2914.8	91.81	3006.63	91.63	3068.94	91.63	3108.3	91.96
3164.05	92.23	3275.56	91.9	3331.31	91.96	3423.14	91.59	3498.57	91.53
3521.53	91.63	3567.44	91.31	3600.24	91.36	3606.8	91.16	3678.95	91.19
3698.62	90.92	3747.82	90.87	3760.94	90.5	3777.33	90.86	3800.29	90.38
3839.65	90.6	3862.6	90.4	3892.12	90.5	3964.27	90.19	4000.35	90.36
4026.58	90.13	4079.06	90.19	4157.76	89.9	4239.75	90.07	4292.22	90.69
4311.89	90.58	4334.85	90.97	4403.71	90.98	4416.83	91.11	4485.7	90.95
4548.01	91.09	4574.24	90.83	4715.26	91.12	4767.73	90.95	4800.52	91.21
4852.99	91.06	4905.46	91.17	4961.21	91.08	5049.75	91.14	5059.59	91.26
5138.3	91.15	5177.65	91.38	5203.88	91.14	5236.68	91.16	5282.59	90.97
5328.5	91.32	5358.01	91.89	5367.85	91.26	5380.97	89.19	5400.65	87.64
5492.47	87.07	5528.54	87.27	5571.17	87.23	5617.08	86.95	5636.76	87.15
5659.72	86.95	5712.19	86.81	5764.66	87.07	5784.33	86.95	5830.24	87.02
5840.08	87.35	5863.04	86.77	5872.88	87.37	5902.39	87.55	5925.35	88.28
5945.02	88.54	5981.1	89.62	5997.49	90.33	6020.45	90.46	6043.4	91
6063.08	91.99	6079.48	91.95	6112.27	91.46	6118.83	92.16	6128.67	91.79
6138.51	92.35	6168.02	92.84	6190.98	92.35	6213.93	92.14	6227.05	91.08
6240.17	90.69	6250	89.6	6269.68	88.39	6279.52	88.62	6286.08	87.82
6315.59	88.47	6345.11	88.27	6351.67	87.52	6364.78	87.16	6381.18	87.42
6413.97	88.7	6427.09	88.37	6433.65	86.7	6450.05	76.49	6459.88	74.37
6469.72	73.36	6479.56	71.27	6489.4	68.11	6496.76	67.33	6552.44	63.95
6563.02	58.64	6598.51	60.51	6607.35	60.72	6612.52	63.91	6618.01	64.81
6626.24	68.12	6636.97	72.12	6643.53	72.99	6653.37	76.06	6663.21	77.9
6669.76	79.89	6682.88	85.98	6689.44	87.91	6699.28	92.7	6709.12	93.14
6718.96	92.34	6735.35	92.36	6748.47	91.92	6768.15	91.76	6774.7	92.09
6800.94	91.99	6810.78	92.48	6859.97	92.41	6879.64	92.06	6919	92.11
6932.11	91.91	6961.63	91.97	6991.14	91.74	7017.38	91.29	7060.01	91.12
7086.25	90.72	7158.39	90.59	7230.54	89.67	7250.21	91.04	7266.61	90.47
7283.01	91.12	7296.13	90.42	7312.52	90.54	7348.6	88.54	7361.71	88.29
7384.67	88.67	7414.18	89.91	7440.42	89.68	7463.37	89.11	7473.21	88.51
7509.28	88.71	7545.36	88.3	7604.39	88.18	7656.86	87.68	7715.88	87.57
7768.35	87.14	7788.03	87.24	7824.1	87.02	7863.46	87.48	7883.13	87.23
7919.2	87.21	7984.79	87.6	7994.63	87.84	8024.14	87.87	8063.5	88.23
8076.61	88.13	8109.41	88.38	8158.6	88.34	8178.27	88.57	8201.23	88.38
8234.02	88.67	8247.14	88.38	8260.26	88.65	8283.21	88.54	8322.56	88.69
8440.62	88.68	8466.85	88.54	8535.72	88.71	8575.07	88.44	8588.19	88.63
8666.89	88.5	8729.2	88.72	8781.66	88.49	8811.18	88.73	8866.93	88.68
8945.63	88.96	8965.3	88.83	8991.54	89.1	9030.89	88.91	9099.76	89.45
9109.59	89.3	9145.67	89.77	9155.5	89.59	9270.28	90.54	9299.79	91.07
9306.35	90.96	9381.78	91.64	9401.45	91.4	9444.08	91.67	9450.64	91.35
9463.76	91.69	9506.39	91.73	9526.06	91.38	9555.58	91.57	9591.65	91.37
9608.05	91.53	9650.68	91.17	9706.43	91.33	9735.94	91.16	9781.85	91.38
9880.23	91.62	9906.46	91.34	9913.02	91.5810099.94		91.4610139.29		91.33
10165.53	91.0810247.51		90.8910267.19		90.5810299.98		90.6910345.89		90.42
10401.64	90.2810424.59		90.0310460.66		90.0310490.18		89.7710536.09		89.59
10582	89.6110631.19		89.39 10644.3		89.0210654.14		89.2910709.89		88.93
10719.73	89.1110745.96		88.7810778.76		88.6910831.22		88.9210870.58		88.56
10886.97	88.7110932.88		88.4210982.07		88.38 11024.7		88.1611037.82		88.34
11077.17	87.9111093.57		88.5211106.69		87.93 11326.4		87.9311332.96		88.43
11359.19	88.911385.43		89.8411434.62		91.9611447.73		92.9611457.57		94.3
11470.69	93.8811477.25		93.14 11483.8		93.5911519.88		93.611536.27		94.21
11542.83	93.5211546.11		94.3511552.67		93.7511575.62		93.3711614.98		93.41

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11660.89   93.0311716.63   93.0311733.03   92.87 11801.9   92.7811824.85   92.45
11893.72   92.3911949.46   91.8412015.05   91.5812038.01   91.3212090.47   91.09
12116.71    90.812152.78   90.8212175.74   90.5112195.41    90.712224.93   90.52
12280.67   90.6812293.79   91.0412336.42   91.2312375.77   91.6812411.85    91.7
12480.71   93.6212497.11   93.4812510.22    92.212520.06   91.8212556.13   92.46
12575.81   92.1412628.28   92.5812647.96   92.5912657.79   93.0312664.35   92.26
12680.75   92.6612687.31   92.1212697.14   92.6412733.22   92.7112772.57   92.58
12785.69   92.7912825.04   92.7212903.74    92.9 12926.7   92.73   12989    92.8
13070.98   92.6313103.78   92.8513238.23   92.75 13290.7   92.9313379.24   92.99
13392.36   92.7313398.91   93.4613405.47    92.413415.31   93.3313421.87   92.94
13516.97   92.89 13559.6   92.5313608.79   92.6213657.98    92.313743.24   92.31
 13749.8   92.0313798.99   91.7413854.74   91.1413884.25   90.6213907.21   90.44
13972.79   89.38 14035.1   88.6814061.33   88.5514136.76   87.7914185.95   87.38
14222.02    86.914238.41   86.4114244.97    87.214258.09   85.9314297.44   85.65
14313.84    88.3 14320.4   90.3214330.23   92.2514340.07   95.2214346.63   98.27
14366.31   99.4314379.42   99.6414389.26    97.114395.82   93.61 14399.1   93.34
 14510.6   93.3414523.71   96.7714546.67   96.4214576.18   93.7414595.86   92.45
14608.97   92.2414625.37   92.5514635.21   91.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .09 6469.72    .066  6489.4    .015 6626.24    .066 6653.37    .088

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      6413.97 6709.12          1041.28  836.82     499             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 6413.97    88.7       T
Left Levee      Station=  199.32      Elevation=     105
Right Levee     Station=14379.42      Elevation=   99.64
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 5358.01    91.111824.8514635.21   91.46

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.69    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.090      0.057      0.088
  W.S. Elev (ft)            101.68    Reach Len. (ft)          1041.28     836.82     499.00
  Crit W.S. (ft)             93.08    Flow Area (sq ft)       62218.68    8698.31   86226.33
  E.G. Slope (ft/ft)      0.000080    Area (sq ft)            63143.67    8698.31   86226.33
  Q Total (cfs)           125000.00    Flow (cfs)              42589.61   18683.49   63726.90
  Top Width (ft)          14432.61    Top Width (ft)           6211.37     295.15    7926.09
  Vel Total (ft/s)            0.80    Avg. Vel. (ft/s)            0.68       2.15       0.74
  Max Chl Dpth (ft)          43.04    Hydr. Depth (ft)           10.02      29.47      10.88
  Conv. Total (cfs)       14004940.0    Conv. (cfs)             4771718.0   2093288.0   7139929.0
  Length Wtd. (ft)          698.07    Wetted Per. (ft)         6214.69     306.80    7940.14
  Min Ch El (ft)             58.64    Shear (lb/sq ft)            0.05       0.14       0.05
  Alpha                       1.78    Stream Power (lb/ft s)      0.03       0.30       0.04
  Frctn Loss (ft)             0.05    Cum Volume (acre-ft)    75632.05   35216.27   101870.70
  C & E Loss (ft)             0.00    Cum SA (acres)          12020.31    1631.69   12991.60


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 144.55

INPUT
Description: RGV-01. Bathymetric elevations translated from IBWC 2008
             Cross-sections, Section along left levee updated with 2017 survey
Station Elevation Data    num=     451
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   92.24   29.98    92.2   59.96   93.28   72.95   97.52     105  103.61
  106.55  103.41  106.96  103.41  107.16  103.48  108.55  103.93  108.67  103.97
  109.89  104.36  110.85  104.37  112.17  104.38  127.55  104.54  138.83  104.66
   140.9  104.66  143.13   96.25  151.23   96.12  151.66   96.02  158.15   94.46
   159.5   94.14   162.5   94.87  163.64   95.15  170.21   95.04  176.04   94.95
  179.65   94.89  188.45   94.74  189.15   94.57  191.15    94.1  199.82   92.02
  203.26    91.2  208.85   91.08  211.05   91.04  218.42   90.88  219.68   90.89
  228.92   91.96  243.92   89.81  249.87   90.84  267.87   91.21  310.86   91.09
  340.86   91.63  360.86   91.33  391.85   91.66  431.85   91.38  550.83   91.43
   721.8   91.34   752.8   91.94   792.8   91.87  829.79   92.26  872.79   92.37
  889.78   92.06 1073.76   92.77 1114.76   92.61 1231.74   92.97 1259.61   94.95
  1279.3   94.58 1308.82   90.88 1351.46   91.02 1377.71   91.39 1407.23    90.8
 1436.75   90.65  1446.6   90.37 1482.68      91 1515.48   90.91 1535.17   91.19
 1554.85   90.58 1564.69   90.96 1600.77   91.33 1669.66   91.12 1689.34   90.78
 1731.99   91.32 1745.11    91.1 1764.79   91.29 1777.91   90.97 1810.72      91
 1836.96   90.76 1859.92   91.55 1882.89   91.59 1889.45   91.17 1928.81   91.01
 1948.49   90.58 1968.18   91.06 2020.66   91.02 2037.06   91.52 2050.19   90.82
 2063.31   90.96 2086.27   90.62 2109.23    91.3 2138.76    90.5 2187.96   90.43
 2220.77   90.66 2247.01   90.47 2276.53   91.41 2289.66   90.88 2312.62      91
 2329.02   90.63 2388.07   90.49 2394.63   90.68 2453.68   90.33 2470.08   90.78
 2479.92   90.61  2499.6   90.95 2529.13   90.66 2561.93   91.49 2578.33   91.43
  2601.3   90.93 2627.54   91.12 2643.94   90.66 2689.87    90.7 2709.55   90.38
 2716.11   90.75 2745.63   91.13 2765.32   91.79    2785   91.91 2807.96   92.46
 2830.92    92.5 2840.77   92.19 2860.45   92.31 2876.85   92.78 2912.94   92.28
  2919.5   91.89 2958.86   91.97 2998.23   91.38 3037.59   91.64 3050.71   91.18
 3142.56   91.99 3188.49   91.94 3280.34   90.75 3342.67   90.91 3372.19   90.59
 3398.44   91.04 3418.12   91.63 3447.64   91.85 3470.61   91.02 3490.29   91.13
 3513.25    90.7 3565.74   90.85  3572.3   90.68 3598.54   91.08 3624.78   90.79
 3644.47   91.22 3716.64   91.28 3726.48   92.17 3746.16   91.59 3759.28   92.27
 3765.84   91.79 3788.81    91.6 3811.77   91.87 3844.57   90.96 3877.38   90.68
 3897.06   90.25 3929.86   91.15 3936.42   91.02 3959.39   91.63 3979.07   91.71
 3992.19   91.41 4051.24   91.84 4061.08   91.71 4087.32   92.04 4107.01   92.63
 4116.85    93.3 4159.49   94.68 4166.05   95.72  4175.9   96.14 4195.58   94.33
 4228.38   94.39 4231.66   94.73 4251.34   94.36 4274.31   94.96 4300.55   94.21
 4349.76   94.42 4362.88   93.71 4369.44   93.89 4395.68   93.54 4415.37    93.6
 4425.21   93.09 4441.61   90.42 4448.17   89.86 4480.97   89.36 4546.58   89.48
 4556.42   89.08 4582.67   89.29 4608.91   89.88 4628.59   90.04 4667.96   88.96
 4713.88   88.96 4727.01   88.63 4763.09   89.32 4795.89   89.28 4802.46   88.97
 4822.14   89.17 4851.66   89.01 4864.78   89.34 4900.87   88.68 4959.92   88.63
    4996   89.21 5038.65   88.44 5058.33    88.3 5107.53   88.72 5117.38   88.44
  5130.5    88.8 5156.74    88.9 5169.86   88.45 5199.39   88.83 5205.95   88.32
 5232.19   88.25 5248.59   88.78 5268.28   88.88 5291.24   89.44 5333.88   89.71
 5360.13   89.63 5373.25   90.01 5389.65   89.88 5409.33   90.23  5432.3   90.15
 5455.26   90.53 5514.31   90.22 5543.83   89.32 5556.95   89.47 5576.64   89.19
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 5586.48   89.58 5612.72   89.63 5645.52   89.43 5711.13   89.61 5776.74    90.1
 5786.58   90.87 5809.54   90.24 5829.23   90.36 5871.87   90.28 5898.12   90.03
 5944.04   90.49 5967.01   91.01 5980.13   90.94 6019.48   92.27 6042.43   92.01
 6055.55   92.68 6091.62   92.69 6114.58   93.47 6137.53   93.37 6144.09   93.86
 6167.04   93.18 6176.88   93.72 6203.12   93.43 6212.95   90.97 6235.91   73.95
 6249.03   68.61 6264.31   66.56 6284.31   59.86 6304.31   61.86 6314.31   61.86
 6334.31   63.86 6354.31   64.06 6374.31   65.86 6394.31   66.06 6403.15   68.05
 6409.71   68.64 6422.83   76.19 6426.11   77.23 6435.94   78.04 6445.78    80.3
 6462.18   79.76 6478.58   82.09 6494.97   83.54 6511.37   87.15 6531.04   89.24
 6540.88   87.74 6550.72   88.52 6570.39   89.04 6613.02   88.81 6655.66   88.28
 6672.05   88.41 6731.08   88.13 6767.15   88.16 6799.94   88.39  6822.9   88.84
 6849.13   89.76 6858.97   89.36 6868.81   90.35 6878.65   89.94 6888.48   90.46
 6908.16   90.72 6927.83   89.86 6944.23   90.61 6963.91    90.5  6996.7   90.72
 7016.37   90.47 7065.56   90.58 7101.64   90.33 7173.78   90.14 7206.57   90.19
 7213.13   89.96 7324.62   90.07 7341.02   89.85 7390.21   89.86 7501.71   89.27
 7514.82   89.56 7527.94    89.2 7541.06   89.39 7577.13   89.23 7616.48   89.38
 7698.46   88.84 7760.77   89.03 7813.24   88.81 7823.07   88.53 7846.03   88.71
 7868.98   88.47  7882.1   88.63 7931.29   88.33 7947.69   88.46 8000.15   88.12
 8042.78   88.14 8114.93    87.8 8121.49   87.94 8160.84   87.75  8229.7   87.82
 8282.17   87.62  8419.9   87.49 8429.74   87.23 8455.97   87.72 8478.93   87.49
  8498.6   87.78 8600.26   87.76  8610.1   87.99 8636.33   87.93 8701.92   88.19
  8721.6   88.07  8783.9   88.43 8819.98   88.35 8842.93    88.5 8931.47   88.45
 9157.74   89.06 9220.05   89.13    9243   89.29 9285.64   89.25 9361.06   89.77
 9459.44   89.88 9472.56   89.35 9482.39   89.79 9502.07   92.54 9511.91   92.56
 9525.02   93.37 9547.98    91.5 9584.05   92.28 9633.24   92.09 9636.52   92.76
 9643.08   92.04 9675.87   92.16 9725.06   91.96 9748.02   92.07 9764.41   91.86
 9869.35   91.71 9938.22   91.69 9971.01   91.5110000.52   91.7910016.92   91.57
10033.32   91.7910072.67   91.7510187.44   91.2510233.35   91.33 10289.1   90.92
10338.29   90.7810348.13   90.4310397.32    90.410443.23      90 10462.9   89.67
 10495.7   89.6310597.35   88.9910692.45   88.6510715.41   88.6910787.55   88.52
10813.79   88.7110872.82   88.4310918.73   88.4611007.27    88.311053.18   88.44
11059.74      8811079.41   88.5111092.53   90.5711102.37   90.9711118.76   93.08
11125.32   93.1211135.16   92.1411148.28   94.6411171.23   94.8211187.63   93.49
11200.75   94.0211233.54   94.1711243.38    93.911282.73   94.1111331.92   94.06
11341.75   93.4411358.15   94.4511377.83    94.311400.78    92.811459.81   92.67
11502.44   92.6911636.89   92.4411692.64   92.2311754.95   92.4111807.42   92.27
11817.25   91.9511836.93   92.0311859.88   91.7411899.24   91.6311925.47   91.77
 11984.5    91.611991.06   91.78 12063.2   91.9412112.39   91.7112164.86   91.82
12276.35   91.7712318.99   91.5712400.97   91.7212473.11   91.6312505.91   92.32
12519.02   92.1112587.89   91.9212643.64   92.1712689.55    92.112705.94   92.26
12748.57   92.0112764.97    92.1 12886.3   91.9413046.99   92.0913096.18   92.04
13132.25   91.8313191.28   91.6913276.54   91.64 13299.5   91.4313342.13   91.36
13358.52   91.5813388.04   91.34 13440.5   91.4213519.21   90.7313558.56   90.26
13620.87   89.9413650.38    89.313686.45   88.9313889.77   87.4613961.91   86.18
13971.75   86.2713981.59   87.0813994.71   85.7714014.38   85.6714020.94    86.1
14037.34   89.3614060.29   92.3514066.85   93.9114076.69   97.4614086.53   98.58
14102.92   99.19

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .172 5776.74    .066 6235.91    .015 6409.71    .066 6531.04    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6144.09 6531.04           855.55 4265.19 3099.28             .1       .3
Left Levee      Station=   140.9      Elevation=  104.66
Right Levee     Station=14102.92      Elevation=   99.19
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    63.1  4175.9   91.4111168.4514197.18   91.41

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.64    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.157      0.047      0.067
  W.S. Elev (ft)            101.62    Reach Len. (ft)           855.55    4265.19    3099.28
  Crit W.S. (ft)             92.66    Flow Area (sq ft)       61945.97    9860.59   84244.40
  E.G. Slope (ft/ft)      0.000072    Area (sq ft)            61945.97    9860.59   84244.40
  Q Total (cfs)           125000.00    Flow (cfs)              23621.46   22353.58   79024.96
  Top Width (ft)          13961.21    Top Width (ft)           6002.38     386.95    7571.88
  Vel Total (ft/s)            0.80    Avg. Vel. (ft/s)            0.38       2.27       0.94
  Max Chl Dpth (ft)          41.76    Hydr. Depth (ft)           10.32      25.48      11.13
  Conv. Total (cfs)       14722290.0    Conv. (cfs)             2782096.0  2632767.0  9307427.0
  Length Wtd. (ft)         2617.85    Wetted Per. (ft)         6008.65     398.91    7576.86
  Min Ch El (ft)             59.86    Shear (lb/sq ft)            0.05       0.11       0.05
  Alpha                       2.34    Stream Power (lb/ft s)      0.02       0.25       0.05
  Frctn Loss (ft)             0.30    Cum Volume (acre-ft)    74136.95   35038.00   100894.20
  C & E Loss (ft)             0.00    Cum SA (acres)          11874.33    1625.14   12902.84


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 144

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections, Section along left levee updated with
             2017 survey
Station Elevation Data    num=     470
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    91.9    34.6   91.98    69.2   94.65  108.38  102.77  109.15  103.04
  110.58  103.54  111.82  103.55  114.03  103.58  114.52  103.74  115.59  104.09
  116.51   104.4  116.89  104.52  132.77  104.69  142.04  104.78  144.33  104.81
  145.07  104.82  147.08  104.82  155.58   93.86  157.15   93.83  159.06   93.35
  166.88   91.42  168.11   91.72   170.9   92.42  175.67   92.33  182.96   92.19
  189.78   92.06  195.02   91.96  198.07    91.2  204.75   89.54  207.47   89.48
  216.41   89.29  217.06   89.13  222.61   87.74  269.79   88.45  331.14      89
  392.49   89.85  453.85   90.76   515.2      91  637.91      91  699.26   91.23
  760.61   91.53  773.47   92.06  806.27    92.9  819.39   92.13  839.06   92.56
   865.3   92.22  907.93   92.84  917.77   92.19  937.45   92.53 1035.84   92.08
 1052.23   92.61 1071.91   92.36 1147.34   93.79 1180.14   94.01 1212.93   93.55
 1262.13   94.13 1294.92   93.69 1337.56   94.04 1357.24   93.01 1380.19   92.85
 1419.55   94.33  1458.9   95.25 1472.02   94.94 1494.98   95.44 1534.33   93.38
 1550.73   93.02 1580.25   93.49 1613.04   93.54 1645.84   92.49 1681.92   92.39
 1691.75   93.07 1708.15   92.67 1744.23   93.01 1777.02   92.42 1816.38   92.58
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 1855.73   93.29 1881.97   90.88 1911.49    91.2 1970.52   90.15  2518.2   90.15
 2560.83   91.03 2596.91   91.01 2616.58   90.64 2652.66   90.69 2675.61   91.58
 2695.29   91.03 2744.48   90.67  2757.6   91.16 2803.51    91.1 2833.03   90.63
 2865.83   91.48 2905.18   90.82 2941.25   90.83 2954.37   91.47    2997   90.49
  3046.2   90.51 3095.39   91.43 3115.07   90.93 3154.42   90.67 3236.41   90.99
 3272.48   90.62 3292.16      91 3308.56   90.61 3344.63   90.51 3364.31   90.88
 3423.34    90.6 3443.02   90.99 3495.49   91.07 3515.17   90.59  3557.8   91.32
  3574.2   90.75 3616.83   91.27  3652.9   90.56 3692.26   90.32 3767.69   90.48
  3780.8   91.11 3803.76    91.2 3826.72   90.56 3872.63   91.37 3898.87   90.41
 3948.06   91.06 3997.25   91.31 4049.72   90.56 4056.28   91.07 4079.24   95.11
 4105.48   95.94 4151.39   95.41 4171.07   96.51 4210.43    94.5 4308.82   95.17
 4387.53    94.9 4397.37   95.13 4443.28   94.07 4449.84   94.44 4476.08   93.93
 4499.04   94.15  4538.4   93.66 4548.23   93.15 4558.07   94.11 4590.87   94.08
 4617.11   95.06 4626.95   94.28 4653.18    94.6 4685.98   94.39  4699.1   93.78
 4738.46   94.81 4777.81    94.3 4790.93    92.9 4813.89    92.6 4823.73   93.27
 4846.69   92.99 4879.48   95.65 4889.32   95.82 4902.44   94.44 4915.56   95.97
  4958.2   95.33 4971.32   95.93 4997.55   95.92 5013.95   95.03 5027.07   96.01
 5046.75   95.64 5072.99   95.79  5102.5   97.69  5118.9   96.02  5135.3   95.52
 5154.98   96.22 5171.38   92.09 5197.61   90.28 5230.41   89.22 5253.37   89.58
 5276.33   90.65 5309.12   91.56 5423.91   91.56 5443.59   92.04 5476.39   91.88
 5525.58   92.43  5571.5   91.76 5643.65   92.07 5653.49   92.56 5676.45   92.06
 5715.81   92.88    5765   92.96 5787.96   91.08 5804.36   91.09 5866.67    93.1
 5892.91   92.18 5909.31   92.85 5922.43   92.63  5942.1   93.28  5958.5   92.43
 5988.02   91.96 6010.98    92.2 6030.66   91.78 6086.41   92.32 6106.09   92.12
 6145.45   93.09 6194.64   92.03 6263.52   92.16 6283.19   91.91 6355.35   92.72
 6391.42    93.6 6453.74   94.08 6473.42   94.63 6486.53   93.68 6519.33    92.6
 6601.32   91.18 6630.84   89.74  6686.6    90.4 6709.55   91.16 6755.47   91.19
 6778.43   91.92  6830.9   91.66 6873.54   91.69 6899.78   91.23  6912.9   92.15
 6939.13   91.37 6991.61   91.22 7017.85   91.79 7086.72   91.21 7165.43   92.61
 7224.47   92.17  7250.7   91.68 7270.38   92.57 7290.06   92.59 7303.18   94.97
 7313.02   95.44 7326.14   93.37 7335.98   94.24 7342.54   93.55 7385.17   92.55
 7408.13   93.24 7417.97   94.81 7463.88   95.21 7473.72    93.7 7490.12   95.17
 7499.96   93.52 7519.64   93.43 7529.48   94.88  7542.6   93.53 7555.72   94.38
 7575.39    94.1 7608.19   91.83 7624.59   93.19 7640.99   92.35 7677.06   91.85
 7690.18   93.06 7706.58   92.35 7745.94   92.67 7759.06   93.82 7778.73   94.28
 7798.41   92.94 7811.53   93.58 7827.93   92.52 7841.05   92.66 7860.73   95.65
 7893.52   95.21 7919.76   95.68 7936.16   94.26 7955.84   90.12 7968.96    88.8
 7985.36   88.56 8027.99   90.76 8047.67   90.49 8073.91   88.76  8106.7   88.57
 8165.74   89.27 8214.93   88.96 8231.33   89.71 8287.08   89.65 8313.31   90.49
 8359.22   90.28 8382.18   90.73 8408.41   89.28 8451.04   90.96 8460.88   90.94
 8490.39   87.04 8526.46   86.74 8674.05   87.84 8690.45   87.55 8742.92    87.4
 8756.04   87.82 8782.28   87.51 8805.24   88.31 8851.16   89.26 8903.64    88.8
 8923.32   88.05    8943   89.08 8985.63    88.9 8998.75   88.26 9038.11   88.64
 9054.51   88.21 9077.47   88.54 9106.99   88.07 9136.51   88.63 9175.87   88.65
 9215.22   88.17 9228.34   88.54 9290.66   88.16 9326.74   88.37  9366.1   88.97
 9408.74   88.51 9428.42   88.88 9474.33   88.66 9497.29   89.18 9536.65   88.51
 9589.13    88.4 9648.17   88.56 9667.85   90.17 9680.97   90.15 9710.48   88.56
 9733.44   89.33 9749.84    90.5  9789.2   89.58 9851.52   91.56 9864.64   92.83
 9881.04   93.14 9897.44   94.95 9910.55   92.76 9920.39   92.37 9933.51   93.55
 9949.91   93.95 9985.99   93.2510002.39    93.410038.47   87.8610064.71   88.61
10074.55   90.5310090.95   90.8910100.79   90.0110123.75   86.4210136.87   84.93
10146.71   85.1210166.39   89.4810192.62   88.9110235.26   90.7510258.22   89.84
10274.62   93.0610281.18   93.15 10310.7   89.1510333.66    87.810350.06   86.01
10382.86   87.07 10392.7   87.8110402.54   86.6710409.09   87.2510428.77   86.17
10441.89   88.4510464.85   86.7710481.25   86.5610491.09   87.5110507.49   85.87
10520.61   86.3710537.01   88.8110556.69   88.8510576.37   88.2110592.77   83.26
10605.89   82.1410632.13   84.9810638.69   84.1810648.52   80.7210655.08   79.76
10671.48   79.6410694.44   81.1310710.84    77.7 10733.8   73.7210753.48   74.84
 10766.6   76.8710776.44   76.5310792.84   74.08 10799.4   74.5110809.24   78.52
 10815.8   78.7110822.36   75.88 10832.2   69.1610842.04   67.09 10849.4   66.31
10905.08   62.9310915.66   57.6210950.27    67.110963.39   69.8310983.07   76.23
10992.91   88.5510996.19   91.0311019.15   90.4911028.99      9111097.87   90.88
11225.78   90.3611242.18   90.5511281.54   89.9211317.62   90.4611327.46   89.69
11370.09   90.0611422.57   89.5311550.43   89.5411576.66   89.0711606.17   89.92
11632.39   89.7611652.06   89.1111694.68   89.5611760.25   89.57 11842.2   89.37
11894.66   89.5711956.95   89.3212002.84   89.4412065.13   89.2612097.91   89.66
12127.42   89.5812176.59   90.4212189.71   93.8412209.38   92.3312229.05   93.25
12337.23   93.3412386.41   93.5312442.14   92.2812448.69   93.5112455.25   92.16
12465.08   92.4912510.98   91.9912589.66   92.2612733.91   92.1112786.36   91.96
12835.54    92.212887.99      9212973.22   91.9412999.45    92.213045.35   92.07
13133.86   92.4313176.48   91.9313209.26   92.2613261.72   92.0813425.63   92.18
13517.43   92.1313556.77   92.3213596.11   92.0413684.62   92.0913740.35   92.37
13782.97   92.1113937.05   92.1913950.16   91.8813976.39   92.5613992.78   93.64
14002.62   93.2514019.01   97.6214025.57   98.2414051.79   97.5714068.18   93.19
14084.58   91.9714100.97   94.04 14110.8   93.2414146.86   92.2714182.92   92.07
14196.04   90.8714212.43   86.6614235.38   85.8614287.83   85.6614343.56   85.92
14356.68    85.714422.24    86.314448.47   86.28 14458.3   87.1514471.42   91.82
14487.81   94.3314500.92   97.9414517.31   99.2414536.98   98.9414546.82   94.62
14553.38   93.2814661.56   93.2814668.12   93.7814677.95   97.8414707.46   96.95

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .172 10766.6    .06610842.04    .01510950.27    .06611694.68    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10537.0110992.91          1039.03 1363.41 2237.29             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       010537.01   88.81       T
Left Levee      Station=  147.08      Elevation=  104.82
Right Levee     Station=14025.57      Elevation=   98.24
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1494.98 4171.07   93.81

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.34    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.172      0.117     0.067
  W.S. Elev (ft)            101.32    Reach Len. (ft)          1039.03    1363.41   2237.29
  Crit W.S. (ft)             92.00    Flow Area (sq ft)       94370.20   11806.41  37076.58
  E.G. Slope (ft/ft)      0.000209    Area (sq ft)            95719.00   11806.41  37076.58
  Q Total (cfs)           125000.00     Flow (cfs)            51241.76   18485.89  55272.36
  Top Width (ft)          14557.66    Top Width (ft)          10387.21     455.90   3714.55
  Vel Total (ft/s)            0.87    Avg. Vel. (ft/s)            0.54       1.57      1.49
  Max Chl Dpth (ft)          43.70    Hydr. Depth (ft)            9.09      25.90      9.98
  Conv. Total (cfs)       8651676.0     Conv. (cfs)           3546617.0  1279471.0  3825588.0
  Length Wtd. (ft)          1577.50    Wetted Per. (ft)        10400.79     472.25   3726.19
  Min Ch El (ft)              57.62    Shear (lb/sq ft)            0.12       0.33      0.13
  Alpha                        1.93    Stream Power (lb/ft s)      0.06       0.51      0.19
  Frctn Loss (ft)              0.25    Cum Volume (acre-ft)    72588.62   33977.23  96578.27
  C & E Loss (ft)              0.00    Cum SA (acres)          11713.38    1583.87  12501.32
```

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 143.5

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
IBWC 2008 Cross-sections, Section along left levee updated with
2017 survey
Station Elevation Data num= 470

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.59	34.56	92.16	69.12	92.85	101.67	103.28	101.69	103.28
102.39	103.29	107.3	103.34	108.81	103.84	108.84	103.86	110.1	104.27
110.13	104.29	134.77	104.53	138.15	104.57	140.15	104.57	140.15	95.89
140.24	95.89	142.97	96.56	143.58	96.71	153.36	96.5	155.65	96.45
164.91	96.25	167.73	96.19	188.14	91.08	197.01	88.86	202.99	88.74
213.02	88.54	214.1	88.27	215.21	87.99	261.67	86.97	322.44	88.59
383.2	89.31	443.96	90.25	504.72	90.75	565.49	90.95	626.25	90
687.01	89.98	747.77	89.55	763.48	90.81	806.12	90.34	848.77	91.34
868.46	90.29	888.14	91.77	897.98	93.7	907.82	92.41	920.95	92.38
940.63	93.17	950.47	92.69	973.44	92.54	1002.96	93.69	1012.81	93.08
1032.49	93.32	1039.05	92.92	1058.73	93.26	1088.26	92.83	1107.94	93.18
1160.43	93.16	1189.96	93.6	1222.77	93.66	1291.66	93.12	1304.78	93.75
1331.03	93.94	1344.15	93.6	1360.55	94.05	1380.24	93.55	1409.76	94.13
1416.32	93.8	1442.57	94.62	1472.09	93.88	1481.94	94.4	1514.74	94.64
1537.71	94.39	1550.83	95.21	1563.95	94.3	1583.64	94.97	1593.48	94.5
1629.56	94.86	1642.69	95.56	1668.93	95.03	1708.3	92.76	1724.7	93.33
1741.11	92.29	1773.91	92.91	1813.28	91.18	1829.68	92.33	1849.37	91.43
1865.77	91.85	1878.89	91.33	1901.86	91.47	1934.66	91.01	1941.22	90.59
1977.31	90.42	2000.28	91.39	2010.12	90.87	2036.36	92.08	2059.33	91.83
2082.29	92.53	2092.13	92.08	2141.34	92.1	2164.31	92.43	2180.71	91.1
2206.96	90.15	3686.54	90.15	3709.5	90.77	3725.9	93.44	3739.03	93.4
3752.15	94.76	3778.39	96.61	3788.24	95.65	3794.8	96.28	3814.48	95.34
3824.32	95.86	3850.57	93.59	3870.25	93.2	3880.1	93.54	3926.02	93.26
3965.39	93.6	4004.76	92.67	4044.13	92.78	4073.66	92.49	4103.18	93.32
4122.87	93.02	4152.39	93.43	4165.52	93.95	4198.32	94.46	4231.13	95.4
4257.38	94.74	4273.78	95.21	4286.9	96.25	4300.03	94.89	4309.87	95.13
4319.71	93.82	4349.24	94.01	4365.64	93.55	4375.48	93.96	4385.33	93.22
4418.13	92.23	4467.35	92.16	4483.75	91.83	4536.24	92.39	4542.8	92.02
4578.89	92.53	4595.3	92.28	4631.38	92.79	4660.91	92.44	4677.31	92.85
4693.72	92.44	4706.84	92.93	4779.02	92.79	4792.14	93.2	4808.54	92.82
4834.79	93.59	4854.48	93.43	4893.84	93.74	4933.21	93.71	5028.36	92.9
5077.57	93.86	5090.69	93.42	5110.38	93.71	5189.11	92.63	5215.36	93.12
5238.32	92.28	5254.73	92.38	5277.69	91.88	5294.1	92.36	5313.78	91.96
5333.47	92.32	5349.87	92.08	5379.4	92.59	5422.05	92.48	5454.85	92.13
5530.31	93.09	5576.24	92.32	5592.65	92.71	5618.89	92.26	5628.74	92.81
5668.1	92.49	5720.6	92.68	5786.21	93.96	5815.74	93.56	5828.86	94.06
5861.67	94.31	5894.48	95.72	5910.88	93.21	5924	95.21	5950.25	95.3
5976.5	94.89	5996.18	93.61	6009.3	94	6032.27	93.22	6055.23	91.81
6065.08	90.46	6078.2	87.61	6094.6	89.79	6104.45	88.41	6120.85	87.83
6156.94	87.42	6179.9	88.43	6212.71	88.38	6245.52	89.4	6261.92	89.48
6301.29	90.34	6330.82	89.81	6360.35	89.95	6399.71	89.47	6406.28	89.76
6458.77	88.98	6507.98	89.52	6553.91	89.43	6586.72	90.19	6629.37	90.68
6672.02	90.86	6698.26	89.13	6737.63	87.29	6767.16	87.21	6793.41	87.78
6859.02	89.63	6881.99	89.75	6914.79	90.36	6964.01	90.77	7026.34	90.68
7049.31	90.89	7062.43	90.53	7078.83	90.84	7101.8	90.38	7137.89	90.84
7144.45	90.56	7190.38	90.15	7236.31	89.28	7259.27	89.24	7275.68	88.79
7292.08	88.98	7328.17	88.26	7357.7	88.58	7367.54	88.36	7443	88.21
7485.65	88.45	7511.89	88.94	7547.98	89.19	7564.38	89.78	7574.23	89.5
7600.47	90.26	7620.16	89.94	7652.97	90.64	7698.9	90.55	7725.14	91.49
7734.98	92.8	7744.83	92.84	7764.51	94.16	7780.92	91.62	7797.32	91.97
7836.69	91.71	7843.25	92.28	7859.65	95.42	7879.34	92.49	7895.74	92.97
7908.86	94.62	7921.99	93.55	7958.08	92.17	7977.76	93.18	8000.73	92.42
8010.57	92.94	8043.38	92.29	8063.06	93.66	8076.18	93.75	8095.87	92.92
8108.99	93.45	8161.48	94.19	8200.85	93.52	8233.66	93.9	8246.78	94.52
8259.9	94.18	8305.83	94.75	8315.67	93.83	8332.08	89.69	8338.64	88.87
8358.32	87.97	8384.56	88.28	8394.41	89.05	8410.81	88.56	8433.77	88.73
8460.02	89.38	8489.54	90.67	8515.78	90.67	8528.9	89.95	8571.55	89.25
8584.67	89.86	8601.07	88.99	8660.11	90.14	8689.64	91.6	8709.32	91.63
8722.44	89.5	8735.56	89.15	8758.52	90.08	8771.64	89.14	8811.01	88.86
8827.41	90.06	8866.77	89.93	8876.61	89.47	8945.5	91.43	8968.46	90.94
8988.14	91.52	8997.98	90.88	9020.94	91.35	9053.75	90.79	9070.15	91.11
9102.95	90.63	9132.47	87.32	9158.71	86.48	9191.52	84.14	9221.04	82.74
9263.68	82.63	9299.77	83.23	9312.89	84.55	9326.01	83.72	9362.09	83.68
9378.49	84.37	9427.7	84.42	9457.22	84.82	9506.42	85.1	9512.98	85.43
9542.51	85.07	9581.87	85.86	9683.56	85.86	9713.08	86.61	9752.44	87.17
9850.85	87.83	9873.81	88.21	9883.66	87.66	9919.74	87.37	9955.82	88.83
9975.5	88.19	9995.18	88.7310057.51		87.710073.91		87.7910106.71		89.15
10116.54	89.1810136.21		88.1310146.04		89.0810172.27		88.6910198.49		86.94
10208.32	85.6210221.43		85.4410234.55		83.5910264.05		83.2810277.16		83.88
10286.99	85.5410303.38		86.9110309.94		86.0310323.05		82.8310339.44		84.79
10345.99	84.7510359.11		81.2310378.77		79.0210388.61		78.9410401.72		80.65
10418.11	78.110431.22		77.5910450.89		73.8310460.72		73.2510480.39		74.96
10490.22	76.6210506.61		72.2810526.28		73.7710532.84		72.210539.39		67.35
10542.67	66.710555.62		61.4510570.75		53.9910584.69		53.63 10599.7		49.57
10609.93	50.8910638.43		51.5910660.15		52.5910670.38		52.6110673.79		66.7
10683.62	70.2410700.01		74.05 10716.4		75.410732.79		80.110749.18		88.54
10759.01	90.6110785.24		90.9710804.91		90.5310847.52		90.5110899.97		89.96
10932.75	9010991.75		90.411021.25		91.4911037.64		91.57 11073.7		89.67
11093.37	89.8111116.31		89.3511155.65		89.6611204.82		89.6111231.04		90.14
11240.88	89.9611286.77		90.4 11296.6		90.1511332.66		90.6711417.88		90.35
11444.11	90.0711493.27		90.3711532.61		90.13 11591.6		90.3111653.87		90.02
11683.37	90.5411706.31		90.1311742.36		90.5611752.19		90.3411807.91		91.8
11840.68	92.0311860.35		91.7911873.46		92.1911899.67		91.3611912.78		91.66
11922.62	90.6311942.28		90.6311955.39		90.0112020.94		89.9212043.88		89.31
12050.43	89.7812115.98		89.7812145.47		89.9912197.91		89.7112253.63		89.88
12355.22	89.7212374.89		89.912410.94		89.72 12460.1		89.9412502.71		89.82
12581.36	89.8812666.57		89.7912709.18		9012791.11		89.8912859.94		90.08
12915.65	90.1413004.14		90.213040.19		90.113102.46		90.413109.01		90.25
13194.22	90.4613289.27		90.4613344.98		90.6513397.42		90.6213426.92		90.8
13479.35	90.6113535.07		90.8613548.18		90.6813590.78		90.9 13617		90.81
13721.88	90.8513980.79		91.29 14066		91.2214079.11		91.414174.15		91.45
14203.65	92.114206.92		91.214246.25		93.2814256.08		94.8614265.92		98.8
14275.75	99.3814288.86		98.8514308.52		99.3414315.08		98.7214321.63		94.98
14328.19	93.2414436.34		93.2414439.62		93.5314449.45		98.3814472.39		98.13

```
Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .07  140.15     .1210542.67    .02510673.79     .0710899.97    .066
14275.75    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10146.0410749.18          1673.73 2335.33 3367.52             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       010116.54   89.18       T
Left Levee      Station=  140.15      Elevation=  104.57
Right Levee     Station=14275.75      Elevation=   99.38
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1642.69 3778.39    93.4

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            101.09    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.120      0.096      0.066
  W.S. Elev (ft)            101.07    Reach Len. (ft)          1673.73    2335.33    3367.52
  Crit W.S. (ft)             83.88    Flow Area (sq ft)       92059.30   15995.22   38474.96
  E.G. Slope (ft/ft)     0.000124    Area (sq ft)            96006.60   15995.22   38474.96
  Q Total (cfs)            125000.00   Flow (cfs)             55594.06   23774.94   45631.00
  Top Width (ft)           14332.24    Top Width (ft)         10005.89     603.14    3723.21
  Vel Total (ft/s)             0.85    Avg. Vel. (ft/s)           0.60       1.49       1.19
  Max Chl Dpth (ft)           51.50    Hydr. Depth (ft)           9.20      26.52      10.33
  Conv. Total (cfs)        11244590.0    Conv. (cfs)            5001061.0   2138717.0   4104816.0
  Length Wtd. (ft)          2565.01    Wetted Per. (ft)       10018.38     626.48    3730.14
  Min Ch El (ft)              49.57    Shear (lb/sq ft)           0.07       0.20       0.08
  Alpha                        1.51    Stream Power (lb/ft s)     0.04       0.29       0.09
  Frctn Loss (ft)              0.28    Cum Volume (acre-ft)    70302.02   33542.14   94638.06
  C & E Loss (ft)              0.00    Cum SA (acres)          11470.16    1567.30   12310.32


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 143.25

INPUT
Description: RGV-01. Bathymetric elevations translated from IBWC 2008
             Cross-sections, Section along left levee updated with 2017 survey
Station Elevation Data    num=     454
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.17   13.92   91.88   27.85   97.41    37.8   97.76   44.76   95.62
   58.69   95.62   62.67   96.78   65.04  103.41   65.18  103.41    67.9  103.44
   69.38  103.93   69.45  103.95   69.51  103.97   70.74  104.38   97.14  104.65
   98.74  104.66  100.74  104.66  106.09  100.84  111.99  100.64  112.74  100.61
  113.49  100.59  124.74   100.2  127.19   99.58  161.92    90.9  163.08   90.88
  175.74   90.63  176.17   90.64  177.17   90.63  189.46    92.4  204.46   90.25
  206.42   90.72  278.42   89.24  306.42   86.02  343.41   84.72  384.41   83.74
  464.41   83.32   503.4   84.36   544.4   84.45   564.4   84.84   641.4    85.1
  683.39   85.82  805.39   87.51  865.38   88.16  905.38   88.31  927.38   88.75
 1024.38   88.86 1064.37   89.58 1138.37    89.9 1140.77   91.43 1157.17   92.35
 1206.38   92.02 1222.78   92.86 1242.47   93.07 1255.59   92.55 1265.43   93.13
 1304.79   93.28 1327.76   93.68 1344.16   93.42 1363.84   90.86 1376.96   92.69
 1396.65   93.32 1406.49   93.04 1419.61   93.91 1449.13   93.36 1475.38   93.36
  1488.5   93.77  1521.3   92.72 1580.35   92.68 1613.15   92.27 1626.28   92.86
 1652.52   92.05 1665.64   92.16 1701.73   91.62 1708.29   91.85 1767.34   91.06
  1806.7   91.99 1819.82   91.42 1859.19   91.57 1882.15   92.69 1928.08   92.63
 1964.16   93.08 1980.56   92.34 1996.97   88.76 2006.81   89.64 2029.77    89.8
 2052.73   88.46 2095.38   89.72 2180.67      90 2210.19   90.64 2216.75   91.14
 2239.72   90.79  2259.4   91.15 2272.52   91.91 2282.36   91.79 2315.17    92.5
 2347.97   92.77 2390.62   92.56 2416.86   93.11  2443.1   93.02 2498.87   93.76
 2521.83   93.47  2528.4   93.91  2561.2   93.53 2584.16   94.21 2610.41   94.09
 2626.81    93.1 2656.33   92.87 2676.02    92.1 2702.26   92.12 2715.38   92.53
  2728.5   93.66 2794.11   93.75 2810.51   94.23 2840.04   94.42 2869.56   93.44
  2895.8   93.29 2928.61   93.86 2964.69   93.32 3007.34   91.95 3027.02   92.39
 3040.14   91.98 3066.39   91.97 3076.23   92.43 3099.19   91.96 3125.43    92.5
 3135.28   92.24 3177.92    93.4 3223.85   93.07 3233.69   93.76 3250.09   93.98
 3269.77   95.14 3279.61   94.19 3302.58    93.7 3318.98   93.81 3358.35   95.09
 3371.47   94.28 3400.99   94.68 3410.83   95.76 3420.67   95.15 3460.04   95.19
 3473.16    95.7 3479.72    95.2 3489.56   95.92 3515.81   95.65 3535.49    96.5
 3578.13   96.43  3633.9   96.12 3647.02   97.66 3660.15   97.53 3669.99    96.4
 3683.11   97.16 3712.63    96.1 3732.31   95.93 3742.16    96.4 3778.24   93.98
 3794.64   92.57 3863.53   90.65 3893.06    90.9 3912.74   91.65  3935.7    91.4
 3981.63    92.1 4027.55   91.74 4060.36   92.21 4073.48   91.73 4096.44   92.59
 4119.41   92.24 4135.81   92.75 4158.77    92.7 4168.62    93.4 4185.02   92.57
 4207.98   93.24 4217.82   93.04 4309.68   94.16 4316.24   93.55 4349.05   92.91
 4365.45   93.49 4381.85   93.11 4411.38   93.85  4424.5   93.52 4467.15   94.27
 4490.11   94.06 4562.29   94.37 4581.97   94.71 4598.37   93.89 4624.62   94.57
 4637.74   94.08 4647.58   94.58 4693.51   94.08 4719.75   95.24 4732.88   94.71
 4755.84   94.48 4775.52   95.04 4795.21   94.65 4801.77    95.2  4864.1   95.37
 4890.35   94.83 4906.75   95.49 4929.71   94.79 4952.68   95.28 4978.92   95.06
 4995.32    94.3 5018.29   94.46 5034.69   93.63 5044.53   94.17 5060.94   93.91
 5077.34   92.19 5093.74   91.74 5106.86   90.82 5142.95   90.36 5159.35   90.54
 5182.32   91.57 5198.72   90.79 5215.12   91.04 5244.65   90.67 5257.77   90.18
 5290.58   89.91 5333.23   90.03 5366.03   90.73 5385.71    91.7 5425.08   91.52
 5441.48   92.14 5461.17    91.9 5477.57   92.46 5503.82   92.71 5536.62   92.19
 5546.46   92.91 5559.59   92.68 5585.83   93.45 5595.67   94.58 5602.23    94.1
 5621.92   88.34 5635.04   87.65 5648.16   88.48 5674.41   88.13 5690.81   89.03
 5700.65   88.39 5746.58   87.83 5756.42   88.49 5772.82   87.32 5808.91   88.18
 5831.88   88.22 5851.56   87.26 5887.65   90.19 5904.05   87.18 5930.29    87.7
 5943.42   88.49 5956.54   89.98  5979.5   91.28 6009.03   91.19 6018.87   90.66
 6028.71   91.19 6068.08   89.36 6091.04   87.37 6104.16   88.43 6114.01   88.18
 6150.09   88.24 6163.22   89.23 6179.62   88.43 6192.74   89.25  6215.7   88.68
 6228.83    89.2 6241.95   88.44 6274.76   88.43  6284.6   88.89 6291.16   87.87
 6314.12   89.04 6327.24   87.89 6353.49   87.56 6373.17   87.88 6383.01   87.53
 6409.26   87.52  6419.1    88.2 6455.19   88.16 6468.31   88.56 6478.15   88.13
 6514.24   88.06 6547.04   88.86 6599.53   88.72 6609.38   87.94 6629.06    88.2
  6638.9   87.67 6665.15   87.74 6674.99   88.52 6694.67   87.53 6737.32   88.06
 6763.56   87.34 6806.21   87.15 6825.89   88.03 6878.38   88.46 6911.19    87.9
 6927.59   87.98 6950.56   87.46 7026.01   87.56 7081.78   88.61 7104.75   88.87
  7163.8   88.65    7213   88.19 7288.46   88.62 7304.86   89.11 7317.98   88.88
 7367.19   88.91 7409.84    89.6 7442.65   92.62 7455.77   93.24 7495.14   92.79
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 7531.22   93.67 7570.59   93.06 7580.43   94.04 7590.27   93.37  7603.4   94.39
 7613.24   93.17 7629.64   92.09 7649.32   92.14 7665.73   90.21 7695.25   90.47
 7714.94   92.36  7754.3   92.66 7773.99   92.55 7793.67   91.88  7829.7   91.75
 7859.17   93.27 7872.27   92.91 7918.11   93.59 7937.76   92.89 7950.86   93.32
 7973.78   93.24 7993.43   92.49 8003.26   92.94 8019.63   92.67    8036   93.03
 8052.38   92.21 8072.03   92.22  8101.5    92.7  8114.6   93.42 8140.79   93.62
 8166.99   93.35 8186.64   90.96 8196.46   92.94 8216.11   93.49 8255.41   93.35
 8281.61    92.3 8311.08   92.81  8320.9   93.87 8340.55    94.8 8363.47   94.38
 8373.29   95.03 8389.67   94.43 8419.14   94.25 8438.79   94.87 8458.44   94.83
 8468.26   91.06 8478.08   84.38 8487.91   76.41 8494.46   72.47  8514.1   67.35
 8520.65    62.3 8533.65    62.7 8547.65    59.3 8558.65    60.8 8579.65      61
 8612.65    62.1 8623.65      62 8645.09    66.7 8651.62   68.79 8661.43   73.37
 8677.77    75.8 8690.84   81.48 8697.37   83.51 8707.17   85.18 8723.51   85.95
 8756.19   80.78 8772.53   81.37  8785.6   84.02 8834.61   85.09 8850.95   86.11
 8857.48   87.08 8890.16   87.69  8916.3   87.57 8942.44   88.02 9024.13   88.52
 9063.34   88.98 9141.76   89.24 9203.85   88.82 9262.66   89.73 9308.41    89.9
 9370.49   89.59 9412.97   89.72 9432.58   89.52 9491.51   89.38 9527.58   89.56
 9586.59   89.24 9606.27   89.34 9681.67   89.03  9724.3   89.11 9734.13   90.58
 9747.25   90.75 9773.48   87.81 9802.98   88.57 9868.56   88.15 9924.29   88.18
 9943.96   88.01 9993.14   88.1110061.99   88.0210075.11   88.4210114.45   88.41
 10229.2    89.310265.27    89.110399.69   89.2410425.92    89.110471.82   89.35
10504.61   89.0410543.95   89.0810599.69   88.8710625.92   89.13 10675.1   88.79
10757.06   88.5210786.57   88.2210809.52   88.6710835.75   88.3910865.26   88.59
10875.09   89.0510901.32   88.1610947.22    87.711055.42   87.1611071.81   87.45
11173.45   87.3311281.64   86.9411324.26   86.5511363.61   86.6911432.46   86.27
11448.85   86.4811599.67   86.2411622.62   86.4311730.81   86.3511776.71   86.43
11852.12   86.31 11901.3   86.5911970.15   86.7111983.27   86.8812006.22   86.22
13186.52   86.2213206.19   86.7213232.42   93.7213252.09   92.9113278.32   93.28
13307.83   92.78 13327.5   93.0513370.12    92.613396.35   93.09 13419.3   92.36
13461.92   92.2913494.71   92.9513514.38   94.0313537.33   96.66

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .07  100.74     .12 8438.79     .07  8514.1    .025 8661.43     .07
 8890.16    .06613461.92    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       8468.26 8890.16          1772.15 3068.24 1935.18             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 8468.26   91.06       T
 8890.1613537.33   87.69       T
Left Levee      Station=  100.74      Elevation=  104.66
Right Levee     Station=13537.33      Elevation=   96.66
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 1327.76 2584.16   93.58

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            100.81    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.120      0.057      0.066
  W.S. Elev (ft)            100.78    Reach Len. (ft)         1772.15    3068.24    1935.18
  Crit W.S. (ft)             91.09    Flow Area (sq ft)       68024.20   10638.40   56671.27
  E.G. Slope (ft/ft)      0.000100    Area (sq ft)            77029.37   10638.40   59450.02
  Q Total (cfs)           125000.00     Flow (cfs)             34049.93   23492.57   67457.51
  Top Width (ft)          13429.40    Top Width (ft)          8360.33     421.90    4647.17
  Vel Total (ft/s)            0.92    Avg. Vel. (ft/s)           0.50       2.21       1.19
  Max Chl Dpth (ft)          41.48    Hydr. Depth (ft)           8.14      25.22      12.19
  Conv. Total (cfs)       12523810.0     Conv. (cfs)            3411478.0   2353731.0   6758598.0
  Length Wtd. (ft)         2158.19    Wetted Per. (ft)        8368.63     435.27    4652.83
  Min Ch El (ft)             59.30    Shear (lb/sq ft)           0.05       0.15       0.08
  Alpha                       2.05    Stream Power (lb/ft s)     0.03       0.34       0.09
  Frctn Loss (ft)             0.28    Cum Volume (acre-ft)    66977.69   32828.21   90852.89
  C & E Loss (ft)             0.00    Cum SA (acres)          11117.31    1539.82   11986.77


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 143

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections, Section along left levee updated with
             2017 survey
Station Elevation Data    num=     481
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    90.8   33.35   91.19   66.71   93.66   88.65  100.77   92.65  102.27
   94.64  103.01   95.62  103.34   96.14  103.53   96.94  103.79    97.4  103.96
  117.05  104.16  125.72  104.25  127.75  104.25  137.26   92.64  137.78   92.63
  137.86   92.63  150.74   89.46  154.05   88.64  156.89   89.35   158.1   89.65
  165.11   89.51  170.24   89.41  175.37   89.32  182.38   89.18  185.95    88.3
  187.28   87.97  200.79   87.73  201.32   87.72  203.26   87.24  203.62   87.15
  250.74   86.91  312.24   85.67  373.74   85.31  435.23   86.43  496.73   87.21
  558.22    87.3  619.72   87.17  681.21   87.15  742.71   87.72  747.71    88.9
  770.67   89.29  839.55   89.02  875.63   89.69  888.76   89.11  954.36   89.16
 1006.84   88.69 1042.92   88.91 1065.88   89.52 1082.29   88.94 1098.69   89.89
 1151.17   90.06 1167.57   90.84 1210.21   91.81 1223.33   93.39 1233.18   92.24
  1262.7    92.2 1321.74   93.24 1354.54   93.19 1387.35   94.22 1416.87   94.02
 1456.23   93.13 1521.83   94.34 1528.39    93.9 1571.04   93.92 1580.88    94.5
 1616.96   93.58    1676   93.37 1702.25   93.93 1715.37   93.52 1784.25   93.53
 1826.89   94.18  1859.7   93.25 1885.94    93.8  1908.9   93.47  1958.1   94.24
  1974.5   93.61 2010.59   93.97 2020.43   93.12 2043.39   93.16 2082.75   94.01
 2131.95   93.42 2194.28   93.73  2207.4   94.55 2217.24   93.71 2250.04   94.75
 2315.64    93.4 2348.45   94.06 2387.81    93.4 2407.49   93.93 2430.45   93.38
 2476.37   93.94 2486.21   93.28 2541.98   93.49  2555.1   94.04 2581.34   93.45
  2620.7   93.92 2650.22   93.39 2692.86   94.14 2705.99   93.54 2742.07   94.45
 2778.15   93.94 2784.71   94.85 2801.11   93.87 2817.51   94.58 2830.63   94.03
 2896.24   94.18 2974.96   94.68 3007.76   94.07 3043.85   94.16 3060.25   93.05
 3083.21   90.27 3102.89    90.1 3148.81   88.47 3181.61   89.02 3191.45   88.42
 3253.78   88.94 3280.02   89.78  3332.5   89.95 3352.18   90.97 3388.27   91.43
 3414.51   90.93 3434.19   91.63 3450.59   91.04 3457.15   91.75 3493.23   92.43
 3509.63    91.9 3535.87   93.31 3552.27   92.07 3575.24   92.61 3601.48   91.91
 3650.68   92.06 3670.36   92.84  3680.2   92.41 3722.84   93.61 3735.97   92.15
 3811.41   93.18 3834.37   93.01 3854.05   93.62 3867.17   92.98 3893.41   92.88
 3922.94   94.55 3942.62   92.87 3965.58   94.22 3985.26   93.57  3995.1   94.97
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 4008.22   94.57  4027.9   95.48  4044.3   95.16 4054.14    96.4 4096.79   95.04
 4129.59    96.1 4152.55   95.17 4168.95   96.46 4188.63   94.99 4214.87    95.5
 4244.39   94.69 4257.52   95.01 4300.16   94.34 4319.84   94.83 4352.64   97.11
 4369.04   95.42    4392   95.69 4434.65   94.94 4454.33   95.81 4460.89   95.33
 4526.49   95.92 4556.01   95.06 4565.85   95.73 4598.66   94.91 4611.78   95.45
  4641.3    95.4  4674.1   92.11  4706.9   90.48  4756.1   92.78 4805.31   91.56
 4838.11   91.66 4854.51   91.22 4913.55   93.59 4923.39   92.95 4933.23   93.84
 4949.64   92.41 4975.88   92.06 4985.72   92.58  5005.4   91.53 5011.96   89.63
 5044.76   88.54 5067.72   89.97  5087.4   89.87 5110.37   90.67 5156.29   88.86
 5195.65   89.73 5254.69   89.33 5323.58   89.57 5333.42   90.08  5353.1   89.25
 5382.62    90.3 5399.02    89.9  5435.1    90.7 5458.06   89.92 5467.91   90.93
 5520.39    90.7 5530.23   89.62 5559.75   91.57 5589.27   92.17 5612.23   91.54
 5638.48   87.53 5687.68    88.1 5697.52   87.79 5720.48   90.86 5799.21   91.83
 5832.01   91.46 5851.69   90.15 5871.37   90.22 5910.73   87.21 5933.69   88.79
 5946.81    88.2 5979.62   89.81 5992.74    89.8 6009.14   87.87 6035.38   89.08
 6061.62   87.31 6084.58   88.05  6097.7   89.17 6123.94   87.97 6137.06   88.65
 6160.03   87.41 6179.71   88.53 6196.11    90.3 6209.23   89.81 6219.07   87.75
 6255.15   88.88 6271.55   88.17 6291.23    90.7 6324.04   89.43    6347   90.15
  6379.8   89.05 6409.32   90.93 6419.16   93.15  6445.4   94.62 6458.52   94.39
 6530.69    94.8 6573.33   94.01 6599.57   94.62 6615.97   93.89 6638.93   94.09
  6678.3    92.3 6701.26   93.25 6737.34   93.17  6776.7   94.42 6819.34   93.28
 6842.31    91.4 6861.99   91.55 6891.51   94.94 6901.35   92.93 6934.15   93.48
 6960.39   92.14 6980.07   93.35 7003.03   92.91 7045.68   93.12 7078.48   93.81
 7127.68   91.86  7157.2   92.37 7186.73   91.69 7252.33    91.2 7304.81   89.84
 7334.33   90.48 7367.14   90.37 7386.82   88.29 7396.66   89.04 7429.46   88.97
 7452.42   93.03 7498.34   94.48 7518.02   96.08 7534.43   94.24 7583.63   93.46
 7606.59   94.06 7655.79   93.68 7682.03   93.87 7698.44   95.62 7708.28    94.3
 7731.24   93.76 7757.48   95.52 7780.44   93.29 7800.12   93.85 7839.48   92.47
 7882.13   92.73 7911.65   92.15 7931.33   92.57 7944.45   91.97 7970.69   92.43
 8010.05   91.98 8023.17   92.37 8039.58   91.57  8069.1   91.86 8078.94   91.04
 8121.58   91.07 8164.22   91.52 8229.83   90.84 8252.79   91.52 8262.63   90.94
 8295.43   90.64 8324.96   91.78 8338.08    91.2 8374.16   91.46 8390.56    90.4
  8433.2   89.79 8466.01   90.67 8482.41   90.29 8518.49   90.61 8564.42   91.52
 8577.54   92.29 8597.22   91.82 8603.78   92.43 8643.14   91.92 8656.26   92.32
 8679.22   91.78 8698.91   92.07 8708.75   90.95 8738.27   92.51 8764.51   92.53
 8800.59   91.86 8823.56   92.63 8839.96   91.86 8853.08   92.27 8905.56   91.38
 8918.68   92.24 8984.29   91.36 9020.37    91.4 9063.02   91.91  9099.1   91.87
 9167.99   92.31 9233.59   91.61 9286.08   92.46  9299.2   91.57 9312.32   92.14
  9348.4   91.82 9368.08   90.31 9433.69   92.09 9463.21   91.81 9476.33   92.71
 9541.94   91.87 9551.78   92.36 9620.66   92.22 9646.91   92.86 9666.59   92.39
 9699.39   93.35 9748.59   91.27 9768.28   92.15 9840.44   92.57 9860.12   92.42
 9869.96   93.12 9889.65    92.6 9951.97   92.46 9968.37   93.610001.17   93.36
10040.54   92.5710060.22   90.46 10079.9   92.6810099.58   92.32 10112.7   93.97
10129.11   91.3910178.31   93.0910224.23   93.0710257.04   92.2310270.16   93.13
10316.08   93.3510325.92   92.8110339.04   93.6210348.88   92.0310371.85    90.8
10391.53   90.7510411.21   91.8310421.05   91.6110444.01   92.7310460.41    91.6
10480.09   93.05 10512.9   91.1810565.38   91.1210588.34   91.8810637.55   91.88
10663.79   92.3210676.91    93.210719.55   92.0410739.24   93.0910768.76   92.03
10785.16   93.8810798.28    92.910831.08   94.7410850.77   93.1310870.45   94.23
10886.85    93.310896.69   93.9610922.93   92.7710955.73    93.910985.26   93.95
11008.22   92.7511024.62   93.5711050.86   93.22 11077.1   94.2411086.95    93.6
11132.87   93.3311152.55   93.7611221.44   93.5511237.84   90.2511267.36   90.09
11283.76   87.7511365.77   87.9611405.13   86.6511421.53   86.6911451.06   88.15
11467.46    89.7 11510.1   89.32 11526.5   89.7411546.18   89.2311624.91   89.24
11634.75   87.2511660.99    84.811683.96   85.1911703.64   86.2511729.88   81.85
11762.68   77.4711772.52    77.8 11792.2   75.9411811.89   78.2611834.85   71.81
11847.97   66.4711891.97    58.411927.97    56.911937.97    56.911947.97    56.2
11956.97    56.711976.97     5612001.97    56.512016.97    55.812028.97    55.7
12034.94   66.47 12041.5     6712051.35   73.0912074.31   75.3212087.43   79.47
12100.55   81.0312116.95   81.6912126.79    83.512143.19   89.0412162.88   89.42
   12176    88.912218.64   89.7912251.44   89.9312280.96   90.5712300.65   90.27
12340.01   90.8312369.53   90.1212405.62   90.25 12425.3   89.7412477.78   89.65
12500.74   90.2112517.14   91.7112540.11   90.7912589.31   93.7912648.36   92.62
 12674.6   93.1912727.08   91.6212766.45   88.8812818.93   86.22 13655.4   86.22
13678.36   87.8913694.76   91.3413707.88   92.5613730.85   91.7913760.37   92.66
13770.21   94.1813796.45   94.2213809.57   93.5213835.81   93.9913852.22   96.66
13868.62   98.0813878.46   97.2913894.86    98.213914.54   97.7613924.38   93.24
14026.07   93.24

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .07  127.75     .1211729.88     .0711847.97    .02512034.94     .07
12251.44    .06612540.11    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      11624.9112143.19          889.07  960.39  837.85            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       011624.91   89.24       T
Left Levee      Station=  127.75      Elevation=  104.25
Right Levee     Station=13868.62      Elevation=   98.08
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       011152.55    91.5

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            100.52    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.120      0.068     0.081
  W.S. Elev (ft)            100.48    Reach Len. (ft)           889.07     960.39     837.85
  Crit W.S. (ft)             82.44    Flow Area (sq ft)       91149.95   14732.40   21169.05
  E.G. Slope (ft/ft)      0.000178    Area (sq ft)            91452.80   14732.40   21169.05
  Q Total (cfs)           125000.00     Flow (cfs)             59842.45   39221.41   25936.13
  Top Width (ft)          13895.23    Top Width (ft)          11494.07     518.28    1882.88
  Vel Total (ft/s)            0.98    Avg. Vel. (ft/s)            0.66       2.66       1.23
  Max Chl Dpth (ft)          44.78    Hydr. Depth (ft)            7.93      28.43      11.24
  Conv. Total (cfs)       9369694.0     Conv. (cfs)            4485644.0  2939941.0  1944109.0
  Length Wtd. (ft)          915.54    Wetted Per. (ft)        11504.70     532.31    1892.53
  Min Ch El (ft)             55.70    Shear (lb/sq ft)            0.09       0.31       0.12
  Alpha                       2.83    Stream Power (lb/ft s)      0.06       0.82       0.15
  Frctn Loss (ft)             0.12    Cum Volume (acre-ft)    63550.51   31934.68   89062.12
  C & E Loss (ft)             0.05    Cum SA (acres)          10713.44    1506.71   11841.72


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
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REACH: Lower Reach RS: 142.5

INPUT
Description: RGV-01. Bathymetric elevations translated from IBWC 2008
Cross-sections, Section along left levee updated with 2017 survey
Station Elevation Data num= 485

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.15	6	91.95	16	96.69	28	97.16	33	95.43
40.67	99.97	45.83	102.11	47.23	102.69	48.55	102.7	48.81	102.71
50.13	103.14	50.37	103.22	51.5	103.59	51.67	103.65	60.86	103.74
74.5	103.88	79.95	103.93	81.97	103.93	81.98	90.53	88.17	90.41
92.08	90.33	99.42	88.51	108.24	86.32	111.11	87.03	112.28	87.32
122.92	87.11	124.4	87.08	131.54	86.93	135.79	86.85	136.52	86.83
142.17	85.43	143.2	85.18	152.52	84.98	156.46	84.9	157.33	84.68
157.74	84.58	169.99	86.54	184.99	84.39	196.97	84.9	228.97	83.57
265.97	83.31	306.96	84.15	344.96	85.49	425.95	87.67	506.94	87.67
551.93	88.83	585.93	91.73	632.92	92.21	670.92	89.71	715.91	88.82
778.9	88.46	866.89	88.86	905.89	88.39	937.89	88.68	1026.87	88.8
1063.87	89.37	1105.86	89.39	1146.86	89.89	1174.32	91.2	1207.12	90.49
1216.96	91.73	1262.88	91.52	1279.28	91.98	1338.32	91.83	1426.89	92.25
1440.01	91.89	1462.97	93.08	1482.65	92.55	1502.33	94.07	1544.97	93.17
1571.21	92.13	1581.05	91.04	1600.74	92.37	1626.98	89.16	1676.18	87.13
1699.14	85.77	1718.82	85.61	1754.9	86.15	1777.86	86.93	1843.47	87.73
1853.31	88.21	1869.71	87.57	1882.83	87.95	1945.15	87.52	1974.67	88.23
1997.64	87.34	2027.16	87.1	2056.68	87.52	2109.16	87.44	2128.84	86.97
2197.73	87	2305.98	86.29	2328.94	86.84	2355.18	86.16	2394.55	86.38
2407.67	85.95	2447.03	85.88	2469.99	87.04	2512.64	87.64	2538.88	86.35
2574.96	86.77	2607.77	85.84	2647.13	87.36	2670.09	86.14	2699.61	85.89
2778.34	87.2	2830.82	86.75	2883.31	89.06	2919.39	90.09	2985	89.8
2994.84	89.19	3063.72	89.06	3093.25	88.3	3132.61	87.8	3142.45	88.15
3178.53	87.15	3214.62	87.66	3240.86	87.14	3250.7	87.82	3290.06	87.76
3322.87	88.88	3362.23	89	3388.47	88.71	3404.87	89.33	3496.72	88.07
3506.56	88.4	3516.4	87.27	3588.57	88.02	3608.25	89.22	3637.77	89.31
3680.42	91.71	3690.26	92.9	3703.38	91.52	3729.62	93.18	3742.74	92.4
3762.42	93.14	3778.82	94.55	3788.67	92.65	3801.79	92.06	3824.75	93.55
3850.99	91.08	3877.23	91.2	3890.35	93.02	3900.19	92.23	3929.72	92.16
3942.84	93.42	3969.08	93.83	3985.48	92.94	4011.72	93.47	4018.28	92.89
4031.41	94.22	4041.25	93.55	4074.05	94.01	4080.61	94.8	4093.73	93.57
4110.13	94.16	4146.22	93.31	4156.06	94.11	4208.54	93.52	4224.94	94.68
4241.34	93.3	4254.46	94.43	4267.59	94.21	4277.43	95.16	4352.87	93.74
4369.27	94.79	4388.96	95.18	4434.88	94.49	4444.72	95.27	4467.68	94.56
4477.52	95.36	4516.89	95.15	4530.01	94.26	4549.69	94.93	4608.74	95.25
4628.42	94.51	4644.82	95.64	4677.62	95	4694.02	94.03	4726.83	94.85
4739.95	94.12	4766.19	94.11	4792.43	94.75	4798.99	94.35	4858.04	94.82
4867.88	95.82	4884.28	94.71	4913.8	94.88	4923.64	95.68	4940.04	94.98
4959.73	95.98	4992.53	94.43	5015.49	95.55	5031.89	95	5071.26	95.43
5094.22	94.87	5110.62	95.3	5136.86	94.68	5149.98	95.15	5182.79	94.76
5199.19	95.43	5238.55	94.81	5264.79	96.48	5300.88	94.78	5314	90.72
5336.96	88.58	5373.04	89.18	5396	90.59	5435.37	91.62	5471.45	90.79
5517.37	91.1	5533.78	90.81	5573.14	92.2	5579.7	93.01	5605.94	92.64
5622.34	88.49	5632.18	88.21	5658.43	91.45	5678.11	91.59	5694.51	90.39
5707.63	87.83	5750.27	88.01	5763.4	89.23	5792.92	87.49	5845.4	87.65
5861.8	88.12	5891.33	87.63	5901.17	88.67	5950.37	87.69	6002.86	87.58
6038.94	89.46	6065.18	87.47	6084.86	88.65	6091.42	90.13	6130.79	87.13
6153.75	88.44	6179.99	87.3	6202.95	88.07	6216.07	87.52	6239.04	88.44
6255.44	88.37	6304.64	91.11	6324.32	91.76	6360.41	91.4	6426.01	90.1
6485.06	90.02	6527.7	89.08	6567.06	89.49	6583.47	89.16	6593.31	89.87
6662.19	88.9	6704.84	89.08	6714.68	89.6	6786.84	87.45	6845.89	87.88
6859.01	89.55	6881.97	88.49	6891.81	89.52	6901.65	87.65	6921.33	87.27
7019.74	87.37	7026.3	87.9	7055.83	87.48	7068.95	88.29	7111.59	87.66
7206.72	87.86	7288.73	87.7	7314.97	87.43	7347.77	88.77	7364.17	87.62
7377.29	89.17	7400.26	95.49	7419.94	93.33	7436.34	93.76	7469.14	93.68
7498.67	92.75	7534.75	92.93	7547.87	92.13	7603.63	92.79	7623.32	92.27
7656.12	92.44	7672.52	91.85	7702.04	92.18	7751.25	91.73	7761.09	92.17
7800.45	92.16	7820.13	91.33	7836.53	91.98	7889.02	91.77	7915.26	92.1
8000.55	91.2	8033.35	91.76	8069.43	91.35	8112.08	91.47	8121.92	92.01
8167.84	91.35	8295.77	91.73	8328.58	91.51	8358.1	92.17	8384.34	91.91
8423.7	92.09	8446.67	91.57	8469.63	91.82	8492.59	91.18	8518.83	91.49
8587.72	92.91	8617.24	94.08	8650.04	94.13	8679.57	95.39	8715.65	95.33
8728.77	94.75	8745.17	95.44	8794.38	94.59	8820.62	94.53	8837.02	92.97
8863.26	89.24	8889.5	88.35	8955.11	88.37	8968.23	89.05	8991.19	88.65
9066.64	89.45	9125.68	90.73	9188.01	89.84	9207.69	90.37	9263.45	90.57
9365.14	89.77	9404.51	90.14	9463.55	91.86	9489.79	91.37	9516.04	89.89
9558.68	89.84	9581.64	89.44	9643.97	89.66	9666.93	89.51	9693.17	89.97
9706.29	89.45	9742.37	89.93	9801.42	89.7	9824.38	90.32	9860.46	90.33
9873.58	90.94	9893.27	90.66	9916.23	91.6	9932.63	91.42	9978.55	91.84
9994.96	92.69	10021.2	91.8	10090.08	92.18	10113.04	91.9	10155.69	92.14
10172.09	92.58	10195.05	92.15	10221.29	88.5	10240.98	88.14	10293.46	88.09
10329.54	88.94	10395.15	88.56	10437.79	89.23	10480.44	91.26	10503.4	91.36
10523.08	90.81	10575.56	91.17	10605.09	90.72	10628.05	91.1	10657.57	90.91
10683.81	91.86	10710.05	90.94	10755.98	91.26	10792.06	90.38	10860.95	90.32
10923.27	90.65	10956.08	91.99	10969.2	90.72	10998.72	90.85	11028.24	90.2
11041.36	90.87	11074.17	91.41	11116.81	92.9	11129.93	92.45	11179.13	92.72
11251.3	93.51	11284.1	92.91	11303.78	93.33	11326.75	95.18	11356.27	92.91
11369.39	90.2	11412.03	93.22	11421.87	90.74	11441.56	91.11	11448.12	90.07
11467.8	89.54	11517	90.83	11530.12	90.17	11546.52	91.11	11582.61	89.82
11605.57	90.23	11615.41	91.12	11641.65	90.37	11664.61	90.53	11694.14	88.73
11720.38	91.41	11749.9	90.44	11769.58	84.78	11799.11	83.08	11828.63	83.16
11858.15	86.98	11884.39	86.31	1897.51	84.73	11907.35	85.06	11923.76	87.28
11956.56	86.31	11999.2	86.46	12025.44	87.57	12051.69	86.03	12061.53	86.03
12091.05	81.46	12107.45	84.42	12130.41	81.56	12140.25	81.19	12153.38	82.19
12173.06	76.31	12186.18	74.34	12196.02	75.41	12202.58	73.2	12212.42	66.5
12218.7	66.04	12238.7	60.64	12318.7	56.94	12338.7	60.14	12340.35	66.24
12356.75	67.73	12373.15	71.21	12382.99	77.75	12389.55	85.66	12396.12	89.93
12419.08	90.67	12438.76	90.54	12501.08	91.67	12556.85	92.16	12566.69	91.43
12586.37	91.77	12619.17	91.51	12632.29	92.51	12638.86	91.71	12661.82	92.79
12674.94	91.51	2717.58	90.95	12747.1	91.23	12753.67	92.03	12766.79	91
12819.27	91.21	12835.67	92.51	2852.07	90.78	12884.88	90.33	12927.52	90.4
12950.48	90.08	13022.65	90.09	13166.98	90.91	13186.66	92.32	13196.5	91.35
13209.62	92.43	13271.95	92.67	13311.31	92.08	13327.71	92.37	13406.44	91.84
13475.33	92.54	13540.93	92.41	3580.29	92.11	3609.82	92.33	13642.62	91.62
13665.58	91.63	13691.82	92.43	13714.79	91.91	3727.91	92.34	13747.59	91.64
13770.55	92.34	13780.39	91.87	13813.19	92.06	13832.88	93.45	13842.72	96.85
13859.12	99.16	13882.08	98.11	13905.04	98.42	13918.16	93.51	13937.84	93.24

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.19	211720.38	.06	612202.58	.01	512373.15	.06	612501.08	.074

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
12025.4 4412501.08 741.16 2145.86 2675.39 .1 .3
Left Levee Station= 81.97 Elevation= 103.93

Right Levee Station=13859.12 Elevation= 99.16
Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
31.5511720.56 90.4612564.5113976.34 91.15

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	100.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.174	0.019	0.074
W.S. Elev (ft)	99.85	Reach Len. (ft)	741.16	2145.86	2675.39
Crit W.S. (ft)	88.24	Flow Area (sq ft)	101397.40	11019.88	11059.38
E.G. Slope (ft/ft)	0.000107	Area (sq ft)	101397.40	11019.88	11059.38
Q Total (cfs)	125000.00	Flow (cfs)	37494.50	78593.23	8912.28
Top Width (ft)	13855.87	Top Width (ft)	11943.47	475.64	1436.76
Vel Total (ft/s)	1.01	Avg. Vel. (ft/s)	0.37	7.13	0.81
Max Chl Dpth (ft)	42.91	Hydr. Depth (ft)	8.49	23.17	7.70
Conv. Total (cfs)	12092530.0	Conv. (cfs)	3627227.0	7603128.0	862175.9
Length Wtd. (ft)	1657.14	Wetted Per. (ft)	11960.85	493.17	1445.70
Min Ch El (ft)	56.94	Shear (lb/sq ft)	0.06	0.15	0.05
Alpha	31.29	Stream Power (lb/ft s)	0.02	1.06	0.04
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	61582.45	31650.80	88752.17
C & E Loss (ft)	0.14	Cum SA (acres)	10474.26	1495.75	11809.79

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 142

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
IBWC 2008 Cross-sections, Section along left levee updated with
2017 survey
Station Elevation Data num= 475

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.3	34.96	91.78	67.75	98.78	71.86	99.94	80.67	102.43
81.13	102.58	82.19	102.94	82.57	103.07	83.46	103.37	94.59	103.49
105.04	103.59	111.47	103.65	113.47	103.65	113.48	87.64	115.42	87.6
123.48	87.44	128.52	86.18	129.48	85.94	132.89	86.79	133.48	86.94
144.06	86.73	145.49	86.7	156.46	86.48	157.5	86.46	157.9	86.36
162.87	85.12	163.74	85.1	175.75	84.86	176.21	84.74	188.51	81.67
217.67	89.24	278.34	84.19	339.01	85.72	399.67	86.28	460.34	86.9
521.01	87.8	581.68	89.09	642.34	88.48	703.01	84.32	773.61	84.45
783.45	84.88	845.77	85.43	868.73	86.79	908.09	88.18	957.29	87.34
976.96	88.28	996.64	87.15	1009.76	87.73	1032.72	87.5	1065.52	87.82
1154.07	87.88	1177.03	87.74	1216.39	88.08	1252.47	87.64	1268.87	88.22
1295.11	88.23	1357.42	87.46	1380.38	87.8	1406.62	87.57	1413.18	88.02
1436.14	87.07	1455.82	87.38	1514.85	87.3	1534.53	86.98	1583.73	86.88
1606.69	87.75	1623.09	87.63	1682.12	88.1	1705.08	87.94	1760.84	88.58
1803.48	88.77	1832.99	88.43	1859.23	88.82	1951.07	87.4	1967.47	87.44
2000.26	86.67	2013.38	87.24	2065.86	87.29	2072.42	87.76	2138.02	87.7
2160.97	88.29	2203.61	87.99	2216.73	88.54	2262.65	88.89	2305.29	90.08
2338.08	89.81	2364.32	88.37	2406.96	88.11	2449.6	88.79	2521.76	89.29
2544.71	89.15	2577.51	89.75	2669.35	88.48	2702.15	88.55	2725.1	87.84
2748.06	88.14	2767.74	87.84	2784.14	88.24	2797.26	87.7	2833.34	88.88
2879.26	89.05	2895.65	89.64	2928.45	89.02	2938.29	89.6	2974.37	88.87
3020.29	89.59	3039.97	89.24	3072.77	89.98	3105.56	89.24	3121.96	89.69
3144.92	89.04	3164.6	89.58	3181	89.21	3213.8	89.58	3243.32	89.01
3282.67	89.62	3295.79	89.35	3354.83	90.4	3420.43	90.36	3449.94	90.9
3459.78	90.36	3535.22	90.28	3548.34	90.85	3564.74	90.36	3633.61	91.22
3646.73	90.73	3692.65	91.45	3715.61	91.07	3738.57	92.06	3777.93	90.8
3784.49	91.26	3814.01	90.6	3866.48	91.09	3882.88	90.52	3912.4	90.3
3922.24	91.11	3941.92	91.42	3991.12	91.31	4027.19	92.21	4040.31	92.88
4079.67	93.38	4089.51	91.98	4119.03	92.02	4132.15	92.71	4181.34	92.62
4210.86	93.67	4233.82	92.79	4273.18	93.4	4292.86	93.03	4309.26	94.61
4322.38	93.34	4335.49	93.66	4348.61	92.94	4394.53	92.59	4410.93	93.18
4433.89	92.71	4456.85	93.23	4496.2	93.49	4525.72	92.37	4574.92	93.12
4584.76	92.66	4614.28	93.14	4656.91	92.36	4692.99	93.3	4709.39	92.97
4722.51	93.67	4755.31	93.87	4765.15	93.43	4784.82	93.96	4824.18	93.55
4889.78	94.33	4919.3	94.21	4938.97	94.73	4945.53	94.25	5011.13	93.57
5027.53	92.06	5057.05	90.7	5070.17	90.93	5099.68	90.33	5109.52	88.75
5129.2	88.2	5188.24	87.39	5214.48	87.48	5237.44	88.29	5250.55	87.56
5270.23	87.52	5293.19	88.52	5322.71	89.06	5335.83	88.66	5352.23	89.27
5371.91	88.82	5404.7	90.54	5437.5	90.54	5457.18	91.62	5476.86	91.5
5503.1	92.54	5535.9	91.78	5552.29	92.33	5585.09	92.36	5611.33	91.66
5644.13	92.01	5653.97	91.68	5686.77	92.73	5699.88	92.38	5732.68	92.68
5739.24	92.15	5781.88	93.07	5854.03	92.75	5880.27	93.08	5991.79	92.02
6001.62	92.64	6080.34	91.62	6126.26	92.86	6155.77	92.33	6188.57	91.17
6241.05	91.1	6260.73	92.18	6273.85	91.24	6300.09	91.32	6323.04	89.91
6362.4	91.11	6391.92	90.54	6411.6	91.99	6424.72	92.11	6447.68	89.55
6526.39	92.01	6546.07	91.05	6572.31	92	6591.99	90.75	6608.39	90.83
6621.5	90	6647.74	90.24	6664.14	90.98	6710.06	91.6	6762.54	90.37
6782.21	90.42	6808.45	91.37	6844.53	91.07	6883.89	91.44	6910.13	90.51
6959.32	90.37	6969.16	89.82	6995.4	90.57	7005.24	89.87	7044.6	90.2
7054.44	90.88	7083.95	89.75	7103.63	89.45	7169.23	91.08	7192.19	90.93
7205.31	90.06	7234.82	90.1	7244.66	90.61	7290.58	90.95	7297.14	90.4
7329.94	90.1	7369.3	90.75	7388.97	89.96	7411.93	89.82	7464.41	91.11
7484.09	90.45	7493.93	89.37	7513.61	89.85	7523.45	90.84	7552.96	89.96
7572.64	90.86	7625.12	91.2	7634.96	91.87	7671.04	92.69	7684.15	92.32
7713.67	92.43	7756.31	92.15	7769.43	92.71	7798.95	92.82	7848.14	92.35
7884.22	91.41	7894.06	91.77	7936.7	90.84	7959.66	91.29	8018.69	91.13
8061.33	91.59	8094.13	91.12	8143.32	92.14	8189.24	91.62	8208.92	92.25
8251.56	91.69	8277.8	91.77	8287.64	92.38	8320.44	92.4	8353.23	91.77
8389.31	91.89	8405.71	93.01	8422.11	92.54	8448.35	88.11	8461.47	87.28
8487.71	88.96	8504.11	87.77	8530.35	87.59	8579.54	87.83	8595.94	88.27
8651.7	87.87	8687.78	87.94	8697.62	88.32	8736.98	87.94	8776.34	88.37
8815.69	88.02	8832.09	88.59	8917.37	88	8963.29	88.32	9005.93	88.08
9074.8	88.54	9120.72	88.5	9127.28	88.78	9212.56	89.16	9245.36	90.72
9268.32	91.22	9297.83	91.09	9304.39	91.51	9330.63	89.48	9363.43	89.01
9399.51	89.19	9429.03	88.56	9455.27	89.14	9497.91	89.37	9530.7	90.55
9553.66	90.03	9570.06	90.83	9602.86	90.83	9615.98	91.33	9678.3	91.47
9714.38	91.93	9770.13	91.05	9806.21	89.78	9845.57	90.77	9868.53	89.63
9898.05	90.5	9904.61	89.9	9940.69	90.39	9953.81	89.78	9986.6	89.87
9993.16	91.0710006.28		89.4610029.24		88.64	10068.6	88.0410098.12		88.19
10137.46	87.86	10160.4	89.81	10189.9	88.7110206.29		89.1910235.78		91.08
10265.28	90.4910288.22		88.7610301.33		88.5510330.83		89.0210343.93		89.7
10366.88	89.3910399.65		87.7210432.42		89.910445.53		90.3310468.47		89.87
10481.58	90.2910497.97		89.7810514.36		90.1110547.13		89.9410586.46		90.85

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10625.79   92.4810671.67   92.22 10681.5   92.5210701.16   89.52   10711   89.16
10737.21   90.0410743.77   89.2110763.43   83.6510773.27   81.9910789.65   83.22
10812.59   88.9610838.81    90.110848.64   89.5210868.31   86.1910881.42   77.05
10894.53   72.9510910.91   66.6910920.75   66.0710964.75      5811000.75    56.5
11010.75    56.511020.75    55.811029.75    56.311032.18   66.0711058.39   81.02
11091.17   88.24   11101   92.5211114.11   94.41 11130.5   93.1911159.99   92.88
11169.82   93.6911218.98   92.7811251.76   93.0911277.98   91.5211294.36   92.43
 11317.3   92.2311350.08   92.55 11376.3   92.2111454.95    92.211500.83   91.96
 11520.5   91.4111546.72    92.811579.49   92.9511615.54   93.4911635.21   92.79
11671.26   90.88 11772.9   90.85 11838.5    91.111864.75    91.911897.55   92.13
11923.79   91.7411940.19   90.7411982.83   90.4712064.84   90.82 12087.8    89.9
12100.92   91.2612133.73   92.3212202.61   91.3612225.58   91.5712251.82   91.04
12310.86   91.2712353.51   90.9212399.43   91.3812448.63    91.112560.16   90.96
12602.81   91.0712730.74   90.8612747.14   91.2212789.78   90.4612829.15   90.72
12943.96   90.4412983.32    90.613039.08   90.3313193.26    90.213206.38   89.55
13242.46   90.5713281.82   89.7213396.63   89.7313498.32   89.5513531.12   89.75
13652.49    89.5 13668.9   89.2213698.42    90.813704.98      8713711.54   86.18
13727.94   92.74 13734.5   93.8413757.46   91.8613839.47    92.713901.79   92.61
13914.92   93.2413941.16   93.3914006.76   92.9714019.88   92.4914075.65    92.6
14082.21   92.2514134.69   92.2814144.54   91.8514193.74   91.5614210.14   90.59
14252.78   89.7214305.27   89.3814357.75   90.0114374.15   89.75   14384   90.68
14393.84   94.0614406.96   96.8914446.32   97.2914462.72   93.2414557.85   93.24

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .07  113.47     .12 10681.5     .0710920.75    .02511032.18     .07
11114.11    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10838.81   11101          2632.84 1550.77 1580.34             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       010838.81    90.1       T
Left Levee      Station=  113.47      Elevation=  103.65
Right Levee     Station=14446.32      Elevation=   97.29

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)            100.00    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.119      0.053     0.066
  W.S. Elev (ft)             99.96    Reach Len. (ft)          2632.84    1550.77    1580.34
  Crit W.S. (ft)             93.43    Flow Area (sq ft)       97220.80    7587.77   29779.62
  E.G. Slope (ft/ft)      0.000156    Area (sq ft)           107659.00    7587.77   29779.62
  Q Total (cfs)           125000.00     Flow (cfs)             66089.59   23774.22   35136.17
  Top Width (ft)          14444.38    Top Width (ft)          10725.34     262.19    3456.85
  Vel Total (ft/s)            0.93    Avg. Vel. (ft/s)            0.68       3.13       1.18
  Max Chl Dpth (ft)          44.16    Hydr. Depth (ft)            9.06      28.94       8.61
  Conv. Total (cfs)       10001500.0     Conv. (cfs)            5287963.0   1902224.0   2811317.0
  Length Wtd. (ft)         1967.61    Wetted Per. (ft)        10746.42     281.24    3468.27
  Min Ch El (ft)             55.80    Shear (lb/sq ft)            0.09       0.26       0.08
  Alpha                       2.90    Stream Power (lb/ft s)      0.06       0.82       0.10
  Frctn Loss (ft)             0.25    Cum Volume (acre-ft)    59803.94   31192.47   87498.04
  C & E Loss (ft)             0.02    Cum SA (acres)          10281.41    1477.58   11659.51


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 141.9

INPUT
Description: RGV-01.Bathymetric elevations translated from IBWC 2008
             Cross-sections, Section along left levee updated with 2017 survey
Station Elevation Data    num=     477
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   98.51       1   99.46    5.33  101.39    8.35  102.32    9.11  102.68
    9.38  102.83   10.01  103.13   10.24  103.26   24.57   103.4   38.48  103.53
    40.5  103.53   43.18   88.89   50.58   88.72   51.54   88.48   56.63    87.2
   56.99   87.28   60.66   88.18   61.09   88.17   63.79   88.11   72.77   87.91
   74.43   87.87   84.87   87.63   88.82   86.63   97.18   84.54  101.71   84.43
  106.72   84.32  110.69   83.34  116.13   81.99     117   82.06     134   84.39
     149   82.24  152.99   82.03  162.99   84.24  219.99   84.75  282.98   85.83
  310.98   86.69  364.98   85.91  430.97   85.67  447.97    85.2  504.96   86.25
  517.96   85.67  548.96   85.96  597.96   85.96  635.95   87.57  684.95   88.56
  725.95   88.69  801.94   89.26  829.94   87.36  842.94   87.22  885.94   85.83
  915.93   82.01  937.93   80.89  964.93   80.72 1106.92   81.65 1328.43   83.92
 1348.11   84.55 1371.07   86.17 1387.47      86 1420.27   86.76 1430.11   86.34
 1469.48    87.1 1489.16   88.04 1518.68    88.3  1548.2   87.97 1558.04   88.37
 1590.84      88 1623.64   88.68    1663   88.86  1712.2   89.58 1741.72   89.13
 1774.52   89.47 1790.92   89.03 1840.12   89.13 1869.64   89.86 1895.88   89.81
 1922.12   90.34  1974.6   90.13 1987.72   89.45  2007.4    89.8 2020.52   89.32
 2059.88   89.85    2073   89.21 2115.64   88.99 2128.76   89.42 2148.44   88.53
 2164.84   88.96 2194.36   88.32 2207.48   88.88 2217.32   88.37 2259.97   88.64
 2269.81    89.2 2299.33   88.65 2345.25   88.61 2374.77   89.08 2381.33   88.66
 2410.85    89.2 2417.41   88.84 2440.37   89.28 2483.01   89.03 2496.13   88.48
 2535.49   89.22 2568.29   89.51 2594.53    89.3 2630.61   89.95 2640.45   89.63
 2679.81   89.75 2702.77   90.12 2722.45    89.6 2758.53   90.35 2771.65   89.96
 2833.97   90.66 2856.93   90.43 2879.89   90.88 2889.73   91.62 2948.77   91.23
 2971.73   91.28 2981.57   92.14 3001.26    92.2 3017.66   94.52 3034.06   93.29
 3099.66   93.42 3119.34      94  3142.3    93.3  3191.5   93.49 3214.46   94.07
 3237.42   93.55 3250.54    93.9 3309.58   93.99 3342.38   93.44  3355.5   95.03
  3371.9    90.7 3378.46   90.15 3398.14   91.25 3430.94   91.15  3470.3   90.24
 3483.42   90.92 3526.06   90.07 3558.86   90.63 3598.22   89.41 3627.74   89.32
  3634.3   88.78  3650.7   89.34 3680.22    89.2 3709.74   89.68 3722.86   88.98
 3758.95   89.02 3804.87    89.9 3867.19   89.37 3893.43   88.68 3932.79   88.66
 3975.43   89.46 3995.11   88.47 4031.19   88.29 4047.59   88.89 4083.67   89.48
 4123.03    88.9 4152.56   89.01 4168.96   89.72 4198.48   90.26 4214.88   90.11
 4237.84   91.04  4244.4   90.51 4283.77    90.8 4300.17   89.95 4326.41   90.24
 4352.65   89.55 4392.02    89.5 4454.34   90.29 4467.46   89.52 4496.98   90.58
 4533.07    89.6 4552.75   89.96 4595.39   89.31 4657.72   89.94 4664.28   89.68
 4697.08   90.39  4726.6   89.68 4756.13   90.54 4792.21   89.91 4802.05   90.18
 4825.01   89.54 4831.57   88.46 4844.69   88.18 4870.94   86.58  4893.9   89.16
 4933.26   89.14  4943.1   87.89 4962.78   88.92 4985.74   87.02 4998.87   87.96
 5015.27      87 5028.39   88.63 5041.51   88.81 5061.19   87.15 5087.43   87.54
 5100.55   88.17 5113.68   86.86  5143.2   87.55 5156.32   88.87 5189.12   88.29
 5205.52   89.21 5228.48   88.79 5271.13   89.47 5297.37   89.37 5320.33   88.36
  5359.7   89.26 5385.94   89.07  5408.9   87.54 5422.02   87.46 5438.42   88.56
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 5451.54    88.4 5461.38   87.31 5494.19   87.69 5520.43   88.51 5543.39   88.34
 5566.35   89.06 5582.75   88.77    5609   89.01 5654.92    90.4 5664.76   90.04
 5687.72   90.44 5694.28   91.13 5727.09   90.81 5799.25   91.13 5815.65   91.44
 5871.42   91.25 5897.66   90.79 5937.02   91.98 5946.86   90.78 5963.27   91.31
 5992.79   90.82 6032.15   90.95 6051.83   90.39 6064.95   91.13 6104.32   91.25
 6146.96   90.67 6160.08   91.23 6166.64   90.57 6225.69   91.11 6251.93   90.94
 6284.73    91.2 6317.54   92.23 6330.66   93.45 6353.62   92.56 6363.46   93.61
 6386.42   91.85 6412.66   93.14 6435.63   92.23 6484.83      92 6491.39   92.51
 6514.35   91.95 6547.15   93.96 6570.12   93.07 6583.24   92.06 6599.64   92.12
 6612.76   93.44  6622.6   92.89    6639   93.31 6658.68   92.98 6665.24   93.64
 6694.77   93.35 6704.61   92.75 6770.21   93.29 6786.61   92.89 6803.02    93.6
 6842.38   93.39 6852.22   92.58 6875.18   92.72  6904.7    94.4 6934.23    93.4
 6950.63   93.83 6970.31   92.83 6983.43   93.04 7003.11   92.09 7016.23   90.63
  7039.2   90.55 7078.56   89.75 7117.92   90.46 7131.04    90.1 7140.88   90.82
 7190.09   90.94 7206.49   91.39 7226.17   89.78 7242.57    89.7 7255.69   90.73
 7268.81   90.18 7298.34   86.76 7311.46   85.92 7350.82   85.06  7386.9   85.33
 7455.79   85.43 7547.64   85.36 7573.88   85.08 7636.21   85.31 7649.33   85.09
 7701.81    85.7 7734.61   85.57 7773.98   85.96 7796.94   85.87  7869.1   86.41
 7931.43   87.47 7957.67   87.47 7983.91   88.31 7997.04   87.92 8065.92   87.71
 8161.05   88.23 8184.01   88.65 8233.21   88.55 8315.22   89.29 8403.79    89.4
 8410.35   89.05 8443.15   89.03 8459.55   89.91 8525.16   89.98 8557.96    90.5
 8580.92   90.05 8603.89   90.44 8617.01   90.01 8633.41   90.57 8646.53   90.34
 8682.61    91.7  8718.7    91.3 8728.54   91.79 8761.34   91.42 8771.18   92.01
 8794.14   91.99 8836.79   90.96 8853.19   91.13 8866.31   92.11 8876.15   91.48
 8899.11   92.14 8938.47   92.32 8951.59   91.44 8977.84   92.18 9010.64   90.95
 9027.04   91.12 9053.26   92.68 9089.24   89.72 9118.68   89.18 9157.93   89.08
 9174.28   89.92 9197.18   88.93 9223.35   89.02 9246.25   89.74 9269.14   91.98
  9285.5   91.67 9298.58   92.58 9314.94    92.7 9344.38   86.72 9370.54   82.38
 9383.63   82.85  9409.8   77.62 9422.88   78.61 9439.24   77.28 9455.59   74.51
 9475.22   76.31 9485.03   73.51 9494.84   73.58 9504.66   66.24  9511.2    59.8
  9533.2    59.2  9564.2   59.31  9593.2   57.57  9601.2   57.51  9634.2   55.73
  9648.2   56.23  9668.2   58.35 9681.29   66.07  9691.1   67.74    9714    77.7
 9720.54   81.58 9727.08   87.38 9730.36   88.13 9746.71   86.37 9772.88   86.06
 9789.24   89.46 9805.59   91.79 9831.76   90.63  9861.2   91.91 9867.74   90.78
 9877.55   91.33 10041.33  91.41 10159.39  91.54 10195.46  91.91 10261.05  91.93
10306.96   92.34 10316.8   92.94 10320.08  91.82 10329.92  92.19 10395.5    92.4
10467.65   91.84 10556.19   91.81 0687.36  91.09 0703.76    91.21 0775.92   90.93
10913.74   90.68 10923.58  90.44 10976.08  90.45 11081.08   90.71 1117.17   90.44
11159.83   90.66 11212.32  90.39 11238.57  90.53 11277.95   90.05 11291.07  90.53
11310.76   89.72 11346.85  89.98 11359.98  92.13 11363.26   90.98 11369.82  92.62
11382.95    90.21 1405.91  88.96 11435.45  89.88 11471.54   89.88 11629.04  90.19
11773.41      90 11802.94  90.16 11989.97  90.14 12016.22   90.29 12170.43  90.25
12229.49    90.11 2268.87  90.24 12298.4   90.02 12390.27   90.34 12406.68  89.82
12446.05    90.21 2452.62  89.63 12475.58  90.19 12544.49   90.28 12619.96  90.09
12731.52   90.21 12816.83  90.07 12895.58  90.25 12934.95   90.02 12977.61  90.14
13069.48   89.87 13135.1   89.86 13226.98  90.02 13312.29   89.86 13391.04  90.11
13430.41    89.71 3476.35  90.51 13489.47  91.72 13499.32   91.62 13515.72  89.49
13532.13    88.61 3538.69   89.31 3620.72  88.77 13663.38   89.01   13729   88.77
13794.62   88.88 13879.93  88.66 14132.59  88.64 14171.96   88.37 14198.21  89.07
14204.77   88.05 14227.74  89.69 14234.3   87.21 14240.87   86.44 14247.43  89.29
14257.27   90.33 14270.4   89.63 14280.24  87.24 14322.9    86.78 14365.55  87.36
14381.96   88.27 14401.64  87.15 14427.89  87.39 14454.14   90.66 14470.55  95.79
14477.11   96.67 14513.21  97.53 14532.89  93.21 14641.17   93.21 14651.01   96.3
14673.98    95.91 4677.26   95.2

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066    40.5     .12 9314.94     .07 9455.59    .025  9691.1     .07
  9861.2    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9314.94  9861.2            2997    3385 3501.58             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 9314.94    92.7       T
  9861.214677.26   91.91       T
Left Levee      Station=    40.5      Elevation=  103.53
Right Levee     Station=14513.21      Elevation=   97.53

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             99.74    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.19    Wt. n-Val.                 0.120      0.029     0.066
  W.S. Elev (ft)             99.55    Reach Len. (ft)          2997.00    3385.00    3501.58
  Crit W.S. (ft)             83.09    Flow Area (sq ft)       62839.70   13501.80   36129.18
  E.G. Slope (ft/ft)      0.000104    Area (sq ft)            96822.23   13501.80   44287.27
  Q Total (cfs)           125000.00     Flow (cfs)             28387.46   64860.79   31751.75
  Top Width (ft)          14636.03    Top Width (ft)           9273.71     546.26    4816.06
  Vel Total (ft/s)            1.11    Avg. Vel. (ft/s)            0.45       4.80       0.88
  Max Chl Dpth (ft)          43.82    Hydr. Depth (ft)            6.78      24.72       7.50
  Conv. Total (cfs)       12255160.0     Conv. (cfs)            2783143.0   6359035.0   3112982.0
  Length Wtd. (ft)         3325.06    Wetted Per. (ft)         9289.73     562.19    4825.67
  Min Ch El (ft)             55.73    Shear (lb/sq ft)            0.04       0.16       0.05
  Alpha                       9.89    Stream Power (lb/ft s)      0.02       0.75       0.04
  Frctn Loss (ft)             0.45    Cum Volume (acre-ft)    53624.34   30817.07   86154.48
  C & E Loss (ft)             0.05    Cum SA (acres)           9677.02    1463.19   11509.45


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 141.5

INPUT
Description: RGV-01, new cross-section, Bathymetric elevations translated from
             IBWC 2008 Cross-sections, Section along left levee updated with
             2017 survey
Station Elevation Data    num=     475
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   90.89   35.03   91.62   70.06   92.76   77.04   98.12   86.58   100.8
   91.37  102.14   92.06  102.44   92.56  102.66   93.12   102.9   93.55  103.08
  104.32  103.19  114.11  103.28  121.92  103.36  123.94  103.36   124.5    87.4
  127.89   87.33  133.21   87.22  134.08    87.2  139.06   85.97  140.16    85.7
  143.21   86.45  144.21   86.69   151.7   86.54  156.37   86.44  161.87   86.33
  168.53   86.19  175.84   84.38  178.15   83.81  186.81   83.66  187.24   83.65
  187.71   83.53  189.99   82.98  199.94   80.51  239.23   85.82  300.65   83.57
  362.07   85.58   423.5   85.96  484.92   85.92  546.34   85.86  607.76   85.91
  669.18   86.32  730.61   87.31  745.11   88.24  771.34   88.13  784.46   89.25
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  804.14   89.89  817.25   89.57  846.77   87.11     873   86.44  912.35    87.7
  935.31   87.99  954.98   87.82  984.49   88.82 1027.12   88.64 1059.92   89.14
 1069.75   89.71 1099.27   89.19 1115.66   87.16  1125.5   84.37 1132.06   83.92
 1469.82   83.92 1486.21   85.59 1525.56   87.72 1568.19   89.27 1607.54   90.02
 1643.62   89.48 1676.41   88.31  1709.2   88.21 1781.34   89.34 1817.41   88.44
 1833.81   88.73  1866.6   88.23 1892.84   88.58 1922.35   89.48 1942.02   90.49
  1978.1   90.23 1991.21    89.6 2001.05   90.02 2030.56   89.89 2050.24   90.42
 2125.66   90.09 2155.17   90.73 2178.12   90.76 2217.47   91.36 2227.31   91.08
 2250.26   89.06  2276.5   87.29 2289.61   86.94 2312.57   87.29 2345.36   89.05
 2397.82   89.15 2420.78   90.26 2440.45   90.38 2499.48   89.83 2525.71   90.28
 2561.78   90.04 2588.01   90.56 2604.41    90.1  2620.8   90.82 2640.48   90.19
 2656.87   90.79 2666.71   90.29 2702.78   90.61 2709.34   90.28 2738.85   91.21
 2781.48   91.39  2794.6   92.43 2801.15   92.03 2850.34   92.34 2863.46    93.1
 2909.36   93.18 2938.88   92.76 2974.95   92.62 2988.06   93.04 3011.02   92.32
 3024.13   91.49 3047.09   91.41  3076.6   92.52 3089.72   93.54 3119.23   93.66
 3142.18   93.35  3155.3   92.69 3181.53   88.27 3194.65   87.22    3234   85.99
 3273.35   86.72 3302.86   87.72 3312.69   88.71 3335.65   88.55 3378.28   89.38
 3427.46    89.5 3443.86   89.24  3453.7   89.87 3463.53   89.32  3499.6   89.51
 3506.16   89.87 3542.23   89.82 3558.63   89.31 3568.47   89.77 3617.65   89.83
 3640.61   89.44 3660.28   89.82 3709.47   88.89 3761.93    88.8 3811.12   89.18
 3837.35   88.82 3853.75   89.43 3863.58   88.61 3889.82   89.08 3909.49   88.81
 3975.07   89.22 4004.59    88.9 4086.56   87.28 4155.43   86.66 4194.78   86.08
  4270.2   86.71 4280.04   86.54 4306.28   87.16 4348.91   87.14 4368.58   86.73
 4424.33   87.45 4466.96   87.29 4483.36   87.76 4499.76   87.44 4525.99   87.64
 4532.55   87.17 4562.06   87.13 4604.69   87.91 4627.65   87.55 4637.49   88.09
    4667   88.42 4689.95   87.53 4696.51    88.3 4712.91   88.74 4735.86   88.47
 4775.22   88.65 4817.85   87.95 4850.64   88.11 4903.11   89.28 4916.23   89.01
 4942.46   89.53 4981.81   89.13 4991.65   88.34 5011.33   88.18 5024.44   89.07
 5057.24    89.4 5080.19   88.96 5096.59   88.14 5122.82   89.44 5149.06   88.65
 5172.01   89.37 5185.13   89.15 5234.32   89.17 5247.44   89.58 5267.11   89.19
 5296.62   89.21 5375.33   89.88 5385.17   89.28  5427.8   90.05 5450.75   89.79
 5519.62   89.83 5545.85   89.53 5588.48   90.13  5601.6    89.4 5634.39   90.02
 5650.79   89.71 5673.74   90.08 5686.86   89.82 5726.21   89.97 5739.33   89.59
 5759.01   89.95 5788.52    89.6 5814.75   89.89 5821.31   90.41 5834.43   89.91
 5844.27   90.37 5873.78   90.73 5900.02   90.58 5952.48   91.26 6024.63    92.5
  6060.7   91.98 6086.94   92.62 6100.05   92.18 6116.45   90.54 6152.52   88.77
 6162.36   88.71 6178.76   87.61 6214.83   87.29 6254.18   87.28 6260.74   87.03
 6303.37   86.95 6313.21   86.52 6359.12   85.92 6405.03   86.03 6450.94   86.53
 6470.59   85.95 6490.24      86 6532.81   87.28 6568.84   88.05 6581.94   87.33
 6624.51   87.13 6640.89   87.73 6676.92   88.27 6706.39   88.15 6726.04   89.04
 6745.69      89 6758.79   88.03 6778.44    85.6 6801.37    85.7 6827.57      88
 6837.39   89.59 6853.77   90.69 6873.42   90.39 6883.24   87.21 6899.62   83.15
 6909.44   81.76 6922.54   80.94 6948.75   80.88 6974.95   81.22 7001.15   83.44
 7010.97   85.49 7017.52   85.39 7040.45   81.93    7047   81.58  7060.1   83.27
  7073.2   82.61 7079.75   83.05  7099.4   85.86  7112.5   83.41 7122.32   79.74
 7128.87   78.34  7138.7   79.12 7148.52    78.5 7161.62      76 7168.17    77.8
 7181.27   77.26 7187.82   74.97 7194.37   69.28 7200.92   66.05 7244.92   57.98
 7280.92   56.48 7290.92   56.48 7300.92   55.78 7309.92   56.28 7329.92   55.58
  7348.3   66.07  7361.4   71.94 7367.95   76.82 7377.78   81.74 7384.33   87.29
 7390.88   90.97 7397.43   92.28 7410.53   91.65 7430.18   92.27    7440   90.08
 7446.55    91.1 7462.93   90.01 7498.95   91.17 7525.15   90.01 7554.63   90.38
 7580.83   89.89 7633.23   90.62 7643.06   90.07 7692.18   90.11 7744.58   89.79
 7796.98   89.83 7849.38   89.46 7964.01   89.41 7983.66   89.18 8062.26   89.35
 8124.54   89.04 8137.66   89.28 8213.11   89.43 8255.75   89.36 8400.08   89.44
 8416.49   89.64 8475.53   89.58 8534.58   89.86  8580.5   89.77 8774.04   89.98
 8787.16   89.83  8862.6   89.85 8961.01   90.04 9016.78   89.64 9033.18   89.95
  9046.3   90.81 9052.86   90.08 9069.26   91.69 9085.66   89.64 9098.78    90.6
  9128.3   90.33 9170.95   90.77 9187.35   90.55 9259.52    90.2 9338.24   90.41
 9387.45   90.32 9433.37   89.91 9449.77   90.07  9512.1   89.71 9630.19   89.53
 9689.23   88.84 9833.56   88.13 9951.65   88.22 9971.33   88.55 9997.58   88.19
10020.54   92.47 10027.1   92.0510040.22   92.6710050.06   90.88 10076.3   90.74
10092.71   91.1310128.79    90.910164.87   91.2610207.51   90.9710223.92   91.39
10315.76   91.2710381.37    91.610414.17   91.4410588.03   91.6710683.15   91.57
10712.68   91.0710732.36   92.5610745.48   91.3310863.57   91.2710873.41   91.04
10922.61   91.6110965.26    91.610994.78   91.2511070.23   91.2611122.71   90.98
11148.95    91.111211.28   90.7411221.12   90.8911352.33    90.511404.81   90.64
11486.82   90.4911578.67   90.6411640.99   90.4711660.68   90.5911778.77   90.62
11801.73   90.4511834.53   90.6911844.37    91.711850.93   90.5811896.86   90.87
11995.26   91.0412008.38   91.2212093.67   91.2312113.35   91.3512208.48   90.87
12234.72    91.612241.28   92.3112244.56   91.1512251.12   91.8812260.97   89.94
12277.37    89.512283.93   88.6212293.77   89.2712375.78   89.0712444.66   89.07
12457.78   89.2212572.59    89.212690.68   89.4212782.53    89.512831.73   89.51
12933.42   89.4412956.38   89.2513044.95   89.35   13104   89.2513182.72   89.48
13222.09    89.313304.09   89.3713327.05   89.1613343.46   89.6613356.58   89.15
13372.98   90.09 13386.1   89.5213395.94   89.8313438.58   89.5213661.64   89.23
13714.13   89.4513733.81    89.213809.25   89.4213858.46   89.31 13901.1   89.52
13969.99   89.5214035.59   89.2814058.56   89.5314114.32   89.2714219.29   89.14
14255.37   89.3714294.74    89.114517.79   89.0814580.12   89.1514589.96   89.32
14642.44   89.2514717.89   89.4414760.53   89.4214780.22   89.1314826.14   89.62
14842.54   89.3514891.75   89.4314937.67   89.2314970.47   89.4915039.36   89.37
15108.24   89.4815137.77   89.2415200.09   89.7715206.65   87.2215213.21   87.27
15219.77    90.315229.61   91.4115252.58   89.2615285.38   90.3815301.78   88.14
15324.74   87.5815334.58   88.0215344.42   89.9115357.54   88.5715373.95   88.92
15396.91    90.715406.75    92.415419.87   93.4215442.83   96.8515469.07   97.99
15475.63      9715482.19   93.1715590.44   93.17   15597   93.3815610.12   97.37
15633.09    96.515639.65   94.8415659.33   94.7415669.17   92.7315672.45   90.93

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .07  123.94     .12 7161.62     .07 7200.92    .025 7462.93     .07
 7744.58    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6853.77 7397.43         1939.57 3724.88  726.46             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6853.77   90.69       T
 7397.4315672.45   92.28       T
Left Levee      Station=  123.94      Elevation=  103.36
Right Levee     Station=15469.07      Elevation=   97.99
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 6086.94   90.62

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             99.24    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.120      0.088      0.065
  W.S. Elev (ft)             99.22    Reach Len. (ft)          1939.57    3724.88     726.46
  Crit W.S. (ft)             86.65    Flow Area (sq ft)       56365.05   12922.74   56813.36
  E.G. Slope (ft/ft)      0.000180    Area (sq ft)            59222.01   12922.74   75528.73
  Q Total (cfs)           125000.00    Flow (cfs)              38584.72   23805.60   62609.68
```

Top Width (ft)	15548.36	Top Width (ft)	6729.69	543.66	8275.02	
Vel Total (ft/s)	0.99	Avg. Vel. (ft/s)	0.68	1.84	1.10	
Max Chl Dpth (ft)	43.64	Hydr. Depth (ft)	8.38	23.77	6.87	
Conv. Total (cfs)	9316526.0	Conv. (cfs)	2875805.0	1774284.0	4666438.0	
Length Wtd. (ft)	1603.56	Wetted Per. (ft)	6739.18	561.31	8290.52	
Min Ch El (ft)	55.58	Shear (lb/sq ft)	0.09	0.26	0.08	
Alpha	1.42	Stream Power (lb/ft s)	0.06	0.48	0.08	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	48256.29	29790.36	81338.76	
C & E Loss (ft)	0.00	Cum SA (acres)	9126.49	1420.84	10983.28	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 140.74

INPUT
Description: RGV-01.Bathymetric elevations translated from IBWC 2008
Cross-sections, Section along left levee updated with 2017 survey
Station Elevation Data num= 453

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.91	10	90.23	23	96.65	23.37	97.88	23.42	97.9
37.64	101.95	37.87	101.95	38.6	101.96	40.23	102.42	40.43	102.47
40.56	102.51	41.95	102.9	42.16	102.91	42.28	102.91	54.16	103.02
61.14	103.08	74.97	103.21	77.33	103.21	80	87.06	85.61	86.98
89.12	86.92	94.6	85.77	96.2	85.43	98.86	86	100.51	86.35
100.92	86.44	108.12	86.33	115.07	86.22	116.21	86.21	117.73	86.18
124.29	86.08	129.22	86.01	136.59	84.46	143.7	82.98	148.53	82.91
155.45	82.82	156.51	82.81	156.95	85.37	161.92	84.32	167.9	83.08
168.89	82.98	170.88	82.94	176.85	82.87	180.83	82.81	182.82	82.64
189.79	81.23	193.99	83.65	208.99	81.5	209.98	81.35	231.98	81.34
245.97	82.95	297.97	83.16	412.95	84.39	514.94	85.14	592.93	87.69
813.9	87.31	840.9	86.86	863.89	84.85	911.89	85.08	951.88	87.17
983.88	87.18	1018.87	84.72	1147.85	85.87	1262.84	86.52	1421.81	86.35
1438.81	88.05	1458.81	87.95	1503.8	82.13	1517.8	81.35	1591.79	81.27
2069.85	83.56	2076.42	84.44	2092.82	83.56	2617.66	83.56	2647.19	83.72
2693.11	83.59	2752.15	84.17	2781.68	83.78	2801.36	84.24	2811.2	84.05
2844	84.46	2857.12	84.42	2889.93	85	2932.57	85.06	2945.69	85.42
2998.18	85.33	3040.82	85.75	3090.03	86.96	3145.79	86.88	3175.31	87.26
3185.15	87.72	3208.12	87.36	3234.36	87.72	3247.48	87.55	3273.72	88.03
3293.4	87.73	3319.65	87.91	3329.49	88.33	3359.01	88.1	3391.81	88.74
3411.49	88.72	3427.9	88.27	3437.74	88.45	3447.58	87.91	3463.98	88.76
3477.1	88.57	3493.5	89.41	3513.18	89.46	3516.46	88.63	3526.3	83.09
3532.87	81.32	3539.43	80.7	3552.55	77.9	3562.39	73.36	3568.95	66.93
3589.23	59.96	3609.23	59.26	3649.23	59.76	3709.23	61.56	3719.23	64.46
3732.96	69.28	3749.36	77.04	3759.21	82.56	3772.33	86.94	3798.57	83.66
3808.41	83.1	3818.25	83.78	3828.09	85.29	3841.21	84.4	3857.61	84.91
3867.45	86.36	3874.02	88.58	3880.58	88.87	3890.42	87.43	3900.26	87.24
3916.66	87.92	3933.06	87.39	3949.46	87.26	3982.26	87.93	4008.51	89.64
4018.35	89.44	4034.75	87.68	4064.27	87.17	4077.39	87.29	4113.48	86.97
4156.12	87.4	4192.2	87.44	4221.73	87.3	4238.13	87.65	4274.21	87.74
4300.45	88.04	4310.29	87.85	4379.18	88.26	4431.66	88.29	4477.59	87.93
4500.55	88.25	4536.63	87.89	4556.32	88.24	4595.68	88.28	4635.05	87.94
4674.42	88.24	4694.1	88.08	4736.75	88.09	4746.59	87.91	4799.08	88.01
4825.33	87.66	4858.13	87.9	4881.1	87.68	4927.03	87.78	4959.83	87.49
4969.67	87.69	5038.57	87.21	5100.9	87.31	5153.39	87.11	5163.23	87.2
5215.72	86.88	5245.24	87.03	5287.89	86.83	5297.73	87.05	5337.1	86.81
5360.07	87.1	5405.99	86.72	5422.4	86.94	5455.2	86.74	5474.89	86.97
5524.1	86.96	5550.34	87.6	5583.15	87.5	5606.11	88.05	5619.23	87.67
5632.36	88.21	5648.76	87.92	5658.6	88.54	5694.69	88.11	5711.09	87.67
5740.62	87.66	5753.74	87.89	5796.39	87.75	5865.28	88.01	5976.82	88.09
5983.38	88.24	6026.03	88.12	6039.15	87.68	6052.27	88.12	6068.68	87.9
6114.6	88.1	6127.73	87.97	6157.25	88.15	6242.55	88.19	6252.39	88.38
6288.48	88.17	6422.98	88.37	6465.63	88.26	6511.56	88.57	6550.93	88.61
6603.42	88.43	6646.06	88.52	6764.17	88.61	6790.41	88.97	6816.65	88.76
6865.86	88.91	6892.11	88.73	6938.04	89.03	6990.53	88.75	6993.81	89.8
7000.37	89.03	7052.86	89.09	7079.1	89.36	7115.19	89.24	7157.84	89.28
7269.38	89.56	7295.62	89.45	7410.44	89.41	7472.78	89.54	7535.11	89.4
7630.24	89.57	7731.94	89.61	7807.4	89.47	7813.96	89.59	7899.25	89.7
7941.9	89.5	7951.74	89.63	8046.88	89.28	8069.85	89.69	8082.97	89.49
8096.09	90.05	8102.65	89.29	8125.62	88.4	8145.3	91.44	8158.42	91.8
8171.54	90.96	8187.95	90.38	8220.76	90.24	8299.5	90.56	8384.8	90.53
8450.42	90.76	8466.83	90.65	8601.35	90.68	8650.56	90.51	8739.15	90.53
8771.95	90.46	8808.04	90.85	8844.13	90.67	8850.7	91.91	8860.54	91.28
8893.35	91.33	8919.6	92.07	8949.12	91.69	8972.09	91.99	8991.78	91.6
9011.46	91.98	9040.99	91.58	9063.96	91.51	9093.49	91.78	9129.58	91.64
9145.98	92.11	9159.11	91.33	9175.51	91.57	9198.48	90.76	9260.81	90.76
9280.5	90.96	9319.87	90.9	9333	90.64	9339.56	91.32	9342.84	90.53
9349.4	91.25	9352.68	90.66	9392.05	90.96	9421.58	90.74	9490.48	90.65
9513.45	90.79	9549.54	90.65	9628.28	90.58	9661.09	90.67	9690.62	90.54
9825.14	90.35	9854.66	90.38	9939.97	90.1110018.71		90.13	10038.4	90.01
10136.82		9010163.07	90.2110205.72		90.110281.19		90.2410333.68		90.12
10369.77	90.3210379.61		90.1510428.83		90.3510461.64		90.2810481.32		90.49
10550.22	90.710602.72		90.7510658.49		91.1110688.02		91.0310697.87		91.59
10704.43	90.5910710.99		91.6810714.27		90.7810740.52		90.9710773.33		90.66
10776.61	91.410783.17		89.9910786.45		91.1410796.29		90.810809.42		91.13
10815.98	91.8310825.82		91.6510835.66		89.0510852.07		88.1910865.19		88.94
10884.88	88.6	10898	88.83 10966.9		88.7511042.36		88.8111062.05		88.7
11104.7	88.9311127.67		88.8211196.57		89.0211239.22		88.8611265.47		88.98
11311.4	88.92 11327.8		89.0611373.74		88.8611432.79		89.07 11465.6		88.75
11485.29	89.8911495.13		92.311514.82		92.8711521.38		90.3811531.22		89.31
11547.63	88.711570.59		88.9711629.65		88.9111649.34		89.1211711.67		89.07
11731.36	89.211790.42		8911813.38		89.2411823.23		89.0411892.13		89.15
11924.94	89.63 11931.5		88.8911938.06		89.52 11947.9		88.6611957.75		88.65
11961.03	89.9811964.31		88.9711980.71		88.6811993.84		89.08 12016.8		88.82
12105.39	89.0812128.35		88.9512184.13		89.1712210.38		88.9812239.91		89.2
12259.59	89.0312312.09		89.2312331.77		89.0312390.83		89.212407.23		89.09
12476.13	89.1812492.54		89.0312548.31		89.2412610.65		89.1112676.27		89.27
12738.61	89.1912761.58		89.3412817.35		89.06 12843.6		89.212866.57		88.96
12886.25	89.0712938.75		88.8113004.36		89.0113020.77		88.8713056.86		89.01
13089.67	88.8313148.73		88.93 13204.5		88.8813240.59		88.9913283.24		88.75
13312.77	88.913329.18		88.7713355.42		89.0613378.39		89.6313384.95		88.02
13391.52	87.9913401.36		89.1113417.76		92.4113430.89		93.3613437.45		93.18
13460.42	91.5513493.22		91.213499.79		91.4313512.91		90.8913555.56		91.08
13624.46	91.01 13634.3		91.2313673.68		91.2113683.52		90.9513709.77		91.06

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13729.45   90.7313752.42   90.6713762.26   90.3113788.51   90.1513847.57   90.78
13857.41   90.4413867.25   91.3313873.81   90.3813883.66   90.0213903.34   90.09
13926.31   89.6313942.71   90.2213952.56   89.39 13962.4    89.513972.24   87.88
13985.37   87.7113995.21   89.8714008.33   90.3714028.02   94.7314044.42   97.23
14050.98   97.1214083.79   98.2914096.92   94.0414103.48   93.1714205.19   93.17
14208.47   93.2914218.31   97.4814224.87   97.8514241.28   97.12 14254.4   95.41
14260.96   95.5914274.09   94.5514280.65   93.34

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .183 2998.18    .066 3562.39    .015 3732.96    .066 3867.45    .068

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3513.18 3772.33          3623.66 4885.99 2026.76            .1       .3
Left Levee      Station=   77.33      Elevation=  103.21
Right Levee     Station=14083.79      Elevation=   98.29
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   27.04 3506.48   89.46 3876.06 8410.14   89.59

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             99.05    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                 0.145      0.037     0.068
  W.S. Elev (ft)             99.00    Reach Len. (ft)          3623.66    4885.99    2026.76
  Crit W.S. (ft)             92.32    Flow Area (sq ft)       32759.71    8057.46   95650.26
  E.G. Slope (ft/ft)      0.000083    Area (sq ft)            32759.71    8057.46   95650.26
  Q Total (cfs)           125000.00    Flow (cfs)              13773.91   28141.13   83084.96
  Top Width (ft)          14202.62    Top Width (ft)           3435.15     259.15   10508.32
  Vel Total (ft/s)            0.92    Avg. Vel. (ft/s)            0.42       3.49       0.87
  Max Chl Dpth (ft)          39.74    Hydr. Depth (ft)            9.54      31.09       9.10
  Conv. Total (cfs)       13725120.0    Conv. (cfs)             1512388.0   3089923.0   9122806.0
  Length Wtd. (ft)         3017.26    Wetted Per. (ft)         3443.26     271.22   10522.92
  Min Ch El (ft)             59.26    Shear (lb/sq ft)            0.05       0.15       0.05
  Alpha                       3.89    Stream Power (lb/ft s)      0.02       0.54       0.04
  Frctn Loss (ft)             0.26    Cum Volume (acre-ft)    46208.48   28893.33   79911.36
  C & E Loss (ft)             0.01    Cum SA (acres)           8900.19    1386.52   10826.65


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 140

INPUT
Description: RGV-01. Bathymetric elevations translated from IBWC 2008
             Cross-sections, Section along left levee updated with 2017 survey
Station Elevation Data    num=     455
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   90.73   36.99   91.04   60.79   101.1   60.88   101.1   61.55  101.11
   62.92  101.56    63.1  101.62   63.24  101.67   64.39  102.05   68.39  102.09
   92.43  102.33   94.43  102.33   95.27   94.39   98.11   94.34   99.37   94.65
  102.08   95.34  106.33   95.25  114.02    95.1  119.11      95  125.96   94.86
  133.22   93.04  140.32   91.25  151.02   91.04     158    90.9  165.95   88.91
  169.55   88.01  170.27   88.24  171.27   88.13  189.98   90.18  204.98   88.03
  205.97   88.15  217.97   90.89  241.97   90.51  346.96   90.58  380.95   88.03
  410.95   87.88  449.94      90  465.94   90.32  529.93    89.3  552.93   86.72
  568.93   86.15  598.93   87.03  625.92   89.11  655.92   89.56  702.91   89.33
  713.91   87.88   759.9   87.49   774.9   84.62   792.9   83.43  896.88   83.23
 1018.87    83.6 1060.86    84.6 1127.85   84.91 1144.48   86.54 1190.39   86.77
 1193.67   87.15  1219.9   87.06 1226.46   87.38 1242.86   87.08 1288.77   87.41
 1315.01   87.97 1324.84   87.44  1347.8   87.26  1364.2   88.09 1370.75    87.7
 1406.83   88.05 1439.62   87.95 1482.25    88.1 1492.09   87.73 1551.12   88.24
 1560.96   88.59 1597.03   88.46 1603.59   88.77 1626.54   88.53 1675.73   88.92
 1692.13    88.8 1715.08   89.14 1734.76   89.16 1741.32   88.81 1774.11   89.26
 1797.07   89.38  1823.3    89.2 1842.98   88.82 1882.33   89.18 1898.73   88.86
 1915.12   89.39  1934.8   89.46  1951.2   90.01 1964.31   89.67 1977.43    90.2
 1997.11    90.2 2010.22   89.73  2029.9   90.39 2036.46   90.22 2065.97   90.59
 2075.81   90.14 2118.44   90.26  2141.4   89.31 2151.24   88.16 2180.75    87.6
 2203.71   88.18 2226.66   86.61 2233.22   87.15 2266.02   86.92 2285.69   86.86
 2308.65   86.82    2348   87.18 2357.84   87.76 2380.79    88.3 2407.03   88.49
 2439.82   87.39  2459.5   88.95 2482.45   88.27 2498.85      87 2515.25   86.63
 2534.93    85.6 2597.23   84.73 2623.47   85.58 2643.15   85.78 2692.34   87.16
 2721.85      87 2757.92   87.39 2764.48   86.98 2780.88    86.9 2810.39   87.25
 2813.67   86.96 2846.47   86.92 2856.31   87.12 2902.22   86.96 2951.41   87.24
 2964.53   87.08    3017   87.11 3026.83   86.81 3072.75   86.75  3112.1   86.47
 3128.49   86.91 3161.29   86.54  3190.8   86.88 3246.55   86.37 3292.46   86.33
  3302.3   86.63  3318.7   86.43 3348.21   86.97 3361.33   86.99 3403.96   86.51
 3433.48   86.96 3443.32   86.54 3462.99   86.36 3485.95   86.54 3495.79   86.94
  3525.3   87.27  3541.7   87.21 3564.65   88.02 3594.17      88 3610.57   88.28
 3663.04   88.48 3669.59   88.14 3708.95   88.43 3735.18   88.01 3774.53    88.8
 3810.61   88.88 3840.12   88.63 3869.64   88.86  3876.2   88.65 3905.71   89.16
 3925.39   89.72 3941.78   89.51 3951.62   89.01 3964.74   89.49 3984.42   91.36
 4000.81   92.09 4013.93   91.71 4040.17   91.79    4050   92.36 4056.56    90.9
 4063.12   88.24 4076.24    85.4 4095.92   86.96 4112.31   87.76 4128.71   87.62
 4154.94   87.96  4177.9   87.84 4197.57   88.37 4207.41   89.28 4223.81   88.88
 4246.76    89.2 4253.32   89.83 4282.84   90.03 4299.23   90.55 4328.75   90.12
 4341.86   88.67  4368.1   87.98 4433.69   89.26 4450.08   88.37 4476.32   87.44
 4492.71    86.2 4509.11   86.43 4538.37   86.09 4548.11   85.65 4583.82   86.23
  4609.8      86 4632.53   86.09  4658.5   86.61 4687.73   87.89 4700.72   88.84
 4723.44   89.01 4733.19    89.4 4759.16   89.01  4768.9   88.31 4778.64   88.54
 4794.88   86.23 4807.87   85.73 4817.61   86.12 4856.92   84.87 4879.87   83.46
 4889.71   83.51 4909.38   82.82 4925.77   82.84 4932.33   83.23    4952      86
 4974.95   86.91 5001.18   83.43 5014.29   82.38 5020.85   83.07 5033.96   86.14
 5060.19   86.74 5070.03   87.73  5089.7   85.76 5096.26   86.02 5102.81   85.23
 5115.93   80.77 5122.48   79.28 5129.04   79.39  5135.6   80.71 5145.44   83.63
 5161.83   82.57 5171.66   80.48 5178.22   78.23 5184.78   77.06 5197.89   77.23
 5204.45   78.71 5217.56   76.38 5230.68    75.2 5240.51   76.53 5250.35   74.71
 5260.19   73.62 5266.74   72.03 5283.14   71.03 5299.53   71.65 5309.36   72.74
 5312.64   72.27  5319.2   69.45 5325.76   68.45 5335.59   69.27 5342.15   68.35
 5351.99   65.87 5395.99    57.8 5431.99    56.3 5441.99    56.3 5451.99    55.6
 5460.99    56.1 5480.99    55.4 5505.99    55.9 5520.99    55.2 5532.99    55.1
 5535.59   65.87 5542.15   67.89  5548.7   73.86 5558.54   78.71  5565.1   83.09
 5574.93   88.16 5578.21    89.2 5647.06    89.2 5663.45   89.06 5706.08   89.14
 5758.57    88.8 5771.69   88.95 5840.59   88.68 5952.13   88.36 5971.82   88.55
  6007.9   88.38 6037.43   88.05 6053.83   88.94 6070.24   91.58 6080.08    90.7
 6086.64   89.28 6099.76   88.61 6126.01   88.69 6135.85   88.37 6204.75   88.33
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 6230.99   88.54 6240.83   88.32 6286.76    88.5 6375.34   88.32 6385.19   88.52
 6421.27   88.37 6460.64   88.62 6486.89   88.46 6532.82   88.52 6585.31   88.38
 6618.12   88.51 6693.57   88.53 6716.54   88.42 6785.43   88.45 6818.24   88.75
 6837.92   88.63 6870.73   88.87 6883.85   88.61 6949.47   89.01 6975.71   88.92
  6995.4   89.53 7008.52   90.32 7015.08   89.25 7038.05   89.58 7054.45   89.41
 7090.54    89.9 7133.19    89.8 7143.03   90.36 7162.72   89.29 7228.33   89.21
 7287.38   89.04 7359.56   89.01 7408.77   88.81  7454.7   88.96 7530.16   88.66
    7540   88.41 7585.93   88.68 7631.86   88.21 7749.96    88.4  7812.3   88.12
 7877.91   88.16 7887.75   88.01 7943.52   88.07 7966.49   87.92 8074.75   88.01
 8107.56   87.93  8117.4    88.1 8140.37   87.86 8153.49   88.01 8209.26   87.97
 8222.38   87.16 8261.75   87.02 8297.83   87.28 8333.91   87.09 8376.55   87.22
  8402.8   87.15 8425.76   87.36 8494.64   87.15 8560.25   87.36 8671.78   87.25
 8698.02   87.39 8727.54   87.21 8760.35   87.44 8786.59   87.34 8806.27   87.55
 8832.51   87.34    8885    87.5 8894.84   87.74 8940.76    87.5 8960.44   87.65
 9052.29   87.62 9085.09   87.91  9117.9    87.2 9131.02   88.25 9137.58   87.49
 9160.54    87.1 9170.38   87.38 9190.06   87.24 9213.02   87.55 9235.99   88.72
 9245.83   88.86 9268.79   90.31 9281.91   90.61 9311.43   89.79 9337.67    89.8
 9344.24   90.08 9396.72   90.15 9406.56   89.92 9459.04   89.73 9482.01   90.02
 9531.21   89.94 9567.29   90.19  9583.7   89.88 9613.22   90.05 9688.66   89.94
 9728.03   90.14 9760.83   90.05 9862.52   90.14 9944.53   89.9510062.62      90
10105.26   89.8110144.62   89.9710170.86   89.8510183.99   90.0410239.75   89.82
10279.11   89.8610292.23   90.0610374.24   89.9610443.13   89.9910466.09   89.85
10475.93   90.3310482.49   89.6110489.05   90.4110495.61   89.8210639.94   89.69
10712.11    89.910787.56   89.6710810.52   89.8310840.04   89.5510885.96   89.79
10941.73   89.7711004.05   89.5711076.22   89.8111161.51   89.64 11279.6   89.49
11305.84   89.2811335.36   89.53 11361.6   89.3711423.93   89.4111482.97   89.25
11496.09   89.4611522.34   89.2811535.46   89.5211555.14   88.9811571.54   88.12
11617.46   88.5211637.15   88.1111669.95   88.1611706.03   88.5311715.87   89.15
11732.27   89.4211774.92   88.8511801.16   89.3611860.21   89.5511896.29   89.56
11909.41   89.3311952.05   90.4211978.29   89.99 11994.7   90.5812001.26   93.02
12017.66   96.0212037.34      9812050.46   97.7412073.42   98.0712079.98   94.48
12086.54   93.1712194.79   93.1712204.63    96.112214.47   97.8912230.88   97.52
12240.72   96.59 12260.4   98.4812266.96   96.8812270.24   95.0112280.08   91.65

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066   94.43     .12 5070.03     .07 5342.15    .025  5548.7     .07
 5574.93    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5070.03 5574.93           1951.2    1010 1431.32             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 5070.03   87.73       T
Left Levee      Station=   93.44      Elevation=  102.33
Right Levee     Station=12037.34      Elevation=      98

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             98.78    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.120      0.054      0.066
  W.S. Elev (ft)             98.75    Reach Len. (ft)          1951.20    1010.00    1431.32
  Crit W.S. (ft)             80.89    Flow Area (sq ft)       51225.65   14557.94   64253.41
  E.G. Slope (ft/ft)      0.000090    Area (sq ft)            55301.22   14557.94   64253.41
  Q Total (cfs)           125000.00    Flow (cfs)              28377.75   34922.18   61700.07
  Top Width (ft)          12185.27    Top Width (ft)           4975.22     504.90    6705.15
  Vel Total (ft/s)            0.96    Avg. Vel. (ft/s)            0.55       2.40       0.96
  Max Chl Dpth (ft)          43.65    Hydr. Depth (ft)           10.30      28.83       9.58
  Conv. Total (cfs)       13205930.0    Conv. (cfs)             2998038.0   3689439.0   6518456.0
  Length Wtd. (ft)         1385.53    Wetted Per. (ft)         4985.22     525.00    6717.39
  Min Ch El (ft)             55.10    Shear (lb/sq ft)            0.06       0.16       0.05
  Alpha                       2.31    Stream Power (lb/ft s)      0.03       0.37       0.05
  Frctn Loss (ft)             0.18    Cum Volume (acre-ft)    42545.68   27624.98   76191.36
  C & E Loss (ft)             0.01    Cum SA (acres)           8550.37    1343.66   10426.20


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 139.85

INPUT
Description: RGV-01. End Wall, Bathymetric elevations translated from IBWC 2008
             Cross-sections, Section along left levee updated with 2017 survey
Station Elevation Data    num=     445
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  101.96     6.5  102.03    6.98  102.04       9  102.04    9.43   96.42
   21.09   96.08   23.61   96.01   33.18   95.73   45.63   92.65   57.17   89.79
   60.95   89.71   68.46   89.55   71.84   88.72   84.56   85.57   85.98    85.6
  190.55   85.42  197.54   85.76  211.54   89.54  233.54   89.99  275.53   89.55
  323.53   89.96  366.53   90.05  383.53   89.58  404.52   84.45  443.52   82.89
  461.52   82.94  486.52   82.29  526.51   82.48  604.51   82.27   724.5   82.33
  761.49   83.17  804.49   83.17  846.48   84.35  943.48   84.42 1031.47   84.78
 1085.46   84.47 1127.46   85.09 1164.44   87.13 1197.24   87.71  1220.2   88.62
 1256.28   88.38 1275.96   88.85  1302.2   88.63 1325.16   88.93 1331.72   88.67
 1348.12   89.39 1387.47   89.82 1423.55   89.87 1433.39   90.53 1446.51    89.8
 1472.75   90.13 1489.15    89.7 1521.95   90.76 1535.07   89.89  1577.7   89.42
 1584.26   89.08 1603.94   89.67 1620.34   89.48  1626.9   90.07  1643.3    89.3
  1708.9   89.24 1738.42   89.69 1767.94   89.42  1774.5   89.86 1800.73   89.67
 1817.13      89 1826.97   87.74 1853.21   86.57 1879.45   87.41 1892.57   86.41
 1912.25   86.41 1945.05   85.42 1977.85   85.21 2007.36   84.73 2013.92   84.18
 2063.12   85.06 2125.44   84.58 2161.52    83.3 2204.15   82.97 2236.95    82.9
 2309.11   81.55 2345.19   81.19 2387.83   81.28 2404.23   80.99 2420.62   81.25
 2437.02   80.98 2482.94   81.51 2496.06   82.02 2515.74   82.14 2541.98   82.94
 2597.74   83.45  2604.3    84.1 2630.53   83.97 2673.17   85.13 2712.53    88.5
 2722.37   90.17 2742.05   90.81 2751.89   88.31 2758.45   84.92 2765.01   83.08
 2794.53   82.81 2801.09   82.26 2820.76   81.79  2830.6   84.94 2837.16   92.58
 2840.44   93.29    2847   86.72 2856.84   82.67 2869.96   82.37  2879.8   81.26
 2886.36   81.35  2896.2      85 2906.04   92.16 2909.32   92.88    2929   93.35
 2942.12   92.81 2971.64   93.61  2978.2   92.77 2984.76   93.66 2991.32   92.87
 3004.44    93.4 3017.56   90.67 3030.67   90.74 3047.07   89.41 3053.63   89.48
 3073.31   88.06 3092.99   86.23 3106.11   85.51 3122.51   85.39 3148.75   84.11
 3171.71   84.23 3181.55   85.66 3191.39   88.95 3201.23   88.35 3211.07   89.58
 3227.47   87.71 3234.03   87.83 3243.86   86.41 3273.38   85.79 3293.06   85.72
  3368.5   86.04 3440.66   85.92 3499.69   85.94 3512.81   86.28 3545.61   85.95
```

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 3575.13   86.38 3594.81   85.84  3709.6     86 3745.68   86.26 3752.24   87.23
 3768.64    86.2 3811.28   86.18  3824.4   86.52 3919.51   86.22 3949.03   86.23
 3955.59   86.87 3978.55   86.26 3998.23   86.68 4008.07   86.22 4031.03   86.36
 4053.99   86.11 4073.66   86.49 4119.58   86.17  4132.7   86.42  4149.1   86.08
 4168.78   86.28 4234.38   86.05 4277.02   86.04 4286.86   86.35 4303.26   86.02
  4345.9   86.34 4368.85   86.05 4496.77   85.93 4542.69   85.72 4611.57   85.88
 4654.21    85.6  4703.4   85.81  4719.8   85.61    4769   85.82  4801.8   85.67
 4893.64   85.63 4910.04   86.06 4936.28   85.64 4946.12   86.42 4952.68   89.09
 4959.24   93.46 4962.52   94.05 4972.36   93.37  4982.2    90.8    5015   80.87
 5028.11   78.88 5067.47    79.2 5080.59    78.9    5097   77.79 5126.52   78.62
 5146.21   79.98 5159.33   79.15 5169.17   76.47 5192.14   73.38 5201.98   73.01
 5211.82   71.72 5238.07   71.25 5247.91   71.89 5257.75    73.7  5300.4   72.88
 5323.37   73.39 5339.77   72.01  5369.3   77.47 5379.14   80.53  5385.7    81.2
 5398.83   79.47 5402.11   79.85 5411.95    83.5 5428.35   85.11 5448.04   81.32
 5457.88   78.65 5464.44   78.53 5474.28   82.47 5480.84   82.12 5500.53   75.74
 5510.37   74.79 5513.65   73.39 5523.49   66.02 5530.77   64.84 5540.77   61.04
 5570.77   59.64 5610.77   60.14 5630.77   59.84 5650.77   61.34 5670.77   61.04
 5690.77   60.34 5694.09   65.78 5700.66   66.34 5713.78   73.48 5720.34   78.93
 5736.74   85.39 5746.59   89.86 5766.27   89.94 5789.24   88.67 5858.13    88.3
 5927.03   88.43 5953.27   88.21 5995.92   88.32  6084.5   87.77 6100.91   87.96
 6133.72   87.69 6156.68   87.78 6232.14   87.28 6281.35    87.1 6353.53    87.1
 6386.33   86.88 6422.42   86.97 6543.81   86.78 6560.21   86.91 6593.02   86.53
 6615.99   86.74 6694.73      86 6737.38   86.32  6750.5   86.75 6776.75   86.62
 6806.27   85.86  6819.4   86.16 6829.24    85.7 6888.29   85.31 6904.69   85.66
 6940.78   85.13 6967.03   85.36 6999.84   85.32 7032.64    84.8 7068.73   84.74
 7085.14   85.13 7124.51   85.05 7134.35   85.35 7147.47   84.95  7193.4   85.91
 7209.81   85.78 7232.77   84.83 7252.46   84.77 7436.18   84.77 7455.86   85.43
 7488.67   85.74 7524.76   87.34 7531.32   87.87 7567.41   88.73 7573.97   89.41
 7593.65   89.65 7610.06   89.27  7619.9   89.62 7626.46   90.84  7636.3   89.47
 7649.43   89.55 7669.11   88.77 7695.36   89.06 7724.89   87.97 7744.57   87.98
 7754.41   88.38  7774.1   87.54 7826.59    87.3 7885.64   87.76 7915.17   87.75
 7934.85    88.8 7957.82   88.32 7964.38    88.6 7987.35    88.1 8007.03   88.16
 8016.87   85.12 8026.72   85.09 8043.12   87.91 8066.08   87.04 8072.65   87.47
 8092.33   86.69 8118.58   86.45 8141.54   86.76 8164.51   86.69 8213.72   86.02
 8239.97   85.42 8305.58   85.08 8351.51   85.43 8476.19   85.59 8535.24   86.16
 8581.17   86.79 8587.74   87.26 8604.14   87.17 8640.23    87.9 8676.32   88.24
 8709.13    89.4 8718.97   89.18 8771.46   89.75 8830.52   90.04 8866.61   89.81
 8896.14   89.98 8909.26   89.69 8928.94   89.98 8935.51   89.63 8968.31   89.78
 9010.97   89.06 9024.09   89.67 9033.93   89.37 9063.46   89.76 9089.71   89.29
 9112.67   89.92 9135.64   89.53 9145.48   90.26  9158.6   89.73 9171.73   92.12
 9188.13      91 9197.97   91.84 9214.38      92 9230.78   90.65 9250.47   89.78
 9299.68   89.08  9312.8    89.5 9352.17   88.95 9375.14   89.39 9388.26   89.03
 9398.11   89.42 9427.63   88.75 9460.44   89.13    9467   88.57 9473.57    89.7
 9496.53    88.9 9526.06    88.5 9545.74   88.56 9575.27   88.18 9594.96   88.69
 9614.64   88.42 9624.48   88.71 9647.45   88.45  9690.1   88.53 9703.22   87.82
 9778.68   87.72 9831.18   88.23 9850.86   89.48 9867.27   88.55 9880.39   88.55
 9896.79   87.75 9906.64   85.58  9913.2   85.23 9926.32   88.58 9959.13   88.25
10014.91   88.4610041.15   88.3210057.56   87.7810093.65   88.3710149.42   88.16
10234.72   88.0810316.74   87.7110356.11   87.8110421.73   89.2910428.29    88.7
10441.42   90.4410454.54   89.9310497.19   90.1410575.93   88.9710602.18   89.53
10631.71   87.8810671.08   87.4510717.01   87.6110815.43   87.4710831.84    87.2
10861.36   87.2910926.98   86.6210959.79   86.6111051.65   86.0211084.46   86.11
11140.24   85.7911179.61   85.7911205.85   86.0111268.19   85.9511330.53   86.32
11353.49   86.6811360.05   86.3911379.74   87.64 11386.3    86.411399.42   86.46
11409.27   88.5511422.39   87.2211474.88   87.6511497.85   88.44 11524.1   90.22
11547.06   90.8511573.31   92.8511579.87   91.9511592.99   87.5411619.24   87.53
 11625.8   88.2711635.65   90.7411648.77   88.7211658.61   91.2911675.02   91.63
 11694.7   95.6411707.82   96.6411724.23   96.6211747.19   97.1411757.04   93.17
11868.58   93.1711871.87   93.2811881.71   97.3511894.83   96.8311914.52   96.84
11921.08   93.4611930.92   93.0211940.76   90.7711947.33   92.0811960.45   92.32

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .157 5428.35    .066 5523.49    .015 5700.66    .066 5746.59    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5428.35 5746.59          1378.43 1433.33 1501.58             .1       .3
Left Levee      Station=       9      Elevation=  102.04
Right Levee     Station=11747.19      Elevation=   97.14
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   47.32 4962.25   94.07 7625.9211959.44   90.82

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)              98.59    Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.14    Wt. n-Val.                 0.157      0.042     0.074
  W.S. Elev (ft)              98.46    Reach Len. (ft)          1378.43    1433.33   1501.58
  Crit W.S. (ft)              86.22    Flow Area (sq ft)       31275.14    9404.33   54164.19
  E.G. Slope (ft/ft)      0.000211    Area (sq ft)            31275.14    9404.33   54164.19
  Q Total (cfs)           125000.00     Flow (cfs)             13821.93   44323.04   66855.03
  Top Width (ft)          11951.18    Top Width (ft)           5419.08     318.24    6213.86
  Vel Total (ft/s)            1.32    Avg. Vel. (ft/s)            0.44       4.71       1.23
  Max Chl Dpth (ft)          38.82    Hydr. Depth (ft)            5.77      29.55       8.72
  Conv. Total (cfs)       8603303.0     Conv. (cfs)             951314.1   3050596.0   4601393.0
  Length Wtd. (ft)          1462.46    Wetted Per. (ft)         5428.20     333.48    6224.33
  Min Ch El (ft)              59.64    Shear (lb/sq ft)            0.08       0.37       0.11
  Alpha                        5.02    Stream Power (lb/ft s)      0.03       1.75       0.14
  Frctn Loss (ft)              0.28    Cum Volume (acre-ft)    40606.66   27347.19   74245.84
  C & E Loss (ft)              0.01    Cum SA (acres)           8317.57    1334.12   10213.95


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 139.57*

INPUT
Description: RGV-02. Begin Wall
Station Elevation Data    num=     435
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.11   36.98   92.45   46.83   93.49   72.37  101.94   96.37  102.18
   97.04  102.18   97.04   92.18  107.04   91.98  198.04   90.75  201.04    91.5
  225.04   91.02  231.04   89.52  241.04   89.32  247.04   87.82  288.89   87.66
  410.98   87.96  433.79   87.62  461.96   84.16  514.29    82.9  538.44   83.03
  571.98   82.59  625.64   82.61  723.67   82.27  730.29   82.08  810.29   82.12
  834.95   82.68  863.61   82.68  891.61   83.47  956.27   83.52 1025.78   83.83
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 1109.62   83.77 1133.23    83.6 1185.58   83.94  1195.3   88.78 1217.18   88.99
 1230.85    88.7 1258.19   89.39 1269.13    88.8 1304.66   88.51 1310.13   88.28
 1326.54   88.67 1340.21   88.52 1345.68   88.91 1359.35   88.39 1414.03   88.37
 1438.64   88.64 1463.25   88.46 1468.72   88.76 1490.58   88.63 1504.25   88.19
 1512.46   87.35 1534.33   86.58  1556.2   87.16 1567.14   86.51 1583.55   86.53
 1610.89   85.83 1638.23   85.76 1662.83   85.43  1668.3   85.07 1700.93   85.58
 1733.68   83.15 1744.59   83.21 1760.96   84.95 1766.42   85.18 1791.34   84.28
 1815.54   83.88 1854.22   83.59 1914.37   82.77 1944.44   82.55 1979.99   82.65
 2020.99   82.44 2059.27   82.81 2108.49   83.73 2154.97   84.08 2160.44   84.52
  2182.3   84.44 2217.85   85.23 2250.66   87.46 2258.86   88.58 2275.27   89.03
 2283.47   87.37 2288.94    85.1 2294.41   83.87 2319.02   83.66 2340.88   82.97
 2349.08   85.08 2354.55   90.18 2357.29   90.66 2362.75   86.28 2370.96    83.6
 2381.89   83.46 2395.57   82.78 2403.77   85.21 2411.97   89.98  2414.7   90.46
 2431.11   90.77 2442.05   90.41 2466.65   90.96 2472.12   90.41 2477.59   91.01
 2483.06   90.48    2494   90.85 2504.93   89.04 2515.86   89.08 2529.53   88.19
    2535   88.23 2567.81   86.06 2578.75   85.57 2592.42   85.49 2614.29   84.63
 2633.43   84.72 2641.64   85.68 2649.84   87.88 2658.04   87.49 2666.24   88.31
 2679.92   87.08 2685.38   87.16 2693.58   86.22 2718.19   85.82 2734.59   85.77
 2797.48   85.96 2836.02   85.89 2906.84   86.01 2917.78   86.24 2945.12   86.02
 2969.73   86.32 2986.13      86 3037.93   86.02 3070.67   85.81  3111.9      86
 3117.36   86.66 3131.04      86 3166.58   86.04 3177.52   86.29 3245.29   86.06
 3281.41   86.08 3286.88   86.51 3306.02   86.13 3322.42   86.42 3330.62   86.11
  3368.9   85.99  3385.3   86.22 3448.19   85.94 3464.59   86.05  3576.7   85.92
 3612.24   86.16 3631.37   85.97 3776.29   85.71  3833.7   85.76 3869.25   85.56
 3910.25   85.71 3923.92   85.58 3964.94   85.72 3992.28   85.59 4068.84   85.61
 4082.51    85.9 4104.38   85.58 4112.59   86.08 4118.05   87.85 4123.52   90.75
 4134.46   90.74 4142.66   89.01    4170   82.35 4180.93      81 4213.74    81.2
 4224.68   81.01 4238.36   80.28 4262.97   80.88 4279.38   81.78 4290.32   81.21
 4298.52   79.41 4317.67   77.32 4334.07    76.2 4355.96   75.91 4364.16   76.35
 4372.36   77.56 4407.91   77.02 4427.06   77.31 4440.73   76.41 4465.35   79.94
 4473.55    82.2 4479.02   82.88 4489.97    82.4  4500.9   85.95 4514.57   87.86
  4521.5   87.44  4529.2   84.79  4553.1   81.16 4560.69   81.16 4572.08   83.84
 4579.67    83.6 4590.82   81.72 4602.46   78.64 4613.84    77.1 4619.6574.73236
 4629.03   70.91 4637.45   69.41 4649.02   64.77 4657.59   62.53 4668.01   61.06
 4683.74   60.07 4697.07   60.07 4735.52   60.54 4754.74    60.4 4773.96    61.4
 4805.89   60.93  4812.4   61.27 4815.3264.82157 4821.91      66 4834.51   71.71
 4841.3477.11629 4848.29   81.21 4866.05   89.17 4877.64   88.37 4897.92   87.68
 4906.62   87.64 4926.91   89.11 4947.19   87.88 4961.69   87.97 4990.66   87.73
 5058.67   87.72 5086.68   87.62 5132.21   87.66 5226.77   87.29 5244.29   87.42
 5279.32   87.25 5303.83   87.29 5432.28   86.88 5513.97    86.9 5548.98   86.78
 5587.51   86.85 5714.66   86.72 5735.04   86.91 5769.63    86.6 5804.91    86.7
 5878.21   86.27 5923.74    86.5 5937.74    86.8 5965.77   86.69 5997.28   86.17
  6011.3   86.38  6021.8   86.09 6084.84   85.86 6102.35   86.07 6140.87   85.72
 6171.69    85.9 6203.92   85.84 6238.94   85.51 6282.32   85.45 6291.05   85.67
 6337.01    85.7 6347.51    85.9 6361.52   85.65  6407.5   86.32 6428.07   86.23
 6448.25   85.72  6473.6   85.62 6611.27   85.66 6669.72   85.62 6690.73   86.07
 6725.76   86.31 6764.29   87.37 6771.29   87.72 6809.82   88.29 6816.82   88.73
 6837.83   88.94 6855.35    88.7 6865.85   88.93 6872.85   89.75 6883.36   88.85
 6897.37   88.92 6918.38   88.38  6946.4   88.57 6977.93   87.86 7007.16   88.03
 7030.46   87.62  7086.5   87.39 7152.72   87.77 7178.92   87.64 7202.07   88.43
 7226.59   88.15 7233.59   88.36 7258.11   88.04 7279.12   88.08 7289.62   86.05
 7300.14   86.02 7317.65   87.88 7341.93   87.34 7349.17   87.63 7370.18   87.12
  7398.2   86.97 7422.71   87.16 7447.23    87.1 7499.77    86.7 7527.79   86.31
 7597.83   86.08 7646.86   86.38 7779.96   86.48    7843   86.81 7892.03   87.25
 7899.04   87.59 7916.55   87.51 7955.08      88 7996.91   88.25 8028.63   88.98
 8039.13   88.83 8095.17   89.23 8158.21   89.44 8196.74    89.3 8228.27    89.4
 8242.27    89.2 8263.28   89.41 8270.29   89.19 8305.31   89.26 8350.85   88.75
 8364.86   89.18 8375.36   88.99 8406.88   89.27 8434.91   88.97 8459.42   89.42
 8480.15   89.36 8483.06      89 8494.44    89.7 8508.45   89.24 8522.47   90.84
 8539.97   90.09 8550.48   90.65    8568   90.76  8585.5   89.86 8619.88   89.16
 8659.05   88.87 8673.06   89.14 8715.09   88.76 8739.61   89.05 8753.62   88.79
 8764.13   89.07 8795.64   88.64 8830.67   88.92 8837.67   88.56 8844.69   89.33
  8869.2   88.76 8900.72   88.52 8921.73   88.54 8953.25   88.32 8977.94   88.65
 8995.28   88.45 9005.79   88.66 9030.31   88.49 9075.84   88.53 9089.84   88.06
 9135.13   88.02 9170.06   87.75 9175.89   88.23 9196.26   88.06 9202.08   88.34
 9226.44   88.58 9247.45   89.38 9264.97   88.78 9278.98   88.76 9296.48   88.24
    9307   86.78    9314   86.52 9328.01   88.72 9363.03   88.48 9422.58    88.6
 9450.59   88.44 9468.11   88.06 9506.64   88.47 9566.17   88.24 9632.92   88.25
  9679.5   88.14 9744.79   87.85 9786.82   87.89 9856.87   88.81 9863.87   88.39
 9877.89   89.55 9897.82   89.19 9937.43   89.2810021.48   88.43 10049.5   88.77
10081.03   87.6710123.06   87.3610191.83   87.4310218.04   87.2610232.59   87.56
10270.43   87.5210294.67   87.1610398.52   86.44 10418.9   86.4410526.61   85.95
10564.35   85.9510613.94   85.7110665.92   85.6210698.36   85.7810760.49   85.69
10827.04   85.8710851.55   86.1210858.55   85.9310879.57   86.7110886.57   85.86
10900.58    85.910911.09    87.3 10925.1   86.3810981.13   86.6211005.65    87.1
11033.68   88.2911058.19   88.6511086.21   90.0111093.21    89.411107.22   86.46
11135.24   86.4811142.24   86.9711152.76   88.6111166.76   87.2511177.27   88.97
11194.79   89.29 11210.7   92.0511219.43   92.1311233.99   93.0711242.72   94.91
11251.46   95.9511271.83   96.7311290.67   92.0511298.74    91.211387.52   91.26
11398.29   93.7711411.83   93.7311422.88   95.9511444.03    92.811459.72   93.06
11467.08   91.0811478.13   90.8911489.18      8911496.56   89.8511511.29   90.18

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .157 4514.57    .066 4619.65    .015 4815.32    .066 4841.34    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      4514.57 4866.05          1378.43 1433.33 1501.58             .1       .3
Left Levee      Station=   97.04      Elevation=  102.18
Right Levee     Station=11271.83      Elevation=   96.73
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 4123.52   90.75 4860.5811270.22    89.2

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 139.29*

INPUT
Description: RGV-02.
Station Elevation Data    num=     441
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    91.4   10.89   91.87   37.01   95.58   57.18  101.83   81.18  102.07
   81.85  102.07   81.85   92.07   91.85   91.87  182.85   88.85  185.85    89.6
  209.85   89.12  215.85   87.62  225.85   87.42  231.85   85.92  266.81   85.64
   306.7    85.8  412.25   85.71     443    85.9  484.06   85.66  519.39   83.87
  590.12   82.86  622.53   83.16  772.14   82.43  847.77   82.25  896.07   81.92
  936.73   82.59  969.07   82.61  991.38   82.97 1052.32   83.01 1082.36   82.77
 1152.72   82.95 1223.96    82.6  1243.7   82.78 1254.84   86.65 1276.72   86.24
 1305.11   86.33 1322.68   85.97  1348.8   86.29 1366.26   82.74    1375   81.46
```

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 1383.74   81.68  1388.1   82.59 1396.84   85.32 1401.21   85.99 1440.52   84.69
  1471.1   84.29  1497.3   84.07 1549.72    83.9 1572.15   84.02 1604.97   83.91
 1663.28   84.33    1675   84.52  1712.2   84.72 1716.58   84.94 1734.08   84.91
 1762.53   85.32 1788.79   86.42 1795.36   86.99 1808.49   87.24 1815.05   86.43
 1823.81   84.66  1843.5   84.51    1861   84.15 1867.57   85.22 1871.94   87.78
 1874.13   88.02 1878.51   85.85 1885.07   84.52 1904.77   84.21 1911.34   85.42
  1917.9    87.8 1933.22   88.18 1941.97      88 1961.67   88.32 1966.05   88.05
 1983.55    88.3 1992.31    87.4 2001.05   87.42 2016.37   86.99 2042.64   85.88
 2062.33   85.59 2079.84   85.15 2095.16   85.22 2101.72   85.71 2108.29   86.82
 2114.85   86.63 2121.42   87.05  2143.3   86.03 2176.12   85.83 2226.46   85.88
 2257.31   85.82 2313.99   86.08 2322.74   86.21 2344.62    86.1 2364.32   86.25
 2377.45   86.15 2397.07   86.29 2418.91   86.11 2445.11   85.63 2478.11   85.75
 2482.49   86.09 2493.43   85.79 2532.47   86.06 2584.88   85.85 2613.79   85.93
 2618.17   86.15 2633.48   85.99 2683.82   85.87 2736.33   85.97 2768.33   85.77
 2790.17   85.91 2820.74   85.77 2878.58   85.98 2921.21   85.72 2938.68    85.8
 2969.25   85.68  3004.2   85.73 3055.84   85.64 3084.29   85.52  3161.4   85.63
 3191.86   85.49 3254.98   85.73 3272.49   85.52 3279.05   85.74  3287.8   88.04
 3296.56    88.1 3325.01   83.82 3333.75   83.12 3360.02   83.21 3379.72   82.77
 3412.55   83.57 3421.31   83.27 3427.87   82.35  3443.2   81.27 3456.33   80.69
 3473.84   80.58 3486.97   81.43 3515.43   81.15 3530.75   81.23  3541.7   80.81
  3561.4   82.42 3572.34   84.56 3583.29    85.8 3589.85   88.41 3596.4190.12216
  3600.8    90.6 3612.42    90.2 3618.26   87.04 3621.17   86.18 3641.59   83.87
 3656.94   83.78 3669.88   85.21  3678.5   85.08 3691.17   84.43 3708.67   80.65
3715.8179.61821 3717.32    79.4 3726.17   76.99 3740.75   74.97 3758.25   68.21
    3767   64.37 3778.85   61.85 3787.78   60.81 3796.71   60.51 3823.38   60.51
 3844.26   60.87  3878.7   60.97 3897.15   61.47 3927.79   61.29 3937.09   64.51
 3943.15   65.67 3951.41   68.05 3954.83   69.66 3968.46   80.42  3985.5   88.48
 3991.67   88.19 3997.83   86.83  4019.4   85.99 4028.65   86.36 4037.89   87.72
 4044.05   89.02 4050.21   89.62 4059.45   89.02 4071.78   87.26 4087.19   87.52
    4118   87.14 4161.14   87.11 4188.87   87.01  4268.5      87 4352.32   86.74
 4387.67   86.88 4442.08   86.76 4482.32   86.81  4494.7   86.72 4516.36   86.88
 4547.32   86.72 4587.56   86.65 4652.56   86.73  4689.7   86.64 4717.56   86.71
 4825.89   86.64 4856.85   86.74  4887.8   86.65 4909.47   86.91 4937.32   86.65
 4983.75   86.76 4996.13   86.64 5061.69   86.53 5104.46   86.63 5124.99   86.86
 5154.78   86.76 5188.29   86.47 5203.19   86.61 5246.84   86.36    5300   86.48
 5340.97   86.32 5373.74   86.44    5408   86.37 5429.45   86.21 5478.98   86.17
 5491.36   86.05 5494.46    86.7 5500.64   86.31 5575.57   86.35 5608.97   86.49
 5624.45   86.78 5673.98   86.48 5773.01   86.46 5841.11   86.55 5903.27   86.47
 5943.25   86.88 5949.44   86.69 6033.01   87.82 6052.22   87.84    6082   88.24
 6100.63   88.12  6111.8   88.24 6119.25   88.67 6130.41   88.23 6145.32   88.29
 6167.65   87.99 6197.45   88.08 6230.97   87.75 6249.67   87.79 6255.86   88.11
 6262.05   87.76 6265.15   88.56 6271.34   87.83 6305.38   87.76 6320.86   87.51
 6392.05    87.6 6416.81   87.77 6444.67   87.54 6453.96   87.91 6460.15   87.74
 6472.52   88.11 6495.35   87.99  6502.8   88.11 6551.21   88.01 6562.38   86.98
 6573.56   86.94 6592.17   87.85    6618   87.64 6625.69   87.78 6648.03   87.55
 6677.82   87.49 6704.66   87.57 6717.04   87.43  6741.8   87.56 6815.61    87.2
 6890.08   87.08 6942.21   87.33 6980.13   87.38 7023.47    87.3 7048.22   87.39
 7100.84   87.41 7107.03   86.96 7110.13   87.65 7116.32   87.42 7150.75   87.47
 7172.04   87.64  7193.7   87.62 7212.27   87.93 7228.96   87.85 7302.03   88.23
 7314.41   88.16 7348.13   88.57 7376.31   88.51 7428.93   88.73  7450.6   88.69
 7485.91   88.84 7560.39   88.82 7575.28    88.7 7597.62   88.83 7617.73   88.67
 7642.31   88.74 7679.64   88.61 7690.73   88.44 7705.62   88.69 7716.79   88.62
 7750.31   88.79  7780.1   88.65 7828.21   89.13 7831.31   88.45 7837.49   89.34
  7858.3   88.76 7877.73   89.57 7891.81   89.19 7902.98   89.46 7921.61   89.52
 7940.23   89.07 7976.77   88.73 8018.43   88.65 8033.32   88.77 8078.01   88.57
 8104.08    88.7 8118.97   88.56 8130.15   88.72  8150.1   88.51 8177.96   88.55
  8200.9   88.71 8208.35   88.55  8215.8   88.96 8241.86   88.61 8289.39   88.49
  8348.2    88.5 8357.48   88.66 8372.95   88.48 8387.09   88.62 8413.17   88.54
 8461.57   88.53 8476.47   88.31 8524.62   88.27 8555.57   87.98 8561.76   87.77
 8567.95   88.68 8589.62   88.17 8595.81   88.67 8611.29   88.75 8644.05   89.28
 8696.18   88.72 8707.36   87.97  8714.8   87.82  8729.7   88.86 8759.85   88.71
 8781.52   88.79 8837.24   88.73 8878.66   88.35 8919.62   88.57 8982.92   88.31
  9053.9    88.4 9081.75   88.26 9103.42   88.29 9131.27   88.13  9177.7   87.99
 9217.53   87.97 9251.98   88.19 9264.37   88.13 9292.01   88.33 9299.46   88.09
 9314.36   88.67 9335.55   88.43 9377.66   88.43 9416.03   88.13 9422.21   88.21
 9474.83   87.86 9496.83      88 9549.12   87.26 9589.36   87.33 9595.55   87.24
 9648.16   87.27 9676.02   86.96  9691.5   87.58 9716.26   87.42 9731.73   87.55
  9757.5   87.11 9787.45    86.8 9793.64    86.2 9809.12   86.49 9824.59   86.34
 9846.26   86.43 9867.92   86.26 9889.59   86.27 9936.02   86.1310028.87   85.73
 10078.4   85.7610161.97   85.4310186.72   85.5510211.49   85.4410248.63   85.44
10295.06   85.34 10349.6   85.5510357.05   85.46 10379.4   85.7710386.84   85.32
10401.73   85.3410412.91   86.0510427.81   85.5510452.91   85.6110474.58   85.51
10513.46   85.7610543.25   86.3610567.43   86.4210599.11   87.1710606.55   86.86
10621.45   85.3710644.81   85.3410658.69   85.6610669.87   86.4710684.76   85.78
10695.93   86.6610714.55   86.9510719.09   87.2210725.29   88.7310731.48   89.44
10740.75   88.3610756.23    89.510765.52   93.1910774.81   95.19   10781   95.76
10796.47   96.3210805.43   95.3410817.37   90.9210823.34   89.3410826.33   89.24
10921.84   89.2410924.82   89.3610933.78    93.510936.76   94.3610951.79   94.18
10960.64   94.9510964.04   94.5610972.58   92.5410981.54   89.9810987.51   88.76
10996.47   88.7311004.91   89.2711013.09   88.7111020.34   89.21 11037.6   87.23
11062.13   88.04

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .094 3596.41    .066 3715.81    .015 3844.26    .066 3927.79     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        3600.8  3985.5          1378.43 1433.33 1501.58             .1       .3
Left Levee      Station=   81.85      Elevation=  102.07
Right Levee     Station=10796.47      Elevation=   96.32
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  172.12 3297.76   88.05 4048.1910767.64   89.44

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 139.01

INPUT
Description: RGV-02. Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     435
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    91.7       8   92.43      42  101.73      66  101.97   66.67  101.97
   66.67   91.97   76.67   91.77  167.67   87.05  170.67    87.8  194.67   87.32
  200.67   85.82  210.67   85.62  216.67   84.12  272.97   83.58  320.96   83.92
  380.95    83.8  447.94   83.57  484.93   83.83  598.92   83.52  661.91   82.84
   700.9   83.32  805.89   83.01  880.88   82.45  971.87   82.24  981.86   81.71
 1007.86   82.21 1036.86   81.88 1078.85   82.19 1113.85   81.79 1195.83   82.14
 1278.82   81.45 1301.82   81.63 1308.12   85.42 1314.67   85.31 1347.46   85.49
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 1376.96    85.3 1399.91   85.45 1406.47   85.65 1439.26   85.59  1478.6   85.77
 1544.17   85.67 1609.74    85.9 1678.59   85.75 1694.98   85.98 1724.49   86.17
 1757.27   86.17  1783.5   86.49 1799.89    86.2 1819.56   85.46  1829.4   85.37
 1885.13   85.83 1924.47   85.65 1970.37   85.91 2016.27   85.64 2032.67   85.79
 2062.17   85.53 2078.56    85.8 2101.51   85.63 2153.97   85.83 2176.92   85.57
 2190.03    85.7 2212.98   85.55 2239.21   85.71 2288.39   85.47 2357.21   85.53
 2380.07    85.4 2412.72   85.59 2432.31   85.56 2451.91   85.32 2458.44   85.47
 2494.36   85.18 2527.01   85.27 2536.81   85.43 2575.99   85.16 2618.44   85.38
 2631.51   85.12  2641.3   85.24 2657.63   84.89 2664.16   85.77 2673.96    88.8
 2683.75   92.96 2687.02   93.35 2700.08   93.28 2703.35   92.96 2709.88   88.65
 2713.14   87.57 2719.67   86.86    2736   85.78  2745.8    86.3 2765.39   86.58
 2778.45   86.56 2791.51   87.15 2801.31   85.63 2811.11   83.27 2817.64   82.38
 2827.43   80.29  2830.7   80.08 2840.49   80.72 2847.03   79.83 2850.29    78.8
 2856.82   75.65 2866.62   71.81 2876.42   66.21 2879.68   65.68 2889.68   62.64
 2899.68   61.24 2909.68   60.94 2949.68   60.94 2969.68   61.34 2989.68   61.34
 3009.68   61.64 3029.68   61.44 3049.68   61.64 3065.78   65.68 3072.31   66.46
 3075.58   67.88 3082.11   72.82 3088.64   79.64  3091.9   81.82 3098.43   84.93
 3101.69   87.11 3104.96   87.79 3111.49   87.35 3118.02   85.29 3124.55   84.72
 3140.87   84.29 3150.67   85.07 3160.46   87.26 3166.99   89.22 3173.52   90.14
 3183.31   89.25 3196.37   86.65  3202.9    86.5  3212.7   87.07 3245.34   86.56
 3291.05   86.48 3320.43    86.3 3346.55   86.44  3369.4   86.42 3467.36   86.18
  3493.6   86.18 3500.15   86.31 3575.58   86.37  3588.7   86.27 3631.33   86.41
 3644.45   86.32  3667.4   86.62  3700.2   86.45 3706.76   86.56 3742.83   86.42
 3769.07   86.54 3792.02   86.43  3811.7   86.55 3851.05   86.45 3880.57   86.62
 3955.99   86.57 3965.83   86.67 3995.34   86.53 4028.14    86.7 4060.93   86.59
 4074.05   86.81 4080.61   86.45 4083.89   86.91 4093.73   86.71  4113.4   86.67
 4136.36   86.82  4146.2   86.68 4162.59   86.82 4175.71   86.69 4201.94   86.79
 4290.48   86.81  4303.6   86.93 4372.47   86.76 4418.38    86.9 4441.33   86.79
 4457.73   86.95 4487.24   86.97 4506.92   86.81 4523.31   86.92 4565.95   86.89
 4575.78   86.98 4595.46    86.8 4611.86   86.89 4634.81    86.8 4644.65   86.94
 4687.28   86.88 4693.84   87.05  4700.4   86.65 4703.68   87.59 4710.23   86.94
 4726.63   86.84 4739.75   87.02 4765.98   86.99 4802.06   87.08 4825.01   86.95
 4841.41   87.25 4847.97   87.11 4887.32   87.15 4893.88   87.31 4966.02   87.32
 4979.14   87.44 4998.81   87.31 5041.44   87.38    5048   87.24 5070.96   87.44
 5087.35   87.27 5103.75   87.39 5136.54   87.32 5169.34   87.36 5179.17   87.53
 5185.73   87.22 5195.57   87.46 5264.44   87.41 5274.27   87.57 5300.51   87.35
 5330.02   87.56 5352.98   87.54 5392.33   87.66 5431.68   87.56 5457.91    87.6
 5467.75   87.77 5480.87   87.64 5503.82   87.69 5510.38   88.13 5516.94    87.5
 5520.22   88.66 5526.78   87.68 5562.85    87.9 5579.25   87.57 5621.88   87.59
 5631.72   87.83 5638.28    87.6 5651.39    87.9 5654.67   87.59 5674.35   87.55
 5680.91   87.78 5694.02   87.45 5700.58   87.78 5710.42   87.43 5720.26   87.82
 5726.82   87.42 5739.93   87.79 5749.77   87.74 5782.56   87.93 5828.48   87.93
 5864.55   87.81 5894.06   87.93 5959.65   88.02 5985.88   87.97    5999   87.79
 6025.23   88.06 6035.07   87.97 6087.54   88.09 6192.48   88.08 6228.55   88.26
 6277.74   88.33 6323.65   88.19 6349.88   88.31 6405.63   88.24 6412.19   87.54
 6415.47   88.57 6422.03   88.19  6458.1   88.12 6481.06   88.25 6504.01   88.09
 6523.69   88.27 6556.48   88.13 6618.79   88.26  6631.9   88.06 6671.25   88.16
 6697.49    88.1 6753.24    88.2 6776.19   88.09 6815.54   88.24  6854.9   88.29
 6920.48   88.19 6943.44   88.33 6953.27   88.16 7018.86    88.3  7028.7   88.13
 7077.89   88.32 7110.68   88.28 7156.59   88.42 7176.27    88.9 7179.55    87.9
  7186.1   89.07 7195.94   88.32 7222.18   88.22 7228.73   88.43 7245.13   88.27
 7307.44   88.29    7314   88.51 7333.67   88.29 7359.91   88.48 7415.65   88.36
 7455.01   88.39  7487.8   88.31 7507.48   88.45 7517.31   88.25 7530.43   88.44
 7546.83   88.37 7589.46    88.6 7612.41   88.46 7658.32   88.58 7664.88   88.47
 7710.79   88.61 7727.19   88.47 7737.03   88.67 7753.42   88.49 7776.38   88.61
 7845.24   88.52 7894.43    88.6 7914.11   88.52  7946.9   88.11 7953.46    87.8
 7960.02   89.14 7966.58   89.13 7982.97   88.27 7989.53      89 8005.93   89.05
 8019.05   89.31 8032.16   89.14 8068.23   89.28 8087.91   89.06 8097.75   89.24
 8133.82   88.98 8163.33   88.91 8186.29   89.03 8219.08   88.86 8245.32   88.88
 8255.16   88.73 8287.95   88.63 8314.18   88.73 8389.61    88.5 8399.44   88.39
 8425.68   88.59 8432.24   88.46 8468.31   88.44 8474.87   88.55 8504.38   88.36
 8527.34   88.44 8556.85   88.26 8606.04   88.13  8612.6   88.23 8661.79   87.98
 8684.74   88.04 8697.86   87.83 8720.82   87.91 8737.21   87.76 8766.73    87.8
 8773.28   87.67 8838.87   87.53 8858.55   87.38  8865.1   87.53 8907.74    87.4
 8920.85   87.23    8993   87.26 8999.56   87.04 9042.19   87.25 9048.75    87.1
 9104.49   87.11 9134.01   86.67 9140.57   87.27  9150.4   87.61 9176.64   87.38
 9193.03   87.59 9215.99   87.11 9242.22   86.87 9252.06   86.56 9258.62   85.67
 9275.02   86.17 9291.41   86.02 9314.37   86.25 9337.32   86.08 9360.28    86.1
 9383.23   85.97 9409.47   85.98 9481.61   85.77 9507.85   85.56 9527.52   85.64
 9543.92   85.51 9560.32   85.67 9579.99   85.43 9589.83   85.56 9648.86   85.21
 9675.09   85.32 9701.33   85.17 9740.68   85.19 9789.87   84.93 9855.45      85
 9891.52   84.75 9917.76   84.81 9947.27   84.59 9957.11   84.71 9980.07   84.48
 9996.46   84.5710012.86    84.410039.09   84.4710068.61   84.3810078.44   84.23
10094.84   84.3510160.43   84.2510166.99   84.37 10212.9   84.2910222.73   84.59
10239.13   84.6110245.69   86.3210252.25   86.8210262.08   84.5910271.92   85.06
10278.48   85.9310288.32   91.4710298.16   94.4310304.72   95.2310321.11   95.91
10330.95   95.8910334.23    95.210344.07    89.810350.63   87.4210353.91   87.27
10458.84   87.2710462.12   87.4510471.96   93.6710475.24   94.9610478.52   95.07
10501.47   94.3110514.59   90.2710524.43   86.5610530.99   84.7310540.83   84.67
10557.22   86.1210567.06   87.2210583.46    85.510593.29   85.3510612.97    85.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .094    2736    .066 2866.62    .015 3075.58    .066  3091.9    .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2687.02 3104.96           1872.8    1725 1469.48            .1       .3
Left Levee      Station=   66.67      Elevation=  101.97
Right Levee     Station=10321.11      Elevation=   95.91
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    6.76 2677.18   93.41 3163.94 10526.2   90.12

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             97.85    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                 0.094      0.049      0.060
  W.S. Elev (ft)             97.77    Reach Len. (ft)          1872.80    1725.00    1469.48
  Crit W.S. (ft)             84.99    Flow Area (sq ft)       11429.99   10256.75   57643.47
  E.G. Slope (ft/ft)      0.000211    Area (sq ft)            11429.99   10256.75   57643.47
  Q Total (cfs)           125000.00    Flow (cfs)               6998.63   37389.18   80612.19
  Top Width (ft)          10546.30    Top Width (ft)           2620.35     417.94    7508.01
  Vel Total (ft/s)            1.58    Avg. Vel. (ft/s)            0.61       3.65       1.40
  Max Chl Dpth (ft)          36.83    Hydr. Depth (ft)            4.36      24.54       7.68
  Conv. Total (cfs)       8597357.0    Conv. (cfs)              481357.5   2571585.0   5544415.0
  Length Wtd. (ft)         1559.27    Wetted Per. (ft)         2628.54     431.50    7531.09
  Min Ch El (ft)             60.94    Shear (lb/sq ft)            0.06       0.31       0.10
  Alpha                       2.12    Stream Power (lb/ft s)      0.04       1.14       0.14
  Frctn Loss (ft)             0.30    Cum Volume (acre-ft)    37612.83   26366.22   68208.26
  C & E Loss (ft)             0.01    Cum SA (acres)           7939.22    1297.79    9504.43
```

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 138.69*

INPUT
Description: RGV-02.
Station Elevation Data num= 437

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	94.01	27.49	99.96	38.49	101.62	62.49	101.86	63.16	101.86
63.16	91.86	73.16	91.66	164.16	85.5	167.16	86.25	191.16	85.77
197.16	84.27	207.16	84.07	213.16	82.57	241.75	82.33	292.03	82.48
334.22	82.83	447.3	84.32	468.07	84.99	523.4	83.91	563.03	82.77
611.12	81.62	616.4	81.24	699.38	81.35	711.88	82.06	720.88	84.61
982.32	84.65	996.78	84.9	1055.74	84.68	1101.34	84.85	1160.29	84.59
1165.19	86.82	1191.67	86.76	1222.56	86.89	1240.22	86.84	1275.52	87.01
1324.08	86.95	1335.62	86.89	1363.8	87.11	1399.11	87.09	1419.1	87.29
1432.14	87.17	1447.79	86.78	1456.48	86.72	1499.97	86.97	1522.69	86.85
1567.79	87.05	1580.06	86.95	1617.36	86.96	1640.83	86.77	1653.87	86.98
1672.13	86.91	1713.88	87	1732.14	86.92	1747.75	87	1760.83	86.86
1781.7	86.98	1820.83	86.84	1875.59	86.97	1893.78	86.93	1919.76	87.01
1950.94	86.9	1956.14	86.99	1988.93	86.89	2018.5	87.04	2049.67	86.81
2063.47	86.91	2076.63	88.42	2085.39	88.79	2094.17	87.46	2098.55	87.78
2102.94	88.9	2119.83	89.66	2135.41	92.72	2138.02	92.72	2145.53	92.25
2152.43	92.14	2158.2	89.99	2161.08	89.39	2183.3887.86608		2186.86	87.61
2201.88	87.87	2205.64	87.78	2213.15	85	2220.67	84.26	2230.28	84.37
2238.93	83.15	2246.96	81.63	2250.72	80.61	2258.24	77.6	2264.88	75.75
2273.53	74.64	2284.53	71.6	2293.12	64.51	2304.3460.82856		2308.13	60.11
2316.96	57.61	2325.79	55.96	2334.62	54.87	2354.62	54.87	2370.23	56.48
2380.33	57.85	2391.35	58.78	2406.96	59.75	2416.72	63.63	2425.3564.91978	
2428.76	65.57	2440.8	69.84	2443.81	70.67	2452.84	72.06	2464.39	72.93
2482.06	75.9	2489.23	76.74	2492.82	77.66	2497.98	79.64	2507.15	84.13
2510.73	85.27	2517.9	86.91	2521.48	88.05	2525.06	88.43	2531.86	88.2
2538.65	87.15	2545.44	86.85	2562.42	86.7	2572.61	86.99	2582.79	87.97
2589.59	88.85	2596.38	89.21	2606.56	88.42	2620.14	86.79	2637.13	86.55
2651.28	86.11	2670.22	85.84	2682.85	85.92	2701.77	85.5	2720.7	85.47
2752.26	85.18	2764.88	85.3	2780.66	85.22	2809.05	85.34	2824.84	85.33
2856.39	85.56	2878.48	85.82	2887.96	86.18	2903.75	86.4	2947.95	86.8
2982.69	86.81	3007.96	86.65	3017.43	86.71	3036.38	86.56	3072.57	86.63
3096.38	86.55	3110.08	86.63	3159.54	86.47	3169.01	86.5	3188.54	86.29
3216.37	86.27	3239.71	85.98	3289.01	85.77	3304.8	85.57	3320.59	85.65
3339.54	85.58	3364.8	85.68	3386.9	85.61	3415.33	85.81	3456.38	85.86
3465.85	85.78	3487.95	85.83	3510.06	86	3533.06	86.07	3539.88	85.94
3543.29	86.21	3570.06	86.28	3597.87	86.73	3620.59	86.85	3649.01	86.89
3671.11	86.84	3690.06	87.01	3709.01	86.84	3746.91	86.86	3762.7	86.77
3781.64	86.85	3803.74	86.65	3835.33	86.73	3885.85	86.96	3936.38	87.03
3962.84	87.18	3983.31	87.03	4005.85	87.1	4012.17	87.26	4024.8	87.21
4050.07	87.44	4056.38	87.6	4075.4	87.64	4097.43	87.9	4129.01	88.05
4144.8	88	4177.73	88.12	4184.55	87.91	4187.97	88.37	4195.33	88.03
4211.84	88.02	4245.85	88.16	4274.27	88.07	4280.59	88.14	4315.33	88.04
4338.05	88.16	4378.98	88.26	4387.96	88.36	4425.85	88.24	4470.07	88.42
4482.7	88.29	4526.9	88.37	4569.99	88.26	4587.04	88.09	4618.49	87.97
4643.74	87.72	4659.53	87.67	4689.37	87.3	4754.28	87.06	4781.46	87.17
4820.59	87.1	4839.45	87.31	4874.28	87.44	4893.23	87.59	4918.49	87.58
4982.71	87.74	5020.23	87.68	5027.05	87.9	5033.87	87.59	5037.29	88.16
5044.11	87.67	5081.63	87.8	5107.96	87.59	5160.08	87.6	5173.72	87.75
5177.13	87.59	5197.6	87.57	5204.43	87.69	5218.06	87.46	5224.89	87.62
5235.12	87.44	5245.36	87.63	5252.18	87.43	5329.02	87.88	5351.12	87.86
5404.8	87.99	5452.17	88.31	5467.96	88.29	5486.91	88.44	5521.64	88.48
5535.29	88.39	5562.57	88.53	5572.8	88.4	5651.11	88.3	5701.64	88.46
5707.96	88.37	5745.86	88.43	5767.96	88.28	5790.07	88.24	5818.48	87.95
5850.07	87.82	5913.23	87.7	5941.64	87.82	5958.24	87.81	5965.06	87.49
5968.47	88.02	5975.3	87.85	6017.44	87.71	6026.91	87.8	6049.02	87.66
6124.8	87.87	6179.96	88.17	6193.59	88.09	6219.54	88.13	6276.38	88.32
6282.7	88.41	6314.28	88.42	6336.39	88.21	6342.7	88.01	6361.65	87.8
6437.44	86.36	6462.7	86.23	6491.12	86.28	6517.64	86.62	6535.33	86.63
6544.8	86.78	6596.09	87.26	6606.32	87.13	6677.43	86.87	6699.54	86.97
6737.44	87.44	6759.82	87.61	6763.23	87.1	6770.04	87.67	6780.28	87.26
6807.57	87.18	6814.38	87.28	6831.44	87.11	6866.91	87.13	6896.25	87.05
6903.08	87.14	6923.54	87	6950.83	87.01	7005.86	87.26	7031.12	87.43
7065.86	87.2	7091.12	87.37	7104.32	87.58	7114.55	87.57	7163.75	88.33
7189.59	88.65	7226.92	88.86	7261.22	88.77	7312.18	88.16	7318.49	88.01
7343.76	87.85	7346.91	87.57	7359.55	87.43	7369.02	87.54	7406.91	87.25
7435.33	86.6	7460.6	85.9	7473.23	85.77	7527.28	85.76	7561.38	85.56
7568.21	85.4	7575.03	86.07	7581.85	86.07	7598.9	85.63	7605.72	86
7636.43	86.15	7650.07	86.07	7687.58	86.14	7708.05	86.03	7718.29	86.12
7755.81	85.99	7786.5	85.96	7810.38	86.01	7844.49	85.93	7871.78	85.94
7916.12	85.82	7943.41	85.87	8021.87	85.75	8032.09	85.69	8059.38	85.79
8066.21	85.73	8103.72	85.72	8110.55	85.78	8141.24	85.68	8165.12	85.72
8195.82	85.63	8246.98	85.57	8253.81	85.62	8304.97	85.49	8328.84	85.52
8342.49	85.42	8366.37	85.53	8389.01	85.46	8483.76	85.38	8516.44	85.47
8559.54	85.41	8597.43	85.41	8613.22	85.52	8649.48	85.52	8656.3	85.42
8700.64	85.68	8707.47	85.62	8765.44	85.85	8796.15	85.67	8813.2	86.12
8843.71	86.02	8857.54	86.14	8868.97	86.06	8891.08	86.11	8918.94	85.85
8925.76	85.43	8942.82	85.77	8957.38	85.59	8983.75	85.87	9007.62	85.82
9055.38	85.94	9077.36	85.84	9086.83	86.08	9096.31	85.9	9112.1	86.15
9121.56	85.95	9149.98	85.92	9191.03	85.74	9197.35	85.88	9219.44	85.59
9260.49	85.74	9298.39	85.2	9317.33	84.74	9345.74	83.89	9427.17	83.85
9478.34	83.72	9546.55	83.76	9584.07	83.63	9611.36	83.66	9642.06	83.55
9652.29	83.61	9676.17	83.5	9737.56	83.49	9863.77	83.38	9870.6	83.44
9918.35	83.4	9929.87	83.64	9939.34	84.64	9945.63	84.68	9952.46	85.58
9959.28	85.88	9969.51	84.93	9977.23	85.53	9986.56	87.6	9996.18	92.63
9999.33	93.3710007.03		94.4810024.59		95.3110030.91		95.310038.87		94.25
10049.48	88.8510054.79		87.4310060.96		87.2710142.33		87.2710144.98		87.36
10152.94	90.4710158.25		91.1710176.81		90.7910189.75		88.6110195.39		87.98
10200.7	87.8110211.21		89.2310229.87		90.3510241.26		89.5210249.85		88.56
10262.72	86.3410267.01		85.82						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	2138.02	.07	2304.34	.025	2425.35	.07	2525.06	.066

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2138.02	2525.06	1872.8	1725 1469.48	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
2525.0610267.01		88.43	T

```
Left Levee      Station=   63.16      Elevation=  101.86
Right Levee     Station=10027.63      Elevation=  95.435
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    6.88 2141.14   92.83 7226.92 9996.56   88.35

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 138.36

INPUT
Description: RGV-02.Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     434
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   96.33   12.99  100.07   24.99  101.51   48.99  101.75   49.66  101.75
   49.66   91.75   59.66   91.55  150.66   83.9  153.66   84.65  177.66   84.17
  183.66   82.67  193.66   82.47  199.66   80.97  200.95   80.97  215.95   81.14
  225.95   83.21  234.94   86.67  240.94   84.79  250.94   80.78  367.91   80.78
   416.9      81   441.9   82.41   447.9   84.43  459.89   87.52  474.89   88.34
  476.89   88.99  481.89   86.61  498.89   87.45  598.86   87.45  622.86   87.55
  982.78    87.6 1018.77   87.55 1039.84      88 1066.08   88.15 1082.48   88.06
 1089.04   88.25  1095.6   88.06 1118.57   88.13 1131.69   88.01 1138.25   88.15
 1167.77   88.19 1174.33   88.08 1187.45   88.28 1190.73   88.13  1213.7   88.15
 1216.98   87.97 1233.38   88.22 1266.18   88.11 1298.96   88.35 1308.74   88.17
 1334.81    88.3 1347.85   88.18 1377.18   88.38  1383.7   88.29 1399.99   88.47
 1419.54   88.46  1439.1   88.38 1471.69   88.65 1478.21   88.58 1514.05   88.68
 1520.57   88.44 1533.61   88.57 1536.87   89.22 1543.39    91.5  1549.9   92.24
 1553.16   91.48 1556.42    89.8 1559.68   90.36 1562.94    92.6 1569.46   93.67
 1582.49   93.41 1589.01   92.09 1595.53    91.2 1605.31   91.38  1621.6   90.67
 1631.38    89.1 1644.41   89.24 1647.67   89.01 1654.19   83.44 1660.71   81.87
 1667.23   81.81 1683.52   79.82 1686.78   78.43  1693.3   74.01 1696.56   72.38
 1706.34   68.66 1712.85   65.86 1716.11   65.68 1723.56   55.66 1725.56    55.2
 1735.56    54.8 1741.56   53.23 1759.56    48.8 1764.56   49.42 1776.56   51.73
 1787.56   54.35 1799.56   56.22 1816.56   58.05 1827.19   65.68 1830.47   66.07
  1840.3   69.57 1846.86    74.1 1853.41   78.22 1856.69   79.88 1866.52   82.59
 1886.18   85.15 1899.29   86.19 1909.12   87.37 1915.68   87.83 1918.96   88.46
 1945.17   89.08 1964.84   88.97  1984.5   89.12 2007.44   88.62 2023.83   88.14
 2033.66   87.24 2053.32   86.66 2059.88   86.11 2076.26   85.37 2089.37   85.34
 2095.93   85.11 2109.04   85.29  2128.7   84.49 2148.36   84.47 2164.75   84.21
  2171.3   84.39 2181.13   84.05 2194.24   84.22 2210.63      84 2240.12   84.29
 2246.68   84.52 2256.51    84.3 2272.89   84.49 2289.28   84.83 2302.39   85.33
 2312.23   85.41 2322.07   86.14 2328.63   86.11 2338.47   86.63  2348.3   86.85
 2384.38   87.28 2390.94   87.07  2397.5   87.26 2420.46   87.27  2446.7   86.93
 2456.54   87.08 2476.22   86.82 2505.73   86.87 2531.97   86.78 2538.53   86.65
 2594.29   86.58 2604.13   86.42 2613.97   86.51 2627.09   86.25  2656.6   85.88
 2663.16      86 2699.24    85.3 2718.92   85.23 2732.04   84.96  2738.6   85.06
    2755   84.67  2771.4   84.74 2791.08   84.54 2800.91   84.72 2817.31   84.77
 2840.27   84.63 2869.79   85.01 2876.35   84.91 2912.43   85.17 2922.27   84.96
 2945.22   84.97 2968.18   85.38 2994.42   85.33  3014.1   85.74  3030.5   85.88
 3060.02   86.65 3082.98   86.92 3089.54   86.84 3112.49   87.06 3135.45   86.88
 3155.13   87.23 3174.81   86.89 3214.17   86.91 3230.57    86.7 3250.24    86.8
  3273.2   86.45 3283.04   86.64    3306   86.68 3332.24   86.89  3338.8   86.81
 3358.48   87.04  3371.6   87.03 3381.44   87.22 3410.95    87.1 3420.79   87.36
 3443.75    87.4 3466.71   87.19 3483.11   87.29 3489.67    87.6 3502.79   87.51
 3515.91   87.83 3529.03   87.95 3535.59   88.23 3558.54   88.52 3578.22   88.93
 3611.02   89.16 3627.42   89.09 3643.82   89.25  3679.9   89.13 3732.37   89.32
 3761.89   89.09 3768.45   89.22 3788.13   89.09 3797.97   89.26 3804.53   89.11
 3879.96   89.41 3902.92   89.19 3919.32   89.16 3935.72   89.33 3965.24   89.43
 3978.36    89.2 4024.27   89.38 4034.11   89.23 4043.95   89.34 4099.71   88.78
 4109.55   88.55 4119.39   88.57 4145.62   88.12 4162.02      88 4184.98   87.37
 4194.82   87.38 4207.94   87.04 4244.02   86.87 4253.86   86.93 4260.42    86.7
 4309.61   86.83 4329.29   86.76 4345.69   87.02 4375.21    87.3 4385.05    87.3
 4404.73   87.55 4430.97   87.54  4473.6   87.81 4499.84   87.71 4529.36    87.8
 4535.92   87.68    4572   87.66 4617.91   87.74 4627.75   87.61 4735.98   87.59
 4742.54   87.46  4798.3   87.42 4857.34   87.82  4880.3   87.79 4922.93   88.13
 4936.05   88.14 4985.25   88.65 5001.65    88.6 5021.33   88.87 5027.89   88.78
 5050.84   88.98 5103.32      89 5109.88   88.84 5162.36   88.62 5168.92   88.49
 5191.87   88.52 5244.35   88.83 5250.91   88.65 5290.27   88.73 5313.23   88.32
 5336.19   88.19  5365.7   87.58  5398.5   87.38 5405.06   87.51 5434.58   87.26
  5464.1    87.1 5493.61   87.37 5500.17   87.27 5526.41   87.52 5546.09   87.48
 5572.33   87.28 5582.17   87.41 5605.13   87.16 5624.81   87.36  5641.2   87.26
 5683.84    87.6 5703.52   87.83 5746.16   88.12 5782.23   88.14 5841.27   88.52
 5847.83   88.68 5880.63   88.65 5903.59   88.29 5910.15   87.93 5929.83   87.45
 5956.06   86.39 6008.54   84.45 6034.78   84.23 6041.34   84.36  6064.3   84.36
 6083.98   84.65 6093.81   84.97 6110.21   85.08 6120.05   85.36 6165.97   86.03
 6172.53   86.23 6211.89    85.9 6215.17   85.76  6257.8   85.44 6280.76   85.63
 6300.44   85.94 6320.12   86.46 6366.04    86.2 6405.39   86.12 6411.95   85.95
 6454.59   85.98 6500.51   85.72 6530.02   85.68 6539.86   85.52  6598.9   86.16
 6612.02   86.15 6625.14   86.48 6641.54   86.18 6661.22   86.05  6664.5    86.2
 6687.45   86.39 6703.85   86.77 6726.81   87.14 6736.65   87.53 6762.89    88.2
 6798.97   88.87 6828.49   89.22 6844.88   89.03 6867.84   88.95 6917.04   87.72
  6923.6   87.44 6936.72   87.36 6949.84   87.03 6953.12   86.51 6966.24   86.36
 6976.08   86.55 6992.47    86.2 6999.03   86.23 7015.43   85.91 7044.95   84.66
 7071.19   83.28 7084.31      83 7986.25      83  8025.6   83.24 8035.44   83.15
  8074.8   83.25 8104.32   83.24 8117.44   83.36 8133.84   83.21 8160.08   83.41
 8212.55   83.41 8228.95   83.62  8251.9   83.59  8268.3   83.79 8284.69   83.73
 8320.77   83.83 8337.16   83.99 8379.79   84.22 8386.35   84.36 8406.03   84.39
 8428.98   84.61 8438.82   84.51 8448.66    84.7 8484.73   84.61 8491.29   84.77
 8507.69   84.62 8533.92   84.76 8543.76   85.09 8556.88   85.19 8573.27   85.02
  8615.9   85.41 8625.74   85.14 8658.53   85.57 8668.37   85.52 8707.72   85.68
 8714.28    85.9  8727.4   85.91 8733.96   85.67 8750.35    85.7 8760.19    86.2
 8770.03   85.85 8786.43   86.41 8796.26   86.03  8806.1   86.14 8812.66   85.94
 8825.78   86.04 8845.45   85.92 8852.01   86.09 8868.41   85.89 8874.97   86.15
 8897.92   85.64 8911.04   85.58 8930.72   85.98 8940.55   86.05 8956.95   85.51
 8979.91      85 8989.74   84.45 8999.58   84.19 9029.09   82.52 9632.49   82.52
 9635.76   82.69  9645.6   84.68 9671.84      85  9678.4   85.36 9684.95   86.11
 9688.23   86.91 9694.79   89.33 9701.35   92.87 9704.63   94.13 9707.91   94.54
 9721.03   94.52 9734.14   94.96  9740.7   94.69 9743.98   94.06 9747.26   92.36
 9750.54   89.79 9753.82   88.09  9757.1   87.51 9763.66   87.27 9855.48   87.27
 9862.04   88.04 9868.59    90.1 9875.15      93 9878.43   93.52 9884.99   93.63
 9901.39    93.3 9907.95   91.74 9917.78   86.93 9921.06   85.75

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 1589.01     .07 1686.78    .025 1853.41     .07 1945.17    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1589.01 1945.17            1700    1725  1637.5             .1       .3
Ineffective Flow     num=       2
```

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   Sta L   Sta R    Elev  Permanent
       0 1569.46   93.67       T
 1945.17 9921.06   89.08       T
Left Levee      Station=   49.66      Elevation=  101.75
Right Levee     Station= 9734.14      Elevation=   94.96
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    5.63  474.89   87.97 8868.41 9695.77   85.89

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             97.25    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.26    Wt. n-Val.                 0.066      0.027      0.066
  W.S. Elev (ft)             96.99    Reach Len. (ft)          1700.00    1725.00    1637.50
  Crit W.S. (ft)             92.44    Flow Area (sq ft)        5113.69    8142.00   62544.66
  E.G. Slope (ft/ft)      0.000162    Area (sq ft)            13633.77    8142.00   85025.45
  Q Total (cfs)           125000.00    Flow (cfs)              3250.00   51139.50   70610.51
  Top Width (ft)           9871.40    Top Width (ft)          1539.35     356.16    7975.89
  Vel Total (ft/s)            1.65    Avg. Vel. (ft/s)           0.64       6.28       1.13
  Max Chl Dpth (ft)          48.19    Hydr. Depth (ft)           3.32      22.86       7.84
  Conv. Total (cfs)       9824252.0    Conv. (cfs)             255430.3   4019259.0   5549564.0
  Length Wtd. (ft)           1670.41    Wetted Per. (ft)        1547.40     375.48    7994.01
  Min Ch El (ft)             48.80    Shear (lb/sq ft)           0.03       0.22       0.08
  Alpha                       6.20    Stream Power (lb/ft s)     0.02       1.38       0.09
  Frctn Loss (ft)             0.29    Cum Volume (acre-ft)    36658.29   25626.89   63261.35
  C & E Loss (ft)             0.06    Cum SA (acres)           7760.60    1267.13    8982.09


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 138.04*

INPUT
Description: RGV-02.
Station Elevation Data    num=     447
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   90.75   26.26   93.04    47.6   95.38   70.74  101.32   94.74  101.56
   95.41  101.56   95.41   91.56  105.41   91.36  196.41   83.28  199.41   84.03
  223.41   83.55  229.41   82.05  239.41   81.85  245.41   80.35  253.25    80.6
   268.2   82.49  274.67   84.64  284.39   84.23  289.06   82.72  310.63   79.19
  369.11   79.19  418.01   79.47  442.96   80.27  460.91   82.89  475.89   83.35
  482.87    82.7  515.37   83.82  543.43   86.75  555.44   86.88  577.48   86.28
  623.57   86.47   758.8   86.55  982.78   86.61 1061.47   86.55 1105.77   87.12
 1116.85   87.21  1123.5   86.81 1134.58   87.25 1145.67   86.99 1172.26   87.17
 1194.42   87.12  1232.1   87.18 1253.25   87.28 1276.43    87.2 1318.53   87.34
 1360.35   87.21 1371.73   87.29 1424.92   87.24 1484.76   87.36 1543.06   87.41
 1568.26   87.36 1593.45   87.49 1606.05   87.41 1631.04   87.47 1694.27    87.5
 1732.07   87.41 1763.56   87.52 1776.16   87.64 1801.36   87.56 1821.65   87.65
 1865.97   87.67 1877.06   87.77 1888.13   88.18 1894.79   88.82 1901.43   90.59
  1910.3    90.6 1914.73   89.97 1921.38    87.8 1930.24   87.27 1952.41   86.97
 1967.92    87.1 1994.52   87.12 2041.06   86.94 2052.14   87.09  2087.6   86.98
 2122.66   86.99 2135.26   86.89 2162.97   86.96 2204.58   86.86 2311.67   86.86
 2322.58   86.74 2362.09   86.79 2380.21   86.69 2399.89   86.84 2462.23   86.67
 2479.97   86.87 2506.57   86.83 2526.52   86.93 2546.47   86.71 2570.85   86.77
 2588.58   86.67 2608.54   87.05 2615.18   84.33  2617.4   84.38 2624.05   86.71
 2639.57   86.05 2648.43   85.92  2688.6   85.82 2719.88   85.89 2734.89   85.82
    2795   85.76 2836.86   85.84 2876.76   85.85 2903.36   85.76 2925.53   85.89
 2951.47   85.69 2976.52   85.76 2982.78   86.08  2995.3   87.22  3007.8   87.57
3018.8686.51429 3026.59   86.56 3032.85   87.69 3045.37   88.17 3058.53   88.46
 3062.97   89.16 3069.62   91.87 3071.83   92.32 3082.92   91.75 3087.84   90.67
 3095.22    87.5 3100.15   85.86    3110   84.27 3119.85   83.86 3131.71   84.06
 3146.36   83.67 3156.77   85.98 3161.69   85.46    3174   82.18 3180.51   80.79
3190.7780.07285 3198.62   78.73 3203.54   78.76 3210.93   79.43 3223.24   78.26
  3229.3   75.44 3235.54   71.89 3240.47    69.6 3243.95   68.91 3268.33   65.47
 3273.22   65.35 3284.37   60.24 3287.36   59.98 3302.34   59.72 3308.24    59.2
 3323.26   57.45 3338.27   55.22 3348.27   55.22 3359.95   57.05 3367.51   58.59
3374.5759.61816 3387.43   61.07 3394.73   65.11 3396.99   65.37 3403.74   67.33
 3412.75   71.86 3421.75   74.78 3435.26   78.76  3448.882.09691 3457.78   84.31
 3475.79   87.62 3479.86   87.88 3492.07   87.69 3500.21   88.05 3508.73   88.01
 3528.69   87.59 3541.67   87.48  3549.9   87.07 3566.37   86.85 3585.58   86.28
 3602.05   86.17 3613.03   86.32  3629.5      86 3645.97   86.08 3673.41   85.95
 3699.58   86.26 3711.77   86.07 3728.31   86.27 3736.54   86.17 3783.21   86.73
 3805.19   87.44 3833.83   87.78 3849.13   87.59 3870.46   87.77 3895.83   87.51
 3907.07   87.65 3927.42   87.43 3964.03   87.58 3980.31   87.18 4019.44   87.21
 4035.92   87.14 4057.61    86.8 4086.09   86.84 4102.37    86.5 4114.57   86.57
 4134.81   86.25 4154.04   86.14 4167.77    86.2 4200.01   86.08 4225.45   85.81
 4250.18   86.02 4297.66   86.11 4313.35   85.94 4332.58   86.07 4354.55   85.97
 4384.77   86.23  4409.5    86.6 4453.44   86.78 4472.67   86.67 4489.15   86.87
 4505.16   86.76  4538.6   86.73 4552.33    86.6 4568.81   86.63 4588.04   86.43
 4596.28   86.51 4642.98   86.55 4651.63   86.67 4670.45   86.65 4696.38   86.81
 4733.01    86.9 4763.84   86.78 4780.32   86.85 4807.79   87.26  4843.5   87.57
 4870.97   87.58  4884.7   87.48 4898.44   87.61 4907.96    87.5 4932.36   87.55
  4940.5   87.45 4964.92   87.55 5002.82   87.44  5019.3   87.24 5046.28   87.17
 5062.56   87.35 5074.77   87.22 5082.91   87.69 5099.18   88.11 5115.45   88.16
 5127.66   87.47 5152.07   87.32 5167.63   87.44 5188.69   87.11 5209.04   86.96
 5233.55    87.1 5245.65   86.83 5280.25   86.79 5306.68   86.52 5332.44   86.42
 5351.67   86.02  5370.9   85.85 5409.36   85.81 5414.85   85.68 5453.15   85.75
 5472.53   85.61 5519.23   85.85 5535.71   86.07    5563   86.24 5575.21   86.02
 5583.35   86.13 5595.56   86.97  5603.7      87 5615.89   86.37 5640.09   86.24
 5676.92   85.74  5722.5   85.57 5758.29   85.55 5782.69   85.47  5807.1   85.54
 5835.57   85.37 5865.33   85.41 5914.78   85.61 5941.31   85.53 5957.59   85.75
  5980.7   85.78 6052.13   86.08 6104.02   86.12 6120.79   86.22 6140.62   86.07
 6194.96   86.08 6238.91   86.26  6244.4   86.17 6277.37   86.28 6315.83   86.01
 6340.54   85.69 6368.01   85.56 6373.51   85.64 6422.95   85.42 6475.14   85.64
 6502.62    85.5 6521.84   85.55 6541.07   85.34 6604.31   85.65 6659.18   85.82
 6685.66    85.8 6744.33   86.05 6771.81   86.02 6791.03   85.85 6813.01   85.44
 6860.56   84.24 6878.93   83.91 6900.91   83.75 6925.63   83.77 6950.35   84.04
 6964.08   84.08 7010.78    84.5 7031.38   84.53 7051.99    84.3 7087.69   84.14
  7123.4   84.39 7139.89   84.65 7178.34   84.52  7211.3   84.48 7216.79   84.39
 7252.51   84.41 7323.92   84.18 7395.35   84.66 7425.56   84.44 7447.53   84.61
  7480.5   84.99 7543.88   86.16 7565.65   86.39 7598.61   86.29 7621.16   86.02
 7637.43   85.47 7645.31   85.35 7667.29   85.38 7670.03   85.16 7690.31   85.32
 7702.99   85.08 7722.85   84.98  7755.4   84.12 7768.92   83.68 7779.91   83.52
 7800.14   83.57 7848.95   83.46 7865.21   83.27 7893.69   83.11 7918.09   83.07
 7938.42   83.18 7946.56   83.07 7970.97   83.44 8011.64   83.46 8044.18    83.4
 8064.52   83.21 8084.85   83.37 8101.12   83.04 8121.45   83.17 8133.66   83.07
    8154   83.16 8182.47   83.02 8227.21   83.04 8239.42   83.12 8284.16   82.99
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 8320.76    83.1 8332.97   83.03 8345.16   83.25 8381.78   83.13 8410.25   83.25
 8422.45   83.18 8442.78   83.28 8450.92   82.87 8463.12   83.42 8487.52   83.49
 8495.66   83.35  8503.8   83.57 8548.54   83.73 8572.95   84.15 8585.14   83.92
 8601.42   84.09 8621.76   84.05 8658.91    84.2 8680.88   84.39  8715.3   84.42
 8731.57    84.3 8739.71   84.46 8757.79    84.4 8768.18   84.58 8776.31    84.2
 8788.52   84.03 8808.85   84.22 8829.19   84.27 8845.47   84.02 8857.66   83.43
 8886.87   83.43 8922.57   83.59 8952.78   83.54 8993.98   83.62 9013.21   83.84
 9026.94   83.75 9062.64   83.95 9070.88   83.81 9098.34   84.03 9139.54   84.08
 9156.02    84.2 9175.24   84.09 9183.49   84.34 9191.73   84.17 9205.46   84.45
  9213.7   84.26 9274.12   84.18 9279.62   84.32 9309.83   84.03 9334.54   84.26
 9367.51   83.74 9383.98   83.34 9408.69    82.5 9496.25    82.5 9536.92   82.63
 9561.33   82.85 9614.21   83.21 9634.54   83.18 9675.21   83.29  9740.3   83.21
 9768.76   83.27 9821.64   83.21 9833.85   83.32 9874.52   83.32 9902.99   83.14
 9916.79   83.21 9925.03   84.19 9947.01    84.4 9957.99   85.07 9966.23   86.86
 9974.47   89.46 9984.34   90.73 9996.54   93.9510004.68   94.7610008.59   94.38
 10016.4   92.15 10020.3   91.3410032.94   91.0410038.59   90.5410049.89   87.69
10055.54   87.2710141.35   87.2710145.96   87.5410151.62    88.910157.27   91.77
10164.77   93.3810168.68   93.5410179.87   93.2810199.65    87.810203.83   87.41
10213.78   85.0810219.43   84.11

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .102 3082.92    .066 3190.77    .015 3374.57    .066 3475.79    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3082.92 3475.79             1700    1725  1637.5             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3082.92   91.75       T
 3475.7910219.43   87.62       T
Left Levee      Station=   95.41      Elevation=  101.56
Right Levee     Station= 10001.4      Elevation=   94.89
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   41.31 1893.29    90.5 7566.27 9969.02   86.44

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 137.71

INPUT
Description: RGV-02. Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     434
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   85.16   44.78   86.13   51.75   87.61   58.71   87.83   71.65   89.45
   95.53   97.01  106.48  101.13  130.48  101.37  131.15  101.37  131.15   91.37
  141.15   91.17  232.15   82.62  235.15   83.37  259.15   82.89  265.15   81.39
  275.15   81.19  281.15   79.69  298.34   80.37  311.33   81.95  320.33    84.9
  330.33   82.93  340.33   79.67  370.32    77.6   479.3   78.38   489.3   79.28
  516.29   80.18  544.29   86.06  556.28    86.3  578.28   85.11  618.27   85.39
  759.24   85.54  902.21   85.53 1027.18   85.67 1104.16   85.55  1107.7   85.97
 1183.11   86.05 1268.36   86.02 1284.75   86.16 1320.82   86.09 1330.65    86.2
 1392.95   86.13 1399.51   86.22 1435.57   86.08 1484.75   86.12 1510.98   86.49
 1520.82   86.36 1537.21   86.52 1586.39   86.47 1651.96   86.53 1668.35   86.72
 1678.19   85.91 1694.58   86.77 1710.98   86.25 1720.81   86.25 1750.32   86.59
 1783.11   86.51 1815.89   86.65 1838.84   86.56 1871.63    86.7 1904.42   86.61
 1914.25   86.71 1947.04   86.66 1966.71   86.79 2015.89   86.74  2045.4   86.87
 2058.52   86.78 2124.09   86.78 2212.62   86.97  2245.4   86.89 2258.52   86.96
 2324.09   86.92 2347.04   87.01 2402.78   87.02 2429.01   87.15 2494.58   87.18
 2510.98   87.07 2586.39   87.04 2655.24   87.23 2704.42   87.12 2710.98   87.26
 2776.55   87.25 2792.95   87.47 2809.34   88.29 2819.18   89.56 2829.01   93.09
 2842.13   93.11 2848.68   91.83 2858.52   87.49 2871.63   86.48 2904.42   85.98
 2927.37   86.19  2953.6   86.04 2966.72   86.17 2989.67   86.01  3015.9   85.98
 3029.01   86.11 3035.57   85.84 3051.96   86.11  3061.8   85.78 3071.64   85.93
 3104.42   85.83 3133.94   85.93 3147.05   85.75 3170.01   85.71 3215.92   85.81
  3297.9   85.67 3311.02   85.61 3386.44   85.52 3399.56   85.65 3452.03   85.34
 3458.59   85.48 3474.98   85.36 3514.33   85.44 3537.29   85.32 3550.41   85.49
 3638.95   85.35 3658.62   85.23 3665.18    85.5 3684.86   85.56 3724.21   85.39
 3753.72   85.51 3783.24   85.24 3796.35   85.38 3806.19   85.14 3819.31    85.3
 3845.54   85.05  3868.5   85.85 3875.06   85.87 3881.62   81.81 3884.89   80.45
 3888.17   80.56 3891.45   81.95 3894.73   84.28 3898.01   85.23 3911.13   84.61
 3920.97   83.85 3934.08   83.55 3960.32   83.33 3989.83   83.35 4055.42   83.29
 4061.98   83.18    4121   83.13 4134.12   83.29 4147.24   83.15 4199.71   83.04
 4212.82   83.12 4239.06      83 4271.85   83.11 4281.69   82.91 4301.37   83.02
  4311.2    82.9    4344   83.12 4380.07   82.93 4435.82   82.95 4481.73   82.87
 4488.29   82.74 4511.24   82.81 4521.08   82.67 4540.75   83.38 4547.31   84.83
 4557.15   90.33 4560.43   91.38 4576.83   91.41 4583.39   89.69 4593.22   83.76
 4599.78   80.43  4612.9   77.24 4626.02   76.71 4639.13   77.41 4652.25   77.64
 4662.09    78.3 4665.37    79.2 4671.93   82.13 4675.21   82.79 4681.76    81.7
  4691.6   78.12 4698.16    77.2    4708   78.26 4717.84   78.51 4721.12   78.21
 4730.95   75.65 4737.51   75.99 4747.35   77.94 4760.47   77.22 4763.75   76.61
 4780.14   68.17  4786.7   65.65 4789.98   65.46 4836.98   64.94 4856.98   64.64
 4876.98   64.64 4896.98   63.64 4916.98   61.64 4936.98   61.64 4970.34   65.46
 4973.62   65.53  4976.9    66.9 4986.74   74.13 5006.41   86.17 5009.69    86.7
 5019.53   86.41 5026.09   87.05 5049.05   86.58 5058.88   86.82 5091.68   87.18
 5108.07   87.23 5147.42   87.73 5170.38   87.88 5186.78   88.51 5196.61   87.98
 5242.52   88.12  5262.2   87.99 5268.76   88.28 5285.15   88.15 5294.99   88.41
 5314.67   87.93 5324.51   88.28 5334.34   88.31 5347.46   88.03 5354.02   88.26
 5370.42   88.02 5399.93   88.36 5413.05   87.72  5452.4   87.86 5475.35   87.52
 5498.31   87.89 5511.43   87.58 5521.26   87.88 5537.66   87.53 5570.45   87.69
 5590.13   87.42 5599.97    87.1 5619.64   86.89 5639.32   87.13 5662.27   86.94
 5668.83   87.26 5681.95   86.89 5711.46   86.62  5816.4   86.46 5836.08   86.63
 5921.34   86.35 5941.01    86.2 5954.13    86.4 5977.09   86.19  5990.2   86.49
 6009.88    86.3 6019.72   86.43 6059.07   86.19 6068.91   86.33  6118.1   86.17
 6141.05   85.87 6154.17   85.98 6160.73   85.79  6180.4   85.95 6186.96   85.72
 6206.64   85.82  6213.2   85.65 6229.59   85.73 6245.99   85.58 6252.55   85.31
 6272.22   85.17 6285.34   85.45 6295.18   85.13 6301.74   86.03 6314.85   86.84
 6327.97   87.13 6337.81   85.78 6357.48   85.27 6367.32   85.47 6380.44   85.38
    6387   84.98  6403.4   84.58 6419.79      85 6432.91   84.46  6465.7   84.86
  6482.1   84.67 6488.66   84.83 6508.33   84.84 6524.73   84.57 6547.68   84.82
  6577.2   84.61 6600.15   84.68 6609.99   84.47 6649.34   84.35 6688.69    84.9
 6698.53   84.37 6705.09   84.52 6714.93   86.14 6721.49   86.24 6731.32   85.03
 6760.84   84.51 6780.51   83.82 6806.75   83.53 6846.09    83.5 6865.76   83.35
 6885.43   83.49 6908.38   83.29 6928.05    83.4  6980.5   83.39 6993.61    83.2
 7006.73   83.49 7059.18   83.31 7124.75   83.25 7144.42   83.52 7154.25   83.38
 7183.76   83.61 7249.32   83.71 7272.27   83.89 7337.84   83.74 7354.23   83.82
 7393.57   83.71 7413.24   83.83 7446.02   83.63 7459.14   83.72 7478.81   83.51
 7501.75   83.68 7527.98   83.72 7547.65   83.57 7593.55   83.47 7629.61   83.48
 7649.28   83.37 7701.73   83.43 7734.52   83.22 7750.91   83.38 7777.13   83.21
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 7819.75   83.07 7832.86   82.93  7872.2   82.99 7885.32   82.84 8259.05   82.84
 8285.27    83.4 8314.78   83.67 8331.17   83.62 8347.56   83.76 8360.67   83.15
 8377.07   83.45 8390.18   83.92 8403.29   84.11 8416.41   83.92 8429.52   84.08
 8439.35   83.91 8455.75   84.11 8481.97   84.03 8491.81   84.15 8531.15   83.92
 8544.26   83.54 8567.21   83.22 8586.88   83.13 8603.27   83.37 8609.83   83.15
  8629.5   83.89 8662.28   83.91 8688.51   83.79  8704.9   83.41 8721.29   83.74
  8734.4   83.08 8750.79   83.34 8760.63   83.13 8777.02   83.32 8799.97   83.04
 8836.03   83.09 8845.87   83.23 8881.93   82.99 8911.43   83.19 8921.27   83.06
  8931.1    83.5 8960.61   83.27 8983.56    83.5 8993.39   83.36 9009.78   83.56
 9016.34   82.73 9026.17   83.84 9045.84   83.98  9052.4   83.71 9058.96   84.13
 9078.63   84.29 9088.46   84.53 9095.02   84.36 9114.69   85.11 9124.52   84.67
 9137.64   84.96 9154.03   84.85  9173.7   85.02 9193.37   85.36 9229.43   85.43
 9242.54   85.09  9249.1   85.31 9265.49    85.2 9272.05   85.42  9278.6   84.63
 9288.44   84.32 9304.83   84.63 9321.22   84.55 9334.34   83.94 9344.17   82.69
 9350.73   82.48 9858.87   82.48 9875.26   82.71 9891.65   82.75 9911.32   83.19
 9953.94   83.89 9970.33   83.8310003.11   84.0510055.57    83.910078.51   84.03
10121.13   83.8910130.97   84.1210163.75   84.12 10186.7   83.76 10216.2   83.66
 10232.6   84.0710245.71   84.8810252.27   86.94 10262.1   93.0410268.66   94.82
10281.77    94.510301.44   94.82   10308   93.8210311.28   92.6410321.11   88.12
10327.67   87.2710429.29   87.2710432.57   87.3610439.13   89.1210445.69   93.32
10448.96   93.9910471.91   92.9810478.47   89.4610481.75   88.53 10488.3   85.28
10494.86   83.03 10504.7   83.1310511.25   82.5210517.81   82.47

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .102 4576.83    .066 4780.14    .015  4976.9    .066 5009.69    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4576.83 5006.41          1088.69    1566 1979.92             .1       .3
Left Levee      Station=  131.15      Elevation=  101.37
Right Levee     Station=10268.66      Elevation=   94.82
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   60.85 4556.62   91.44 5394.9310289.58   88.32

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             96.52    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.12    Wt. n-Val.                 0.102      0.047      0.067
  W.S. Elev (ft)             96.40    Reach Len. (ft)          1088.69    1566.00    1979.92
  Crit W.S. (ft)             85.40    Flow Area (sq ft)       22037.85   10538.27   44544.77
  E.G. Slope (ft/ft)      0.000267    Area (sq ft)            22037.85   10538.27   44544.77
  Q Total (cfs)           125000.00     Flow (cfs)             15237.72   44899.50   64862.78
  Top Width (ft)          10386.66    Top Width (ft)           4445.68     429.58    5511.40
  Vel Total (ft/s)            1.62    Avg. Vel. (ft/s)            0.69       4.26       1.46
  Max Chl Dpth (ft)          34.76    Hydr. Depth (ft)            4.96      24.53       8.08
  Conv. Total (cfs)       7648557.0     Conv. (cfs)            932372.7   2747331.0   3968853.0
  Length Wtd. (ft)         1719.80    Wetted Per. (ft)         4452.79     443.86    5532.15
  Min Ch El (ft)             61.64    Shear (lb/sq ft)            0.08       0.40       0.13
  Alpha                       2.92    Stream Power (lb/ft s)      0.06       1.69       0.20
  Frctn Loss (ft)             0.34    Cum Volume (acre-ft)    35050.70   24883.44   58163.00
  C & E Loss (ft)             0.02    Cum SA (acres)           7527.22    1236.02    8475.07


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 137.43*

INPUT
Description: RGV-02.
Station Elevation Data    num=     448
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   85.94   24.82   85.59   39.15   86.58   48.69    86.5   82.21   93.98
   91.82   97.43  111.03  100.96  135.03   101.2   135.7   101.2   135.7    91.2
   145.7      91   236.7   82.33   239.7   83.08   263.7    82.6   269.7    81.1
   279.7    80.9   285.7    79.4  295.95   81.51  305.95    78.9  320.95   77.86
  346.42   78.12  358.69   79.27  372.85   81.76  436.82   81.87  476.15   82.69
  505.92   85.65  518.67   85.77  542.06   85.19  777.72   85.54  863.61   85.42
  919.29   85.65  972.14   85.64 1111.32   86.21  1157.1   86.39 1184.62   86.32
 1222.44   86.41  1236.2   86.31 1294.67   86.23 1332.06   86.31 1366.89   86.29
  1411.6   86.45 1463.69   86.46 1514.78    86.1 1549.17   86.11 1556.06   86.28
 1576.69   86.19 1589.05   86.34 1598.46      86 1614.13   86.31  1629.8   85.99
 1652.34    86.1 1662.66    86.5 1672.99   86.24  1700.5   86.48 1738.33   86.41
 1748.65   86.61  1762.4   86.48 1783.37   86.57 1844.95   86.48 1872.45   86.84
  1893.1   86.62 1910.29    86.9 1927.48   86.94 1972.19   86.58 2013.47   86.99
 2037.55   86.91 2047.86    86.7 2061.62    86.9 2075.37   86.84 2096.01   87.06
 2120.08   87.53 2137.27   89.11  2147.6   89.66 2157.92   89.88 2171.67    88.8
 2178.55   88.67 2199.19   86.82 2219.82   86.46 2240.45   86.52 2247.34   86.37
  2288.6   86.48 2347.07   86.48 2357.9386.55103 2360.83   86.57 2395.22   86.48
 2422.74   86.77 2446.81   86.53 2491.52   86.58 2549.98   86.93 2567.19   86.62
 2605.01   86.87 2632.53   86.67 2646.29   86.81 2664.08   86.76 2679.75   87.26
 2689.16   87.85 2698.55    89.6  2711.1   89.62 2717.36   88.98 2726.76   86.82
  2739.3   86.33  2752.9   86.35 2780.42    86.1 2804.49   86.35  2849.2   86.42
 2869.83   86.26 2889.74    86.5 2921.08    86.3 2955.82   86.46  2962.7   86.34
 2990.04   86.44 3034.92   86.25 3055.56   86.53 3076.19   86.24 3093.38   86.31
 3124.34   86.17 3151.86   86.31 3186.24   86.31 3203.45   86.18 3224.08   86.25
 3234.39    86.1 3255.02   86.13  3279.1   86.52 3292.86   86.41  3313.5    85.7
 3375.62    85.7 3389.16   85.85 3420.12   85.71 3464.82   85.78  3491.6   85.63
 3497.87   85.76 3537.05   85.75 3557.68   85.83 3595.51    85.8 3609.27   85.65
  3645.2   85.76 3670.28   85.62  3698.5   85.95 3707.89   83.25 3711.03   83.31
 3720.44   85.65 3742.38   84.98 3767.47    84.7 3794.99    84.8 3825.94   84.69
 3860.34   84.77 3911.92    84.7 3956.64   84.71 3977.27   84.52 4008.22   84.56
 4042.61   84.24  4077.8   84.18 4097.64   83.88 4142.35   83.91 4166.43   84.07
 4176.74   83.79 4221.46   84.13 4235.21   85.84  4252.4   85.98 4278.5584.39748
 4290.24   83.69 4317.75   83.78 4334.85   84.64 4341.12   85.57 4350.52   88.61
 4353.66    89.2 4369.33   89.36 4376.38   88.27 4386.95   84.54 4393.99   82.49
 4408.09   80.45 4422.19   79.43 4436.84   78.94 4450.37   78.96 4460.94   79.37
 4471.52   81.27 4475.04   81.58 4482.08   80.99 4492.65   79.13  4499.7   78.62
 4520.85   79.29 4525.81   79.04 4534.93   77.77 4541.98   78.01 4552.55   79.01
 4570.17    78.5 4587.79   74.51 4594.83   73.15 4608.15 72.7091 4617.79   72.39
 4636.14   72.83 4642.26   72.19 4651.43   69.36 4654.7268.56432 4657.55   67.88
 4672.84   65.08  4675.9   61.17 4691.84   61.01 4701.15    60.7 4722.66   58.94
 4734.81   58.17 4744.81   58.17 4753.02   59.32 4774.22   59.78 4789.95   60.51
 4812.95   61.28 4816.9961.86948 4819.05   62.17  4829.2   68.13 4833.68   69.47
 4839.27  72.216 4851.57   79.09 4862.75   84.25 4873.93   86.53 4877.67   86.73
 4888.87   86.19 4908.91   86.18 4922.49   85.86 4938.05   85.77 4952.63   86.12
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4955.54	86.45	4975.94	86.82	4981.77	86.58	4993.43	86.85	5010.92	86.3
5037.15	86.42	5060.67	86.26	5079.34	86.46	5092.53	85.99	5136.25	85.8
5172.71	85.84	5185.9	85.68	5202.58	85.89	5224.99	85.52	5247.39	85.74
5262.33	85.45	5322.09	85.49	5337.03	85.14	5381.84	85.25	5407.98	85.13
5434.13	85.29	5449.07	85.11	5460.27	85.24	5478.94	85.03	5504.59	85.21
5525.06	85.16	5549.9	84.77	5620.85	84.52	5639.65	84.58	5693.13	83.6
5710.96	83.38	5746.61	83.16	5796.38	83.05	5818.8	83.12	5871.4	83.02
5938.3	83.36	5953.24	83.57	5979.39	83.65	5994.32	83.91	6016.73	83.97
6072.75	84.51	6103.97	84.91	6139.05	84.92	6166.11	84.58	6210.93	84.43
6218.4	84.27	6266.95	84.18	6315.49	83.82	6341.64	83.73	6358.33	84.28
6378.99	80.73	6393.99	78.66	6411.81	75.09	6438.74	74.74	6447.47	74.4
6465.29	74.66	6483.55	74.54	6498.5	74	6535.84	74.05	6554.52	73.95
6566.42	74.85	6571.77	83.43	6586.39	83.86	6595.16	85.13	6609.78	85.79
6621.47	85.03	6639.02	85.04	6682.88	84.31	6688.96	84.32	6723.8	83.82
6744.98	83.77	6789.79	83.88	6801	83.57	6808.47	83.68	6819.67	84.53
6827.14	84.57	6838.34	83.95	6871.96	83.77	6919.7	83.01	6969.04	82.96
6991.45	82.87	7013.85	82.93	7044.49	82.83	7080.14	82.48	7097.97	82.63
7140.75	82.43	7150.68	82.97	7171.15	85.99	7176.99	86.48	7203.31	85.99
7212.08	86.09	7235.47	85.91	7282.25	86.07	7319.99	86.05	7340.73	86.22
7384.58	85.96	7410.9	85.94	7445.99	86.17	7472.3	85.93	7495.69	85.9
7533.7	86	7547.74	85.92	7583.4	85.98	7600.94	85.86	7614.94	85.99
7652.27	85.8	7667.22	85.85	7714.97	85.77	7744.21	85.87	7776.38	85.54
7817.31	85.47	7902.1	85.17	7954.72	85.25	7969.34	85.07	7999.5	85.11
8039.51	84.82	8051.21	84.96	8077.52	84.8	8100.92	85.02	8156.47	84.87
8188.62	85	8194.47	85.14	8226.64	85.1	8247.11	84.92	8299.73	85.1
8308.51	84.96	8358.21	84.86	8375.75	84.65	8404.99	85.04	8422.54	84.9
8448.85	85.01	8463.47	84.88	8478.08	85	8492.7	84.82	8527.79	84.99
8536.56	84.69	8583.34	84.61	8618.42	84.86	8638.9	84.86	8647.67	84.68
8678.99	84.71	8693.92	84.27	8712.6	84.13	8735.38	84.17	8741.23	84.47
8755.85	84.47	8770.47	83.92	8788.01	83.92	8802.63	83.61	8888.07	84.08
8929.14	84.05	8977.68	84.46	9000.08	85.02	9027.76	85.01	9068.7	85.19
9085.95	85.04	9104.61	85.13	9119.54	84.79	9138.21	84.95	9168.08	84.94
9194.22	84.77	9246.49	84.86	9287.56	84.75	9332.36	84.72	9343.53	84.95
9377.16	84.77	9433.16	84.86	9440.63	84.41	9451.82	84.93	9474.22	84.98
9522.76	85.24	9530.23	85.13	9552.63	85.45	9563.83	85.23	9578.77	85.37
9597.44	85.32	9642.24	85.57	9683.3	85.61	9698.24	85.4	9731.84	85.57
9750.51	84.97	9787.84	85.06	9802.78	84.8	9813.98	84.2	9821.45	84.1
9858.12	84.09	9875.66	84.18	9931.22	84.17	9939.99	84.09	9978	84.14
10004.31	83.72	10018.94	83.75	10048.17	82.56	10056.94	81.44	10181.73	81.64
10235.21	81.65	10270.86	81.53	10288.69	81.23	10324.34	81.56	10400.14	82.15
10437.47	82.57	10498.44	83.89	10548.14	84.21	10624.15	83.96	10644.62	84.01
10670.94	83.82	10698.82	83.77	10711.87	83.89	10773.49	83.56	10805.44	83.52
10820.05	83.85	10822.98	84.25	10834.67	88.41	10848.16	90.06	10859.36	93.25
10866.83	94.24	10887.11	92.69	10891.16	91.78	10899.27	88.11	10903.33	87.44
10909.65	87.27	10966.18	87.27	10972.27	88.19	10978.35	90.63	10992.54	90.12
10996.6	88.36	11006.74	85.15	11020.93	84.87				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	111.03	.085	4369.33	.07	4608.15	.025	4789.95	.07
4839.27	.066								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4369.33	4873.93	1088.69	1566	1979.92	.1 .3

Left Levee Station= 135.7 Elevation= 101.2
Right Levee Station=10866.83 Elevation= 94.235
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
48.19	4364.89	89.37	4888.12	10829.6	86.68

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 137.14

INPUT
Description: RGV-02. Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 444

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.72	25.84	85.51	40.75	87.18	50.69	86.47	77.59	94.92
85.58	96.24	95.58	100.79	119.58	101.03	120.25	101.03	120.25	91.03
130.25	90.83	221.25	81.1	224.25	81.85	248.25	81.37	254.25	79.87
264.25	79.67	270.25	78.17	271.57	78.13	298.56	78.46	311.56	80.69
320.56	84.55	326.56	85.57	346.56	85.7	361.56	85.59	419.55	85.19
509.55	85.27	560.54	85.11	678.53	85.26	755.52	85.55	846.51	85.31
905.51	85.73	961.5	85.65	1063.5	86.28	1118.49	86.88	1123.97	86.62
1160.05	86.66	1173.17	86.49	1228.95	86.3	1297.84	86.5	1340.49	86.79
1363.45	86.47	1379.86	86.59	1412.66	85.98	1438.91	85.73	1471.71	85.71
1478.28	86.05	1497.96	85.81	1520.92	86.12	1540.61	85.71	1570.13	85.79
1579.97	86.47	1589.82	85.9	1616.06	86.45	1652.15	86.2	1661.99	86.64
1675.11	86.36	1717.76	86.52	1734.17	86.28	1753.85	86.29	1766.97	86.79
1780.09	86.9	1786.66	86.52	1799.78	86.48	1816.18	87.05	1826.02	86.8
1832.58	87.12	1842.43	86.6	1848.99	86.75	1875.23	86.38	1914.6	87.2
1921.16	86.91	1937.57	87.02	1947.41	86.57	1960.53	86.94	1973.65	86.79
1993.34	87.18	2016.3	88.12	2032.7	91.32	2042.55	92.4	2052.39	92.81
2065.51	90.66	2072.07	90.39	2085.19	88.21	2091.76	86.71	2111.44	85.98
2131.12	86.03	2137.69	85.73	2177.05	85.94	2232.82	85.8	2245.95	85.97
2278.75	85.89	2305	86.49	2327.96	86.01	2370.61	86.04	2383.73	86.33
2396.86	86.23	2426.38	86.68	2442.79	86.1	2478.87	86.49	2505.12	86.09
2518.24	86.37	2531.36	86	2554.33	86.27	2560.89	86.09	2610.1	86.18
2619.94	86.44	2646.19	86.13	2669.15	86.58	2711.8	86.81	2731.48	86.53
2754.45	86.97	2770.85	86.75	2813.5	87.08	2820.06	86.85	2869.27	87.04
2888.95	86.77	2908.64	87.28	2928.32	86.68	2944.72	86.85	2974.25	86.63
3000.5	86.97	3033.3	87.05	3049.71	86.8	3069.39	86.98	3079.23	86.64
3098.91	86.67	3121.88	87.6	3135	87.48	3154.69	86.03	3223.58	86.09
3226.86	86.22	3256.39	85.99	3299.03	86.19	3315.44	86.02	3367.93	86.04
3387.61	86.25	3413.86	86	3423.7	86.22	3436.82	86.05	3482.75	86.29
3515.56	86.01	3577.89	86.15	3587.73	85.96	3613.98	86.26	3643.5	86.05
3676.31	86.23	3725.52	86.25	3732.08	86.47	3758.33	86.1	3768.17	86.24
3787.85	85.94	3817.38	86.08	3850.18	85.46	3886.27	85.23	3902.67	84.79
3925.64	84.95	3945.32	84.74	3968.29	85.13	3978.13	84.62	4020.78	85.32
4033.9	88.74	4050.3	89.04	4073.27	86	4086.39	84.62	4092.95	84.44
4112.63	84.82	4145.44	87	4161.84	87.3	4171.69	86.7	4181.53	85.18
4194.65	83.94	4204.49	83.62	4234.02	80.47	4250.42	80.26	4263.55	80.5
4316.04	79.87	4329.16	80.22	4339	79.88	4352.12	80.13	4371.81	79.99
4378.37	80.55	4394.77	80.87	4407.89	80.53	4427.52	79.52	4447.14	80.58
4453.68	79.37	4463.49	73.81	4470.03	70.94	4486.38	65.52	4489.65	65.35
4489.65	57.71	4516.65	57.2	4539.65	55.1	4552.65	54.7	4564.65	56.5
4595.65	56.1	4618.65	56.6	4640.15	56.5	4662.65	57.5	4676.05	57.6
4676.05	65.35	4682.59	66.27	4689.13	68.78	4695.67	72.62	4708.75	79.37

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 4715.29   81.63  4725.1   86.02 4734.91   86.01 4741.45   86.89 4747.99    86.7
 4764.34   85.52 4780.69   85.54 4813.39   84.68 4829.74   85.24 4833.01   85.86
  4855.9   86.45 4862.44   85.96 4875.52   86.42 4885.33   86.01 4895.14   85.13
 4924.57    85.1 4934.38   84.81 4970.35   84.45  4986.7      84 5035.75    83.5
 5061.93    83.6 5091.45   83.18 5111.13   83.38 5117.69   83.17 5153.77   83.05
 5160.33   83.18  5183.3   82.77 5212.82   82.93  5232.5   82.65  5265.3   82.55
 5294.83   82.69 5324.35   82.59 5344.03   82.78 5399.79   82.59 5406.35   82.42
    5449   82.78 5471.96   82.73 5485.08   82.44 5524.44   82.42 5560.53   82.02
 5600.53   82.19 5620.53   81.76 5660.53   80.61 5680.53   80.19 5720.53   79.79
 5780.53   79.63 5860.53   79.56 6052.56   82.02 6075.53   82.61 6121.45   83.55
 6160.81   83.67  6196.9   83.21  6213.3   83.23 6249.38   82.83 6288.74   82.64
 6351.07   82.58 6370.75    82.3 6393.71   82.35 6406.83   78.05 6446.83   71.62
 6466.83    64.9 6506.83   63.85 6526.83   64.73 6566.83   63.45 6586.83   63.26
 6626.83   63.22 6640.29   64.86 6646.29   82.02 6662.69    82.9 6672.53   85.57
 6679.09   86.63 6688.93   86.94 6702.05   85.31 6721.74   85.33 6770.94   83.96
 6784.06   83.95 6816.86   83.24 6846.39   83.18 6902.15   82.77 6925.11   82.93
 6971.04    82.8  6977.6   83.05 7023.52   82.82 7036.64   82.45 7176.64   82.35
 7216.64   81.56 7236.64   81.86 7276.64   81.76 7284.64   81.59 7295.78   82.47
 7318.74   88.54  7325.3   89.54 7338.42   88.97 7354.83   88.65 7364.67   88.87
 7390.91   88.52 7413.87   88.76 7426.99   88.61 7443.39   88.89 7479.48   88.67
    7509   88.92 7531.96   88.49  7558.2   88.27 7587.73    88.2 7604.13   88.48
 7627.09    88.5 7656.61   88.01 7663.17   88.18 7682.85   87.99  7725.5   88.24
 7738.62      88 7781.26   88.23 7800.94   87.97 7810.78   88.14  7840.3   88.16
 7863.27   87.93 7902.63   88.12 7928.87   87.86 7938.71   88.06 7961.67   88.02
  7991.2   87.76 7997.76   87.52 8043.68   87.47 8102.72   87.11 8128.97   87.21
 8138.81   86.95 8197.85   87.14 8214.25   86.86 8227.38   87.02 8292.98   86.46
  8306.1   86.78 8335.62   86.52 8361.87    87.1 8384.83   86.87 8424.19    86.9
 8460.27   87.17 8466.83   87.44 8502.92   87.37 8525.88      87 8548.84   87.26
 8584.92   87.35 8594.77   87.07 8650.53   86.89 8670.21   86.47 8680.05   86.86
 8703.01   87.23  8722.7   86.97 8752.22   87.19 8768.62   86.91 8785.02   87.17
 8801.42   86.81 8840.79   87.13 8850.63   86.54 8876.87   86.37 8883.43   86.57
 8903.11   86.29 8942.47   86.23 8952.32   85.92 8965.44   86.07 8975.28   85.71
 8998.24   85.78  9021.2   85.56 9063.84   84.36 9073.69   84.32 9080.25   84.84
 9096.65      85 9113.05   83.78 9132.73   83.89 9149.13   83.12 9178.65   83.46
 9218.02   83.75 9224.58   83.98 9273.78   84.61 9368.91   86.14 9385.31   86.29
 9401.71   86.11 9424.67   86.44 9441.08   86.32 9447.64   86.61  9470.6   86.67
 9493.56   86.46 9539.48   86.59 9611.65   86.45 9683.82   86.54  9736.3   86.37
 9755.98   86.41 9805.19   86.23 9847.83   86.21 9874.07   86.03 9913.44   85.96
  9936.4   86.04 9988.88   85.7910051.21   85.7810064.33   85.9110087.29   85.77
10126.65   85.8310159.46   85.6910198.82   85.7310231.62   85.4810287.39   85.72
10333.31    85.710352.99   85.8810415.32   85.8510425.16    85.7 10467.8    85.8
10497.32   84.9610507.17   85.2910513.73   85.0210546.53   82.6410556.37    80.4
10616.37   80.5310636.37   80.6610696.37    80.810756.37   80.8310796.37   80.57
10816.37   79.9710856.37   80.6310989.37   82.4811018.89   83.2511032.01   83.42
11051.69   84.0411107.46   84.44 11117.3   84.2311163.22   84.1911205.86   83.94
 11215.7   84.0111245.23   83.6611291.15   83.6511317.39   83.3311396.12   83.37
11412.52   83.75 11415.8    84.511428.92   92.2511435.48   92.99   11465   93.65
11468.29   92.9511478.13   87.7211481.41   87.2711524.05   87.27

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2245.95    .085 4161.84     .07 4489.65    .025 4676.05     .07
 4741.45    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4161.84 4741.45          1159.96 1152.38 1315.88             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4161.84    87.3       T
 4741.4511524.05   86.89       T
Left Levee      Station=  120.25      Elevation=  101.03
Right Levee     Station=   11465      Elevation=   93.65

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)              95.93    Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.03    Wt. n-Val.                 0.074      0.057      0.066
  W.S. Elev (ft)              95.90    Reach Len. (ft)          1159.96    1152.38    1315.88
  Crit W.S. (ft)              82.69    Flow Area (sq ft)       34236.17   13729.74   59607.61
  E.G. Slope (ft/ft)      0.000120    Area (sq ft)            39700.00   13729.74   80400.05
  Q Total (cfs)           125000.00    Flow (cfs)              31224.58   31404.69   62370.73
  Top Width (ft)          11403.80    Top Width (ft)           4041.59     579.61    6782.60
  Vel Total (ft/s)            1.16    Avg. Vel. (ft/s)            0.91       2.29       1.05
  Max Chl Dpth (ft)          41.20    Hydr. Depth (ft)            8.47      23.69       8.79
  Conv. Total (cfs)       11420810.0    Conv. (cfs)             2852880.0  2869336.0  5698593.0
  Length Wtd. (ft)          1246.49    Wetted Per. (ft)         4050.70     603.39    6812.09
  Min Ch El (ft)              54.70    Shear (lb/sq ft)            0.06       0.17       0.07
  Alpha                        1.53    Stream Power (lb/ft s)      0.06       0.39       0.07
  Frctn Loss (ft)              0.15    Cum Volume (acre-ft)    33566.32   24014.66   52706.67
  C & E Loss (ft)              0.00    Cum SA (acres)           7315.35    1199.73    7916.28


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 136.8

INPUT
Description: RGV-02.  End Wall,Updated on left with new survey to Station
             1045.88. Bathymetric elevations translated from IBWC 2008 135
             Cross-section
Station Elevation Data    num=     439
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  100.83      24  101.07   24.67  101.07   24.67   91.07   34.67   90.87
  125.67   90.09  128.67   90.84  152.67   90.36  158.67   88.86  168.67   88.66
  174.67   87.16  200.98   87.89  227.98   82.18  288.97   80.28  370.96   80.08
  383.96   82.21  430.95   83.01  465.95   84.46  472.95   87.58  491.95   87.18
  501.94   84.81   900.9   84.78   903.9   69.63   909.9   68.99  930.89   71.42
  935.89      70  942.89   72.94  945.89   84.57  954.89   86.41  957.89    75.6
  970.89   66.68 1000.89   67.06 1012.88    69.8 1025.88   67.37 1045.88   68.07
 1055.94   84.96 1072.34   85.19 1108.41   85.08 1147.76    85.1 1177.28   85.26
 1187.11   85.07 1233.02   85.31 1255.98   85.11 1292.05   85.29 1311.73   85.19
 1360.92   85.27 1396.99   85.42 1436.34   85.29 1456.02   85.47 1472.42   85.32
 1541.28   85.47 1597.03   85.39 1616.71   85.56  1665.9    85.6 1695.41   85.48
 1724.93   85.52 1741.32   85.71 1790.51    85.5 1800.35   85.74 1833.15   85.52
 1918.41   85.69 1941.36   85.84 1964.32   85.76 1993.83   86.22 2039.74   86.06
 2075.82   86.51 2085.65   86.34 2108.61   83.93 2125.01   83.75  2141.4   83.84
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 2177.48   83.43 2187.31   83.66 2200.43   83.53  2236.5   83.56 2243.06   83.31
 2282.41   83.63 2341.44   83.45 2351.28   83.66 2374.23    83.5 2380.79   83.79
 2393.91   83.45 2466.05   83.67 2502.12   83.48 2515.24   83.63 2551.31   83.48
 2620.18   83.67 2623.46   83.49 2646.41   83.73 2666.09   83.56 2692.32   83.69
 2715.28   83.54 2721.83    83.7 2777.58   83.61 2784.14   83.88 2797.26   83.54
 2839.89   83.81 2879.24   83.65 2895.64   83.82 2912.03   83.67 2941.55    83.7
 2948.11   84.06 2954.66   83.75 3020.25   83.64 3089.11   83.83 3098.95   83.63
 3112.07   83.79 3135.02    83.7 3144.86   83.87 3161.26   83.72 3223.56   83.93
 3305.55      84  3328.5   83.86 3338.34   84.04 3380.97   84.13 3413.76   83.94
 3469.51   84.18 3538.38   84.03 3554.77   83.93 3594.12   84.31 3607.24    84.1
 3626.92   84.33 3636.75   84.13 3653.15   84.27 3672.83   84.08 3712.18   84.32
 3738.41   84.14 3751.53   84.22  3771.2   84.66 3784.32   88.26 3797.44   88.72
    3804   88.26 3813.83   88.53 3823.67   87.29 3833.51   87.74 3859.74   82.39
 3872.86   76.41 3895.82    66.4 3899.09   65.58 3905.65   63.64 3912.65   60.24
 3922.65   59.64 3942.65   60.14 3962.65   59.84 3972.65   59.24 3982.65   59.14
 3992.65   59.64 4002.65   59.64 4012.65   59.14 4022.65   59.34 4052.65   58.44
 4062.65   58.64    4070   60.64 4076.18   65.32 4079.46   65.41 4086.01   67.58
 4102.41   75.98 4108.97    79.9 4118.81   79.41 4128.65   81.16 4138.48   79.94
 4145.04   80.01  4151.6   81.29 4161.44    81.9 4181.11   81.55 4197.51   82.77
 4217.19   82.69 4227.02   82.37 4243.42    82.5 4253.26   82.88 4266.38   82.94
 4292.61   83.55 4302.45    84.1  4325.4   84.33 4377.87   84.44 4390.99   84.32
 4400.83   84.75 4456.57    85.1 4489.37   84.47 4528.72   84.09 4538.56   84.11
 4584.47   83.52  4610.7   83.47  4627.1    83.2 4666.45   82.87 4676.29   82.91
 4709.08   82.52 4728.76    82.6 4774.67   82.32  4784.5    82.4 4873.05   81.89
 4899.28   81.95 4932.07   81.65 4964.87    81.6 4977.98   81.33 5033.74   81.33
 5053.42   81.56 5115.75   81.96 5122.31   82.24 5145.27   82.17 5151.83   82.38
 5201.04   82.32 5227.29   82.15 5289.62   82.41 5312.58   82.61  5325.7   82.98
  5342.1   82.71 5378.19   82.92 5388.03   83.18 5404.43   83.01 5414.28   83.87
 5424.12   83.83 5437.24    84.3  5443.8   84.03  5460.2   84.04 5470.04    83.7
 5489.73    84.1 5499.57   84.55 5509.41   85.45 5519.25    86.8 5529.09   89.92
 5548.78   90.63 5555.34   89.79 5565.18   86.57 5575.02   84.28 5581.58   83.46
 5604.54   82.02 7031.57   82.02 7038.13   82.27 7041.41   83.42 7051.25   83.96
 7064.37   86.34 7074.21   86.92 7077.49   86.39  7093.9   86.08 7120.14   86.01
  7143.1   86.13 7166.07   85.81 7175.91   85.99 7248.08   86.34  7261.2   86.47
 7290.73    86.4 7326.81   86.74 7336.65   86.63 7372.74   87.17 7428.51   87.17
 7441.63   87.41 7494.12   87.47 7503.96   87.27 7579.41    87.2 7599.09    87.3
  7615.5    87.1 7638.46   87.17  7648.3   87.47 7661.42   86.94 7667.98   87.11
 7710.63    87.3 7730.31   86.85 7756.56   87.23 7772.96    86.8 7792.64   86.87
 7818.89   87.35 7832.01   87.13 7874.66   87.18 7881.22   86.97 7940.27   87.27
 7959.95   87.03 7992.75   87.21 8005.88   87.05 8015.72   87.34 8064.93    87.2
 8081.33   86.79 8101.01   87.45  8137.1   86.83  8153.5      87 8196.15   86.61
 8225.67   86.96 8248.63   86.74 8261.75   86.98 8274.87   86.53 8284.71    86.7
 8307.68   86.38 8324.08   86.37 8350.32   86.86 8360.16   86.78 8389.69   87.34
 8392.97   87.16 8422.49   87.19 8432.33   86.91 8481.54    86.7 8484.82   86.58
  8520.9   86.69 8530.74   86.56 8583.23   87.28 8593.07   87.12 8612.75   87.47
 8632.43   87.16 8638.99    87.7 8655.39   87.71 8661.95   87.39  8671.8   87.67
 8684.92   87.53 8694.76   87.88 8711.16   87.85    8721   87.44  8737.4   87.73
 8773.49   87.54 8789.89   86.92 8806.29   86.81 8832.53   86.98 8848.93   86.89
 8865.33   87.16  8904.7   87.24  8937.5   86.85 8976.87    86.8 8996.55   86.52
 9016.23   85.94 9039.19   86.37 9052.31   86.17  9088.4   86.04 9127.76   86.31
 9170.41   85.61 9180.25    85.8 9206.49   85.56 9232.73   85.55 9249.14   85.82
 9268.82   85.62 9278.66   85.89 9298.34   85.64 9340.99   86.17 9360.67   85.96
 9373.79   85.31 9383.63   85.96 9403.31   85.46 9432.84   85.46 9449.24   85.03
 9459.08   85.24 9491.88   85.06 9498.44   85.28 9514.84   85.12 9524.68   85.39
 9541.09   84.85 9570.61   84.52  9606.7   84.47 9646.06   84.14  9672.3   86.17
 9685.42   86.91 9708.38   87.69 9718.23   86.81 9724.79   86.87 9737.91   86.17
 9790.39   86.09  9823.2   86.36 9859.28   86.23 9882.24   86.3410000.34    86.1
 10023.3   86.0110065.94   86.0510095.47   85.9110138.11    85.910187.32   85.63
10200.44   85.6910226.68   85.4210233.24   85.5510262.76   85.3210282.45   85.45
10305.41   85.1510367.73   84.96 10407.1   84.5610430.06   84.7910462.87    84.4
10535.03   84.0510561.28   83.73 10607.2   83.5410633.44   83.1910672.81   82.98
10699.05   82.4810722.01   82.4810738.41   82.9910754.82   82.4811155.02   82.48
11168.14   83.0911177.98    86.211184.54   87.4211197.66   88.15 11207.5   89.23
11217.35   88.4711223.91   88.5511243.59   87.6111259.99   88.0411309.19   88.15
11335.44   88.3111345.28   87.8511387.92   88.0711430.57   88.0211499.46   88.06
 11509.3   87.9611532.26   88.2311568.34   88.1711578.18    88.511588.02   88.26
11627.39   88.5711640.51   88.2511686.44   88.42 11709.4    89.211768.44   88.15
11778.28   88.4611784.84    88.211807.81   88.1811817.65   88.4711870.13   88.02
11899.66   88.1911935.74   87.8811945.58   87.9311991.51   87.4612011.19   87.48
12024.31    87.112043.99   86.9812073.52   85.46 12093.2   85.4212103.04    86.8
12119.44   87.4712122.72   88.2112132.56      92 12142.4    93.412162.09   94.31
12165.37   93.3512168.65   91.0912175.21   88.0912181.77   87.2712290.02   87.27
12296.58   87.5312303.14   88.9112312.98   94.1612316.26   94.8612342.51   94.64
12352.35   94.9212362.19   94.1512368.75   91.9412385.15   90.04

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .101 3797.44    .066 3895.82    .015 4086.01    .066 4456.57    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3797.44 4302.45          6010.21 5782.22 1539.14            .1       .3
Left Levee      Station=   24.67      Elevation=  101.07
Right Levee     Station=12162.09      Elevation=   94.31
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   39.44 3785.92   88.24 4487.8911223.66   84.5711223.6612154.37   88.49

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             95.78    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.101      0.050     0.074
  W.S. Elev (ft)             95.75    Reach Len. (ft)          6010.21    5782.22   1539.14
  Crit W.S. (ft)             87.85    Flow Area (sq ft)       28010.43   11234.63   78586.54
  E.G. Slope (ft/ft)      0.000121    Area (sq ft)            28010.43   11234.63   78586.54
  Q Total (cfs)           125000.00     Flow (cfs)             17244.92   28474.30   79280.78
  Top Width (ft)          12360.48    Top Width (ft)           3772.77     505.01    8082.70
  Vel Total (ft/s)            1.06    Avg. Vel. (ft/s)            0.62       2.53      1.01
  Max Chl Dpth (ft)          37.31    Hydr. Depth (ft)            7.42      22.25      9.72
  Conv. Total (cfs)       11357870.0     Conv. (cfs)            1566924.0   2587258.0   7203684.0
  Length Wtd. (ft)         3207.09    Wetted Per. (ft)         3777.80     516.06    8095.49
  Min Ch El (ft)             58.44    Shear (lb/sq ft)            0.06       0.16      0.07
  Alpha                       1.92    Stream Power (lb/ft s)      0.03       0.42      0.07
  Frctn Loss (ft)             0.51    Cum Volume (acre-ft)    32664.79   23684.45   50305.30
  C & E Loss (ft)             0.00    Cum SA (acres)           7211.30    1185.39    7691.75


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION
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RIVER: Rio Grande
REACH: Lower Reach        RS: 136.2

INPUT
Description: RGV-02.  Begin Wall, Updated on left with new survey to Station
             1755.99. Bathymetric elevations translated from IBWC 2008 135
             Cross-section
Station Elevation Data    num=     371
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    92.6      25   97.22      68   97.23     111   91.63     118   88.29
     217   88.29     253   97.81     276   100.3     300  100.54  300.67  100.54
  300.67   90.54  310.67   90.34  401.67   88.92  404.67   89.67  428.67   89.19
  434.67   87.69  444.67   87.49  450.67   85.99  501.01   85.82  593.01   85.13
  824.01   85.67  848.01   85.22 1031.01   85.51 1082.01   86.63 1241.87   88.81
 1248.42    86.7  1251.7   84.58 1258.25   83.75  1264.8   84.63 1277.91   83.03
 1284.46   80.82  1307.4   65.63    1502   64.41    1525   76.47    1549   72.42
    1569   74.58    1579   79.91 1675.99   80.91 1755.99   79.59 1843.99    82.1
 2027.98   82.66 2222.93   82.07 2225.08   82.33 2264.44   82.72 2280.83   82.55
 2297.23    81.8 2307.07   82.03 2320.19   81.68  2333.3   82.01 2375.94    81.9
 2385.78   82.42 2392.34   84.56 2398.89   85.56 2405.45    85.4 2428.41   86.91
 2454.65   88.02 2461.21   88.91 2467.76   88.29 2474.32   86.59 2490.72   86.64
  2526.8   86.34 2585.83   86.24 2608.78   86.34 2667.81   87.14 2746.52   87.04
 2762.92   86.82 2795.71   86.97 2831.79   86.72 2858.03   86.81 2900.66    86.6
 2920.34    86.8 2953.13   86.53 2995.76   86.44 3018.72   86.76 3028.56    86.6
 3061.35   86.94 3084.31   86.29 3117.11   86.54 3146.62   86.41 3205.65   86.44
 3271.24   86.13 3304.04   85.83 3333.55   85.77 3379.47   85.34 3451.62   85.35
 3468.01   85.55 3490.97   85.35 3513.93   85.78 3658.22   86.47 3671.34   86.32
 3730.37   86.34 3786.12   85.83 3818.92   86.42 3832.04   86.06 3851.71   86.55
 3864.83    86.4 3881.23    86.9 3917.31      86 3959.94   86.37 3976.34   86.92
 3989.45   88.18 4012.42   86.73 4041.94   86.03 4068.18   86.01 4107.55   85.68
 4123.95   85.89 4251.88    85.6 4271.56   85.77 4343.73   85.55 4363.42   85.77
 4376.54   85.58 4406.06   85.78 4448.71   85.64  4550.4   85.63 4596.32    85.3
 4635.69   85.27 4668.49   85.56 4707.85   86.23 4757.06   86.07 4789.86    86.5
 4825.95   86.43 4848.91   86.11 4881.71   86.16 4904.68   85.95  4950.6   86.03
 5003.09   86.43 5019.49   86.26 5049.01    86.8  5068.7   87.96 5078.54    87.5
 5088.38   85.93  5101.5   82.74 5111.34   81.93  5117.9    82.2 5137.58   81.33
 5564.03   81.33 5583.72   82.11 5606.68   82.61 5659.16    83.2    5669   82.98
 5711.65   83.12 5754.29   81.33 6436.61   81.33 6462.86   81.79 6479.26   81.74
 6495.66   84.11 6518.62   83.85  6538.3   84.27 6564.55   85.48 6577.67   85.78
 6646.56    86.7 6676.08   86.72 6738.41   87.02 6761.37   87.25 6771.21   87.84
 6777.77   87.47 6800.73    87.7  6840.1   87.61 6846.66   88.04  6856.5   87.54
 6876.18    87.7 6889.31   87.43 6922.11   87.74 6961.47   87.45 6981.16   87.74
 7017.24   87.38 7046.76   87.82 7086.13   87.21 7112.37   87.26 7155.02   86.93
 7161.58   87.06 7276.39   87.22 7279.67    87.4 7368.24   87.53  7407.6   87.87
 7463.37   88.11 7483.05   88.04 7535.54   88.18 7578.18   88.01 7620.83   88.14
 7627.39   88.73 7653.63   88.32 7663.47   88.76 7679.88   87.85    7693   87.59
 7748.76   87.78 7761.89   87.59 7814.37   87.84 7853.74   87.67 7902.94   87.91
 8001.35    87.9 8021.03   88.02 8135.85   87.92 8194.89   87.66  8227.7   88.26
 8290.02   88.05 8326.11   87.42 8372.03   87.76 8394.99   88.18 8417.95   89.24
 8431.07   90.69 8457.32   91.98 8499.96   92.51 8627.89   91.65 8700.06   90.49
  8726.3   89.84 8778.78   89.18 8805.03   88.72 8847.67   88.33 8864.07   87.88
 8929.68   86.77 8972.32   85.85    8992   85.64 9057.61   85.63 9123.21   86.15
 9136.33   85.85 9165.86   85.75 9205.22    86.1 9238.02   85.86 9303.63   85.79
 9372.51   85.86 9415.16   86.29 9444.68   86.38 9477.48   86.23 9497.16   86.41
 9595.57   86.54 9648.06   87.08 9664.46   87.61  9690.7   87.49 9700.54   87.95
 9713.66   87.62 9746.46   87.57 9766.15   88.47 9792.39   87.33 9808.79   87.95
 9835.03   87.36 9877.67      88 9917.04   87.76 9943.28   87.86 9966.24    87.5
 9992.48   87.6910038.41   87.3510074.49   87.3110081.05   87.4910117.13    87.2
10133.54   87.4410163.06   87.0410192.58   87.1810228.66   87.9310235.22   88.44
10284.43   88.5310310.67   86.7710336.91   86.7210363.16   86.2110376.28   86.61
 10438.6   86.0210468.12   85.9510477.96   86.2110517.33   85.9610523.89    86.5
10553.41    86.210579.65    85.310609.18    85.210619.02   85.5910651.82   85.32
 10671.5    85.810681.34   85.4610727.27   85.2110746.95   85.3110756.79      85
10773.19   85.2810815.83   84.6810832.23   85.0210868.32   84.8510881.44   85.05
10901.12   84.7810927.36   85.1310947.04   84.9510966.73   85.4310992.97   84.66
11058.57   84.1611084.82   84.6111101.22    84.411140.58   84.6611160.26   85.83
 11170.1   85.3111183.22   86.0511206.19   85.1211229.15   85.3311271.79   86.24
   11321   86.62 11337.4   87.1711347.24   86.8811373.48   86.79 11386.6   87.01
11429.24   86.8111468.61   87.2211478.45   87.0311544.05   87.1211560.46   86.86
 11668.7   87.0511678.54   87.2111744.15   87.2311816.32    87.611904.88   87.89
11950.81    87.811977.05   88.0312013.13   87.5112075.46   87.68 12101.7   87.31
12167.31   87.6712206.67   87.5412246.03   87.6612291.96   87.3712314.92   87.41
12321.48   87.0612337.88   87.2112357.56   87.8212377.24   87.4812390.36   87.63
12400.21   87.1912423.17   87.4112439.57      8712498.61   87.1312518.29   86.63
12541.26   86.7512570.78   86.4512619.98   87.0512626.54   87.4912642.95   87.48
12652.79   87.9512672.47   89.6212685.59   91.9712708.55   95.0712738.07  100.01
12744.63  100.76 12767.6   102.1 12849.6   105.6   12866  104.9712879.12  104.02
12898.81  100.5712921.77   97.2512948.01   93.9812977.53    91.912997.21   89.42
13010.34   88.8713039.86   88.5313075.94   87.4713089.06    86.5 13115.3   86.34
13131.71   85.7613144.83   86.5813180.91   86.6713203.87   86.2513246.52   86.65
 13249.8   87.2413256.36   90.8413272.76   92.5513292.44   93.1313295.72   92.79
13305.56   87.8213308.84   87.2713430.21   87.2713443.33   88.3813453.17   93.93
13456.45   94.2113489.26   93.2413508.94   90.7413518.78   85.4313525.34   83.18
 13531.9    82.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .101 1241.87    .066  1307.4    .015    1502    .066 2461.21    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1241.87 2461.21          2472.19 2469.54   881.5            .1       .3
Left Levee      Station=  300.67      Elevation=  100.54
Right Levee     Station= 12849.6      Elevation=   105.6
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  276.06 1230.42    88.8 2468.7312927.32   88.29

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             95.27    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                0.101      0.060      0.074
  W.S. Elev (ft)             95.23    Reach Len. (ft)         2472.19    2469.54     881.50
  Crit W.S. (ft)             85.41    Flow Area (sq ft)       5945.60   20094.50   69841.35
  E.G. Slope (ft/ft)      0.000213    Area (sq ft)            5945.60   20094.50   69841.35
  Q Total (cfs)           125000.00    Flow (cfs)              4349.42   47045.71   73604.87
  Top Width (ft)          12408.85    Top Width (ft)           941.20    1219.34   10248.31
  Vel Total (ft/s)            1.30    Avg. Vel. (ft/s)           0.73       2.34       1.05
  Max Chl Dpth (ft)          30.82    Hydr. Depth (ft)           6.32      16.48       6.81
  Conv. Total (cfs)       8560339.0    Conv. (cfs)            297860.3   3221818.0   5040661.0
  Length Wtd. (ft)          1559.85    Wetted Per. (ft)         946.20    1230.87   10249.34
  Min Ch El (ft)              64.41    Shear (lb/sq ft)           0.08       0.22       0.09
```

Alpha	1.61	Stream Power (lb/ft s)	0.06	0.51	0.10
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	30322.24	21605.11	47683.04
C & E Loss (ft)	0.01	Cum SA (acres)	6886.10	1070.94	7367.90

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 136

INPUT
Description: RGV-02. 8-foot wall applied with 5:1 SS, Bathymetric elevations
translated from IBWC 2008 135 Cross-section
Station Elevation Data num= 432

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108.08	24	108.32	24.67	108.32	24.67	100.32	34.67	100.12
125.67	99.78	128.67	100.38	152.67	99.9	158.67	98.7	168.67	98.5
174.67	97.3	189.96	92.34	209.95	87.57	223.95	86.7	260.94	85.96
280.94	86.76	326.93	86.22	355.92	86.67	377.92	82.31	421.91	81.41
459.9	81.56	495.9	73.25	529.89	64.33	541.32	66.85	547.88	65.46
557.72	64.04	564.72	60.64	574.72	60.04	594.72	60.54	614.72	60.24
624.72	59.64	634.72	59.54	644.72	60.04	654.72	60.04	664.72	59.54
674.72	59.74	704.72	58.84	724.72	59.34	734.72	61.04	744.72	64.08
793.93	64.64	800.5	64.81	819.83	64.33	835.83	69.53	845.82	69.23
856.82	66.05	879.82	69.51	891.81	73.07	913.81	74.7	938.8	78.35
960.8	82.25	974.37	82.24	990.78	82.31	1017.02	82.12	1072.8	83.2
1092.48	84.06	1108.88	84.45	1148.25	84.96	1161.38	84.98	1204.03	85.48
1233.55	85.56	1256.52	85.91	1286.04	85.97	1305.73	86.26	1361.5	86.28
1381.19	86.48	1407.43	86.55	1423.84	86.45	1499.29	86.7	1512.42	86.55
1545.22	86.65	1558.35	86.81	1571.47	86.65	1587.87	86.8	1607.56	86.65
1620.68	86.75	1751.91	86.42	1771.6	86.51	1781.44	86.35	1830.65	86.42
1850.33	86.17	1860.18	86.37	1886.42	86.44	1896.26	86.23	1906.11	86.43
1942.19	86.12	1961.88	86.58	1978.28	86.12	2007.81	86.32	2020.93	86.16
2096.39	86.21	2135.76	85.99	2178.4	85.88	2204.65	86.04	2214.49	85.9
2234.18	86.02	2247.3	85.9	2289.95	85.95	2319.47	85.68	2335.88	85.75
2378.52	85.66	2408.05	85.47	2424.45	85.56	2473.66	85.21	2490.07	85.36
2542.56	85.22	2608.17	85.34	2647.54	85.11	2680.34	85.04	2700.03	84.86
2749.24	85.03	2791.88	85.04	2798.45	85.15	2883.74	85.3	2919.83	84.83
2936.23	85.11	2942.79	85.76	2969.04	84.98	2982.16	85.92	2995.28	88.95
3005.13	90.57	3008.41	90.13	3018.25	86.38	3028.09	85.55	3057.62	85.18
3090.42	85.18	3119.95	85.55	3129.79	85.93	3152.75	86.26	3175.72	87.24
3182.28	87.71	3215.09	91.51	3231.49	92.67	3300.38	93.09	3326.63	93.31
3366	93.11	3372.56	92.96	3425.05	92.72	3457.85	92.85	3464.42	93.31
3474.26	92.48	3487.38	89.06	3493.94	88.23	3500.5	88.07	3507.06	87.05
3513.63	86.64	3546.43	86.08	3585.8	86.41	3625.17	86.21	3644.85	86.29
3664.53	85.93	3697.34	86.03	3739.99	86.56	3746.55	86.78	3753.11	87.6
3769.52	91.75	3785.92	93.29	3808.88	93.21	3831.85	93.35	3841.69	93.09
3848.25	93.51	3874.5	93.85	3920.42	93.68	3936.83	93.33	3972.92	93.3
3979.48	93.19	4028.69	93.28	4048.37	93.1	4077.9	93.21	4084.46	93.59
4097.58	93.62	4110.7	93.32	4127.11	93.33	4182.88	92.83	4192.72	93.24
4215.69	93.4	4225.53	92.99	4248.49	93.04	4300.99	92.93	4360.04	93.07
4369.88	93.25	4399.41	93.25	4465.02	92.95	4471.58	93.09	4543.76	93.24
4556.88	93.19	4573.29	93.61	4602.81	93.12	4625.78	92.91	4638.9	93.69
4668.43	93.94	4691.39	93.74	4760.29	94.2	4789.81	93.56	4816.06	93.54
4884.96	93.31	4944.01	93.24	4996.5	93.47	5062.11	93.83	5071.96	93.47
5088.36	92.35	5104.76	90.31	5134.29	87.51	5157.26	86.52	5170.38	85.66
5180.22	85.35	5203.19	85.52	5255.68	85.37	5262.24	85.48	5301.61	85.01
5308.17	85.35	5321.29	85.27	5340.98	85.64	5354.1	85.33	5377.07	85.54
5386.91	85.33	5406.59	85.6	5459.08	85.55	5482.05	85.65	5495.17	85.48
5527.98	85.72	5554.23	85.56	5580.47	85.61	5593.59	84.91	5610	84.48
5616.56	85.42	5632.96	85.59	5649.37	84.46	5682.17	84.51	5698.58	84.35
5754.35	84.34	5777.31	84.6	5787.16	84.44	5816.68	84.68	5842.93	84.54
5865.9	84.69	5879.02	84.94	5915.11	85.02	5974.16	85.27	6000.41	85.12
6020.09	85.28	6072.58	85.25	6085.7	85.39	6121.79	85.43	6131.63	85.26
6174.28	85.42	6210.37	85.34	6236.62	85.55	6272.71	85.46	6305.51	85.22
6318.64	85.4	6400.65	85.09	6426.9	85.19	6479.39	84.97	6505.64	85.12
6541.73	84.86	6577.81	84.97	6590.94	84.78	6620.46	84.83	6636.87	84.61
6669.67	84.62	6705.76	85.2	6715.6	85.09	6800.9	85.73	6823.87	85.7
6833.71	85.89	6879.64	86.18	6886.2	86.35	6912.45	86.28	6945.26	86.65
6955.1	86.63	7023.99	87.09	7056.8	87.2	7073.21	87	7089.61	87.11
7115.85	86.89	7168.35	86.78	7207.72	86.35	7224.12	86.36	7237.24	86.13
7253.65	86.24	7273.33	86.02	7299.58	85.99	7309.42	85.82	7398	85.37
7466.89	85.2	7502.98	85.2	7519.39	84.99	7562.04	84.96	7585	84.73
7594.84	84.81	7644.05	84.61	7693.26	84.33	7719.51	84.3	7752.32	83.85
7840.9	83.53	7860.58	83.33	7896.67	83.38	7955.72	83	7995.09	83.23
8037.74	83.18	8057.43	83.82	8073.83	84.15	8083.67	83.54	8096.79	83.61
8109.92	84.12	8116.48	83.92	8123.04	84.31	8132.88	83.45	8152.57	82.87
8168.97	83.47	8182.09	83.06	8198.5	82.86	8224.74	83.05	8290.36	82.92
8323.17	83.19	8359.26	83.07	8401.91	83.42	8411.75	84.1	8418.31	83.79
8428.15	83.97	8434.72	83.68	8490.49	84.36	8523.3	84.23	8572.51	84.94
8582.35	84.78	8615.16	85.4	8651.25	85.28	8687.34	85.81	8710.31	85.84
8720.15	86.07	8759.52	86.04	8841.54	86.5	8867.78	86.44	8923.56	86.75
8946.52	86.71	8962.93	87.16	8976.05	86.82	8995.74	87.24	9028.54	87.11
9071.19	87.38	9097.44	87.34	9113.84	87.67	9136.81	87.49	9163.06	87.55
9176.18	87.74	9215.55	87.71	9235.24	87.92	9258.2	87.7	9274.6	87.25
9291.01	87.14	9307.41	87.47	9320.54	87.39	9327.1	87.99	9340.22	87.5
9346.78	87.68	9363.19	87.46	9379.59	89.35	9386.15	89.27	9396	87.69
9412.4	87.02	9438.65	87.51	9484.58	87.82	9537.07	87.43	9563.32	87.61
9592.84	87.36	9612.53	87.5	9625.65	87.38	9681.43	87.31	9707.67	87.16
9730.64	87.24	9753.6	87.04	9792.97	87.08	9838.9	86.81	9874.99	86.88
9881.55	86.72	9911.08	86.91	9934.05	86.74	9966.86	86.79	9983.26	86.64
10012.79	86.7710058.72		86.5310071.84		86.5810134.18		86.4510193.23		86.58
10203.08	86.4510239.17		86.510262.13		86.36 10285.1		86.510291.66		86.23
10314.62	86.9910331.03		86.8810344.15		86.5510380.24		86.2210393.36		86.58
10406.49	86.2410436.02		86.46 10455.7		86.2110475.38		85.710498.35		85.6
10518.04	85.6910531.16		85.510554.12		85.5210580.37		85.910600.05		85.48
10636.14	85.6410652.55		8610678.79		86.9610688.64		87.0110705.04		88.6
10721.45	90.8510737.85		94.1610750.97		98.5810754.25		99.03 10780.5		106.75
10793.62	109.1310823.15		109.95 10849.4		110.8210859.24		111.29 10865.8		110.74
10875.64	109.2710885.49		108.3910888.77		106.9610898.61		100.7910908.45		95.1
10924.86	87.5710928.14		87.2711046.25		87.2711049.53		87.5211059.37		93.57
11065.93	94.5611079.05		93.98						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.101	459.9	.066	529.89	.015	819.83	.066	1361.5	.074

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
        459.9   960.8         1496.01 1684.16 1239.16            .1       .3
Left Levee      Station=   24.67      Elevation=  108.32
Right Levee     Station=10859.24      Elevation=  111.29
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0  153.96   99.41

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             95.02    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.10    Wt. n-Val.                0.101      0.041      0.073
  W.S. Elev (ft)             94.92    Reach Len. (ft)         1496.01    1684.16    1239.16
  Crit W.S. (ft)             78.39    Flow Area (sq ft)       2655.40   14304.26   77708.38
  E.G. Slope (ft/ft)      0.000123    Area (sq ft)            2655.40   14304.26   77708.38
  Q Total (cfs)           125000.00    Flow (cfs)              1945.52   53439.95   69614.54
  Top Width (ft)          10558.10    Top Width (ft)           277.90     500.90    9779.31
  Vel Total (ft/s)            1.32    Avg. Vel. (ft/s)           0.73       3.74       0.90
  Max Chl Dpth (ft)          36.08    Hydr. Depth (ft)           9.56      28.56       7.95
  Conv. Total (cfs)       11263070.0    Conv. (cfs)             175300.2   4815185.0   6272590.0
  Length Wtd. (ft)         1412.95    Wetted Per. (ft)         279.36     507.72    9784.30
  Min Ch El (ft)             58.84    Shear (lb/sq ft)           0.07       0.22       0.06
  Alpha                       3.68    Stream Power (lb/ft s)     0.05       0.81       0.05
  Frctn Loss (ft)             0.18    Cum Volume (acre-ft)    30078.17   20630.03   46190.10
  C & E Loss (ft)             0.00    Cum SA (acres)           6851.50    1022.18    7165.25


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 135.5

INPUT
Description: RGV-02. End wall, Bathymetric elevations translated from IBWC 2008
             135 Cross-section
Station Elevation Data    num=     416
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   85.25   73.99   84.86   89.99    86.7  157.98   87.89  187.97   85.68
  205.97   81.12  257.96   80.62  288.96   81.69  304.96   74.33  330.95   74.42
  369.95    68.6  421.94   67.78  444.94   69.88  465.93   67.78  733.88   67.78
  770.88   75.79  776.88   74.47  790.87   81.66  837.86   82.16  844.86   76.37
  876.86   73.64  904.85    83.6  982.83   83.03 1031.82   80.58 1109.81   81.71
 1233.78   82.61 1357.76   82.58 1459.74   84.25 1531.73   83.36 1569.72   83.84
 1591.05   84.07 1604.17   84.43 1623.86   84.26 1659.94   84.55 1686.18   84.43
 1699.31   84.77 1718.99   84.52 1755.08   84.77  1784.6    84.4 1797.72   84.72
 1856.77    84.8 1866.61   84.54  1919.1   84.76 1932.22   85.13 1945.34   84.51
 1997.83   84.83 2010.95   84.65 2043.76   84.92 2056.88   84.79 2089.69   85.14
 2119.21   84.48 2148.74   93.38 2165.14   98.83 2168.42   99.27 2192.42   99.51
 2193.09   99.51 2193.09   89.51 2203.09   89.31 2294.09    78.2 2297.09   78.95
 2321.09   78.47 2327.09   76.97 2337.09   76.77 2343.09   75.27 2361.97   75.09
 2368.53   75.29 2384.93   74.57 2411.18   74.65 2430.86   76.25 2447.26   79.63
 2463.66   84.68 2470.22   87.13 2476.78   88.67 2486.63   88.47 2493.19   86.72
 2506.31    81.4 2519.43   78.08 2532.55   76.68 2545.68    75.8 2555.52   75.61
 2571.92   76.61 2578.48    77.5  2591.6   78.31 2608.01   81.91 2614.57   81.26
 2621.13   79.42 2634.25    78.8 2653.93   79.45 2670.33   80.77  2676.9   80.65
 2683.46   79.71 2732.66   80.43 2742.51   81.04 2775.31   80.86 2785.15   81.79
 2794.99    81.2  2811.4   82.78 2837.64   81.99 2854.04   79.84 2877.01   79.46
 2886.85   79.59 2899.97   80.59 2913.09   79.57 2926.21   79.67 2936.05   78.47
 2955.74   77.63 2991.82   78.14 3008.23   78.97 3018.07   78.65 3034.47   79.21
 3060.71   79.47 3083.68   80.53 3103.36   80.55 3116.48   79.41 3126.32   79.86
 3142.73   78.91 3152.57   80.19 3159.13   80.26 3168.97   76.38 3175.53   74.43
 3188.65   72.53 3198.49   67.18 3205.06   64.72 3211.62   64.37 3218.62   61.74
 3228.62   61.14 3248.62   61.64 3268.62   61.34 3278.62   60.74 3288.62   60.64
 3298.62   61.14 3308.62   61.14 3318.62   60.64 3328.62   60.84 3358.62   59.94
 3378.62   60.44 3388.62   62.14  3398.6   64.37 3401.89   64.55 3408.45   67.59
 3428.13   74.77 3434.69   78.78 3447.81   84.86 3454.37   86.04  3467.5   85.89
 3474.06   86.31 3493.74   84.67 3519.98   84.51 3542.95   83.95 3562.63   83.89
 3588.87   83.13 3628.24   83.95 3644.64    85.1 3657.76   87.27 3670.89   87.44
 3677.45   86.01 3690.57   85.03 3697.13   85.06 3703.69    86.9 3713.53   86.04
 3756.18   86.08 3779.14   86.26 3805.39   85.96 3854.59   86.28 3867.72   85.91
  3887.4   86.18 3923.48   86.12 3969.41   86.18 4015.34   85.95 4028.46   85.65
 4064.55    85.7 4077.67    85.4 4103.91   85.49 4117.04   85.26 4136.72   85.49
 4202.33   85.73 4212.17   85.18 4238.42   85.82 4244.98   85.33 4287.63   85.78
    4327   85.59 4330.28   86.37 4340.12    85.4  4343.4   86.48 4353.24   85.35
 4372.93   85.58 4402.45   85.11 4409.01   85.31 4438.54   85.07 4451.66   85.22
  4461.5   84.88 4481.19   85.07 4491.03   84.81 4513.99   84.81  4530.4   84.16
 4559.92    84.5 4589.45   84.25 4612.41   84.53 4632.09   84.37 4658.34   84.46
 4668.18   84.27 4697.71    84.3 4743.64   83.93 4796.12   83.81 4819.09   83.87
 4832.21   83.66 4878.14   83.49 4897.82   83.62 4927.35   83.38 4963.44   83.36
 4979.84   83.51 5006.08   83.26 5025.77   83.36 5061.85   83.05 5094.66   83.22
 5124.18   83.05 5134.03   83.16 5202.92   83.11 5212.76    83.4 5232.44   83.46
 5261.97   83.28 5275.09   83.69  5291.5   83.67 5311.18   84.08 5327.58   83.94
 5360.39   84.14  5393.2   84.17 5432.56      84 5445.69   84.12 5550.67   84.07
 5567.07   83.92 5609.72   84.15 5622.84   83.93 5652.37   84.06  5698.3   83.63
 5750.79   83.58 5773.75   83.86    5800   83.67 5822.96   83.79 5842.64   83.61
 5937.78   83.56 5944.34   83.42 6016.52   83.28 6039.48   83.34  6121.5   83.27
 6157.58   83.14 6183.83   83.35 6219.91   83.08 6242.88   83.21 6347.86   83.07
 6367.54   83.32 6400.35   83.48 6433.15   83.09 6446.28   83.46 6462.68   83.11
 6521.73   83.01 6584.06   83.07 6607.03   82.96 6649.67   83.09 6692.32   82.98
 6728.41   83.18 6741.53   83.02 6810.42    83.2 6869.48   83.74 6879.32   83.47
 6912.12   83.34 6974.46   83.43  7102.4   83.22 7118.81    83.4 7168.02   83.25
 7184.42   83.33 7210.66   83.08    7273   83.17 7299.24   82.96 7351.73   82.91
 7377.98   83.06  7407.5   82.88 7538.73   82.99 7669.95   82.92    7729   83.06
 7774.93   82.87 7804.45   82.99 7824.14    82.9 7866.79   82.99 7883.19   82.85
 7902.87   82.99 7929.12   82.87 7952.08   83.24 8014.41   83.15 8040.66      83
  8050.5   83.13 8125.95   83.23 8139.08   83.33 8207.97   83.11  8270.3   83.12
 8289.98   83.28  8319.5   83.18 8375.27   83.36 8414.63   83.21 8463.84    83.7
 8572.09   83.02 8696.75   82.95 8765.64   82.85 8814.85      83 8916.55   83.63
 8936.23   83.61 8959.19   83.88 9034.64   84.03 9051.05   83.84 9070.73   83.97
  9126.5   83.79 9156.02   83.32 9175.71   83.43 9195.39   83.26 9211.79   82.51
    9261   82.26 9329.89   82.19 9372.54   82.22 9428.31   82.03 9490.63   82.14
 9520.16   82.03 9582.49   82.09 9648.09   82.03 9667.78   82.25 9723.54   82.19
 9759.63    82.3 9772.75   82.17 9798.99   82.29 9821.96   82.59 9841.64   82.54
  9864.6   82.84 9900.69      83 9946.61   83.48 9989.26   83.5610061.43   84.29
10084.39   85.0610087.67   84.8610107.36   85.3510143.44   85.610182.81   86.31
10192.65   86.1510264.82   86.310274.66   86.5210310.75   86.3810353.39   86.69
10373.08   86.6510392.76   86.87   10419   86.8510438.69   87.1310455.09   87.09
10481.33   87.4210514.14   87.3810527.26   87.5610576.47   87.3410583.03   87.59
10615.84   87.4610681.45   87.510704.41   87.2610720.81   87.4810786.42   87.17
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10825.79   87.3210868.43   87.0210894.68   87.0510917.64   86.7410976.69   86.89
10986.53   86.7111025.89   86.82 11058.7    86.511124.31   86.5111140.71   86.34
11206.32    86.211222.72   86.7511232.56   86.64 11242.4   85.7711281.76    86.1
11363.78   85.9811370.34    85.811439.23   86.0311478.59   85.8711501.56   86.01
11547.48   85.8611580.29   85.9411616.38   85.7911636.06   85.9111695.11   85.83
11721.35   85.9611813.21   85.9311819.77    85.811875.54   85.9411885.38   85.85
11941.15    85.911950.99   86.0112019.88   85.6812039.56   85.9612046.12   85.67
12072.37   85.8812157.66   85.71 12183.9   85.8712216.71   84.7412236.39   85.91
12249.51    85.312256.07   83.4512262.63    83.4 12269.2   86.3212282.32   88.31
12295.44   89.4312315.12   89.8212321.68   90.3112331.52   92.4512354.49   93.06
12357.77    92.812367.61   88.1912374.17   87.2712502.11   87.2712508.67   88.71
12515.23    92.4

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .101 3152.57    .066 3198.49    .015 3408.45    .066 3670.89    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3152.57 3474.06          911.83  679.76  443.07            .1       .3
Left Levee      Station= 2193.09      Elevation=   99.51
Right Levee     Station=12354.49      Elevation=   93.06
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 2192.68 2476.62   88.51 3470.4212454.08    85.9

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             94.83    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                0.101      0.037     0.074
  W.S. Elev (ft)             94.74    Reach Len. (ft)          911.83     679.76    443.07
  Crit W.S. (ft)             88.08    Flow Area (sq ft)       11818.00    8855.16   78103.84
  E.G. Slope (ft/ft)      0.000137    Area (sq ft)            11818.00    8855.16   78103.84
  Q Total (cfs)           125000.00     Flow (cfs)             10776.58   36849.46   77373.95
  Top Width (ft)          10322.14    Top Width (ft)           959.48     321.49    9041.17
  Vel Total (ft/s)            1.27    Avg. Vel. (ft/s)           0.91       4.16       0.99
  Max Chl Dpth (ft)          34.80    Hydr. Depth (ft)          12.32      27.54       8.64
  Conv. Total (cfs)       10691120.0     Conv. (cfs)            921709.9   3151696.0   6617713.0
  Length Wtd. (ft)          552.79    Wetted Per. (ft)          968.23     329.95    9047.05
  Min Ch El (ft)             59.94    Shear (lb/sq ft)            0.10       0.23       0.07
  Alpha                       3.61    Stream Power (lb/ft s)      0.09       0.95       0.07
  Frctn Loss (ft)             0.07    Cum Volume (acre-ft)    29829.63   20182.32   43973.89
  C & E Loss (ft)             0.00    Cum SA (acres)           6830.25    1006.28    6897.56


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 135

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   86.56    9.83   86.74   22.93   90.19   49.14   98.83   62.25   98.95
   65.52   98.56   85.18   92.06   95.01   89.03  101.56   87.59  111.39   86.61
  124.49   85.79  157.26   79.39  163.81   78.77  183.46   78.69  199.85   79.41
   206.4   79.93  216.23   81.41  229.33   83.81  255.54   84.97  265.37   83.99
  271.92    82.2   275.2   82.33  281.75   84.06   288.3   84.77  294.85   84.93
  304.68   84.42  337.44   84.06  350.55    83.8  363.65   84.81  376.76   87.17
  389.86   87.11  396.42   85.23  406.24   81.28  416.07   78.99   425.9   76.29
  442.28   75.15  458.66   75.27  468.49   76.44   481.6   77.56  491.42   78.87
  497.98   78.61  504.53   77.28  537.29   77.73  556.95   78.38   563.5   78.35
   576.6   78.85  589.71   78.22  606.09   78.74  612.64   79.28  625.75   78.53
  648.68   79.85  655.23   79.31  678.16   78.28  691.27   77.89  710.93   77.81
  720.75   77.07  727.31   77.53  740.41   77.16  756.79      76  766.62   76.36
  779.72   75.76  792.83   77.08  799.38   76.32  805.93   76.12  812.49   76.77
  828.87    77.3   838.7    77.4   851.8   76.93  874.73   78.01  881.29   77.56
  894.39   74.96  910.77   73.28   920.6   71.51  927.15    70.9  936.98   72.22
  940.26   73.26  950.08   77.62  953.36   77.35  963.19   74.34  969.74   73.05
  976.29   70.75  982.85   67.03   989.4   64.43  992.67   62.07  999.67   58.67
 1009.67   58.07 1029.67   58.57 1049.67   58.27 1059.67   57.67 1069.67   57.57
 1079.67   58.07 1089.67   58.07 1099.67   57.57 1109.67   57.77 1139.67   56.87
 1159.67   57.37 1159.76   64.27 1166.31   64.85 1172.86   67.39 1176.14   69.57
 1185.97   73.29 1199.07   76.83  1208.9   82.46 1215.45   85.78 1218.73   86.64
 1225.28   86.88 1238.39   86.54 1254.77   85.77 1267.87   85.72 1280.98   85.18
 1294.08   83.74 1310.46   83.36 1320.29    83.6 1330.12   83.47 1339.95   83.93
 1366.16    83.8 1382.54   83.29 1405.47   83.81 1418.58   83.26 1425.13   83.55
 1434.96   83.15 1451.34      83 1470.99   83.11  1484.1   82.97 1503.76    83.3
 1513.58   82.74 1543.07   82.56 1582.38   83.28 1598.76   84.06 1611.87   84.38
 1618.42   84.88 1651.18    85.6 1664.29   85.36 1687.22   85.52 1693.77   85.22
 1697.05   85.88  1703.6   85.52 1723.26   85.41 1749.47   85.58 1756.02   85.34
 1769.12   85.57 1805.16   85.23 1814.99    85.5 1851.03    85.4 1857.58   85.16
 1873.96   85.32  1896.9   85.28 1913.28   84.96 1926.38   85.16 1936.21   84.97
 1952.59   85.11 1978.81   85.05 2008.33   84.72 2037.85   84.84 2047.69   84.64
  2064.1   84.82 2106.74   84.53 2119.86   84.68 2185.47   84.55 2208.43   84.61
 2221.55   84.33 2228.11   84.52 2260.92   84.53  2280.6   84.22 2300.28   84.48
 2339.65   84.24 2349.49   83.96 2395.41   84.06 2421.66   83.77  2447.9   84.02
 2483.98    83.6 2490.54   83.93 2513.51   83.57 2536.47   83.76 2549.59   83.47
 2565.99   83.69 2575.83   84.11 2644.72   84.36 2677.52    84.2 2730.01   84.17
 2766.09   84.29 2775.94   84.19 2795.62   84.39 2802.18   84.25 2844.82   84.23
 2864.51   83.96 2887.47   84.01 2939.95   83.79 2979.32   83.83 3008.84   83.56
 3081.01   83.43  3133.5   83.42  3166.3    83.5 3176.14   83.37 3202.38   83.55
 3248.31   83.49 3271.27   83.66 3294.23   83.61 3392.64   83.87 3432.01   83.74
 3448.41   83.86 3510.74   83.67 3559.94   83.63 3576.34   83.77 3599.31    83.6
 3625.55   83.66 3641.95   83.52 3681.32   83.77 3694.44   83.75 3710.84   83.45
 3720.68   83.63 3740.36   83.21 3776.45   83.59 3828.93   83.41  3868.3   83.36
 3910.94   83.54 3927.34   83.35 3953.59   83.42 3983.11   83.25 3996.23   83.31
  4035.6   83.18 4065.12   83.36 4114.32   83.26 4137.29   83.41 4166.81   83.29
 4183.21   83.47 4216.01   83.38 4275.06   83.58 4307.86   83.43 4324.26   83.53
 4353.79   83.38 4366.91   83.57 4412.83   83.41 4442.35   83.52 4494.84    83.3
  4517.8   83.46 4540.76   83.36 4560.44    83.5 4606.37    83.4 4612.93    83.3
 4681.82   83.32 4724.46   83.46 4747.42   83.31 4780.22   83.46 4799.91   83.32
 4816.31   83.62 4839.27   83.19 4868.79   83.11 4954.08   83.18 4977.04   83.06
 5006.56   83.17 5019.68   83.05 5049.21   83.15 5095.13   82.97 5121.37   83.05
 5160.74   82.92 5173.86   83.04 5193.54    82.9 5206.66   83.02 5246.03   82.86
 5265.71   82.96 5308.35   82.89 5370.68   82.94 5406.76   82.81 5419.88   82.96
 5439.56    82.9 5498.61      83 5537.97   82.82 5557.65   82.94  5583.9   82.81
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  5616.7   82.95 5698.71   82.92 5731.51   82.83 5757.75   82.88 5813.52   82.69
 5836.48   82.85 5875.84   82.85 5888.96   83.35 5905.36   83.56 5931.61   83.46
 5964.41   83.57 5974.25    83.4 6016.89   83.24 6030.02   83.32 6072.66   82.94
  6082.5   83.09 6118.58   82.99 6125.14   82.81 6216.99   83.14 6230.11   83.35
 6308.84   83.55 6318.68   83.45  6348.2   83.56 6374.45   83.31 6413.81    83.4
 6476.13   83.03 6492.54    83.2  6515.5   84.25 6522.06   83.92 6535.18    82.7
 6551.58    83.6 6561.42    83.1 6604.07   82.81 6617.19   82.94 6630.31   82.78
 6649.99   82.97 6722.16   82.79 6735.28   83.06 6768.08   82.91 6787.76   83.05
 6889.45   83.06 6941.94   82.82 6968.18   83.02 7010.82   83.18 7020.66   83.09
 7109.23   83.39 7132.19   83.35 7155.16   83.14 7171.56   83.42 7184.68   83.35
 7201.08   83.77  7230.6   83.84 7237.16   83.68 7276.53   83.98 7306.05   83.95
 7319.17   84.21 7335.57   84.16 7374.93   84.36  7414.3   84.29 7473.34   84.38
 7502.87   84.79 7515.99   84.65 7525.83   85.03 7555.35   84.57 7565.19   84.67
 7604.56   84.46 7627.52   84.64 7634.08   84.48 7689.84   84.87  7696.4   84.73
 7739.05   85.01 7752.17   84.99 7758.73   84.55 7771.85   85.05 7798.09   86.35
 7837.46   87.59 7840.74    87.4  7847.3   88.11 7873.54   87.41 7922.74   86.99
 7932.58   87.16 7948.99   86.87 7958.83   87.18 7968.67   86.96 7985.07   87.25
 8011.31   87.32 8057.24   87.16 8070.36   87.37 8083.48   87.12 8106.44    87.3
  8129.4    87.3 8149.08   87.04 8155.64   87.22 8178.61   87.24 8188.45   87.08
 8211.41   87.15 8217.97   86.96 8240.93   87.13 8277.01   86.88 8290.14    87.1
  8296.7   86.87 8309.82      87 8332.78   86.67 8381.98   86.94 8418.07   86.49
 8434.47   86.59 8473.83   86.22 8490.23   86.43 8503.35   86.29    8546   86.49
 8552.56   86.23 8572.24   86.35 8582.08    86.1 8614.88   86.21 8624.72   86.05
 8637.84   86.23 8683.77   85.71 8732.97   85.78 8818.26   85.62 8847.78   85.93
 8896.99   85.54 8926.51   85.71 8942.91   85.35 8965.87   85.98 8972.43   85.75
 8982.27   85.99 8988.83   85.47 8998.67   85.36 9008.52   85.62 9031.48    85.6
  9044.6   85.42 9051.16   85.79 9067.56   85.42 9080.68   84.61 9097.08   85.35
 9116.76   85.59 9143.01   85.52 9182.37   85.58 9198.77   85.39 9218.45   85.59
 9225.01   85.39 9257.82   85.62 9274.22   85.52 9320.14   85.66 9346.38   85.39
 9369.35   85.63 9398.87   85.63 9434.95   85.37 9451.35   85.48 9471.03   85.35
 9480.88   85.55 9513.68   85.38 9520.24   85.56  9543.2   85.62 9556.32   85.41
 9582.56   85.65 9598.96   85.47 9641.61   85.58 9658.01   85.38 9664.57   85.53
 9700.65   85.32 9710.49   85.53 9733.46   85.47 9753.14   85.95 9766.26   85.24
 9785.94   84.83 9805.62   87.05  9808.9      87 9818.74   84.62  9825.3   84.42
 9831.86   83.58 9841.71   83.19 9848.27   83.97 9858.11   84.19 9864.67   85.35
 9867.95   86.74 9874.51   91.26 9877.79   92.12 9890.91   92.59 9926.99   92.98
 9933.55    91.1 9936.83   88.62 9940.11   87.34 9943.39   87.2710068.04   87.27
10071.32   87.4410081.17   92.2810084.45   93.5210097.57    93.3

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .101  874.73    .066  982.85    .015 1176.14    .066 1225.28    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       874.73  1208.9          1851.1    1850 1680.42            .1       .3
Left Levee      Station=   62.25      Elevation=   98.95
Right Levee     Station= 9926.99      Elevation=   92.98
Blocked Obstructions     num=      2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   47.32  385.35    87.1 1257.4610323.38    85.7

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             94.76    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                 0.101      0.041     0.074
  W.S. Elev (ft)             94.67    Reach Len. (ft)          1851.10    1850.00    1680.42
  Crit W.S. (ft)             82.48    Flow Area (sq ft)       10446.78    9783.37   77875.05
  E.G. Slope (ft/ft)      0.000134    Area (sq ft)            10446.78    9783.37   77875.05
  Q Total (cfs)           125000.00     Flow (cfs)              9866.72   38155.36   76977.92
  Top Width (ft)          10020.30    Top Width (ft)            797.46     334.17    8888.67
  Vel Total (ft/s)            1.27    Avg. Vel. (ft/s)            0.94       3.90       0.99
  Max Chl Dpth (ft)          37.80    Hydr. Depth (ft)           13.10      29.28       8.76
  Conv. Total (cfs)       10788120.0     Conv. (cfs)             851547.2   3292997.0   6643578.0
  Length Wtd. (ft)         1747.14    Wetted Per. (ft)          801.04     350.60    8895.86
  Min Ch El (ft)             56.87    Shear (lb/sq ft)            0.11       0.23       0.07
  Alpha                       3.27    Stream Power (lb/ft s)      0.10       0.91       0.07
  Frctn Loss (ft)             0.19    Cum Volume (acre-ft)    29596.60   20036.89   43180.62
  C & E Loss (ft)             0.00    Cum SA (acres)           6811.87    1001.17    6806.37


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 134.65

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   95.58    6.56   97.67   13.12   98.04   22.96   97.97   29.53   96.54
   39.37   93.17   49.21   90.27   68.89    85.2   82.02   82.54   91.86   81.47
  118.11   81.47  141.07    81.7   170.6    81.7  193.56   81.49  200.12   81.63
  259.18   81.51  298.54   81.71  311.67   81.63  344.47   81.78  364.16    81.7
  410.09   82.05  433.05   81.93  472.42   82.32  495.39   82.86  515.07   82.92
  528.19    82.7  547.88   82.68  564.28    82.4  577.41   82.39  587.25    82.1
  593.81   81.56  600.37   79.96  603.65   79.66  616.77   79.66  620.05   79.26
   629.9   74.95  639.74   71.97  649.58   70.19  679.11   70.44  682.39   70.82
  688.95    72.9  698.79   77.37  705.35   81.41  708.63   82.75  711.91   83.05
  734.88   82.68  757.84      83  770.97   83.65  777.53   82.86  790.65    79.9
  800.49   79.13  807.05   79.12   816.9   79.78  826.74   79.62  830.02   78.94
  836.58   75.42  843.14   70.72  846.42    68.9  856.26   64.72  862.83   63.98
  894.14    58.3  906.14   57.91  913.14    57.3  935.14    56.4  955.14    56.7
  964.14    56.1  975.14    56.3  995.14      56 1006.14    56.5 1015.34    56.2
 1016.78   63.98 1023.32   65.84 1033.14   70.88 1046.24   75.33 1052.78   76.69
 1069.15   81.35 1072.42   81.69 1075.69   80.88 1082.24   77.91 1085.51   77.08
 1092.06   76.67 1095.33   77.05 1101.88    78.9 1105.15   80.41 1121.52   79.43
 1141.16   79.69 1157.52   79.51 1177.16   80.77 1183.71    82.9 1190.25   84.08
 1203.35   84.01 1213.16   84.81 1216.44    84.4 1226.26   84.16 1242.62    84.3
 1268.81   84.27 1298.27   83.98 1308.09   84.09 1350.64   83.66 1357.18   83.78
 1396.46    83.6 1406.28   83.82 1419.37   83.78 1458.65    84.1  1501.2    83.9
 1511.02   83.99 1547.02   83.61 1566.66    83.5 1576.48   83.61 1596.12   83.39
 1641.94   83.24 1664.86      83 1717.23   83.07 1733.59   82.85 1749.96   82.94
 1779.42   82.84 1799.05   82.59 1831.79   82.41 1848.15   82.66 1897.28   82.39
  1910.4   82.44 1933.36   82.24 1939.91   82.32 1989.11   82.18  2038.3   82.16
 2074.38   81.93 2097.33   82.12 2120.29   82.06 2146.53   82.18 2153.09   82.04
 2176.04   82.85 2228.52    82.9 2261.32   83.12 2290.83   83.15 2307.23   83.27
 2323.63   83.15 2333.47   83.27 2385.94   83.39 2399.06   83.34 2454.81   83.52
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 2484.33   83.69 2540.09   83.76 2582.72   83.61  2618.8   83.77 2638.48   83.73
 2651.59   83.88 2717.19   84.04 2723.75   84.22 2743.42   84.09 2769.66   84.25
 2815.58   84.26 2835.25   84.15 2871.33   84.35 2884.45   84.25 2920.52   84.27
 2969.72    84.1 3002.52   84.32 3032.03   84.22 3077.95   84.23 3091.07   84.36
 3114.02   84.19 3123.86   84.29 3159.94   83.95 3179.62   84.13 3225.53   83.78
 3264.89    83.7 3271.45   83.49 3284.57   83.75  3310.8   83.79  3376.4   83.55
 3422.31    83.1 3435.43    82.8 3464.95   82.36 3481.34   82.41  3504.3   82.11
 3514.14   81.85 3543.66   81.38  3569.9   81.18 3602.69   80.66 3628.93   80.54
 3651.89   80.03 3661.73   80.11 3694.52   79.89  3714.2   79.95 3737.16   79.77
 3773.23   79.84 3786.35   80.01 3809.31   79.82 3835.55   79.77 3865.06   79.85
 3871.62   79.99  3907.7   79.99 3973.29   80.34 3986.41   80.26 4006.09   80.58
 4032.33   80.81  4084.8   81.13  4117.6   81.46 4163.51   81.62 4176.63   82.47
 4186.47   84.73 4193.03   85.46 4202.86   84.74  4212.7   82.92 4222.54   84.74
 4225.82      85 4248.78   84.59 4255.34   85.11  4261.9   86.14 4288.13   85.07
 4297.97   84.11 4307.81   83.88 4324.21   83.93 4347.16   83.72 4360.28   83.83
 4376.68    83.7 4432.43   83.87 4455.39   84.06 4507.86   83.78 4530.82    83.9
 4586.57   83.86 4596.41   83.98  4678.4   84.02 4701.35   84.14 4714.47   84.03
 4730.87   84.23 4737.43   84.09 4757.11   84.22 4773.51    85.1  4806.3   85.63
 4812.86   85.49 4825.98   84.46  4839.1   84.16 4862.05   84.03 4901.41   84.15
  4950.6   83.96 4989.96   84.04 5045.71    83.8 5071.94   83.89 5147.37   83.75
 5170.33   83.85 5212.96   83.61  5239.2   83.57 5275.28   83.72 5281.84   83.59
 5321.19   83.43 5350.71   83.46 5360.54   83.35 5413.02    83.3 5445.81   83.54
 5498.29   83.64 5521.24   83.48 5531.08   83.65 5547.48   83.62    5577   83.79
 5593.39   83.69 5603.23   83.82 5649.15   83.59 5658.98   83.66  5688.5    83.5
 5708.18   83.57 5724.57   83.45 5773.77   83.46 5819.68   83.57 5855.76   83.51
 5911.51    83.9 5927.91   83.74 5963.98    83.9 6045.97   83.94 6059.09   84.09
 6075.49   83.85    6105   84.09 6144.36   84.03 6200.11    83.5 6209.95   83.56
 6252.58   83.26 6262.42   83.36 6295.22   83.05 6314.89   82.73 6334.57   81.85
 6350.97   82.02  6377.2   81.48 6400.16   80.76 6439.52   79.87 6465.75    79.8
 6488.71   79.43 6888.81   79.43 6895.37   79.62 6918.33   82.28 6944.57   84.44
 6964.24   85.21 6967.52   85.57 6993.76   86.44 7026.56   86.53 7036.39   86.35
 7059.35   86.38 7072.47   85.84 7075.75   86.26 7082.31   85.72 7085.59   86.72
 7095.43   85.98 7108.54   86.22 7128.22   86.26 7138.06   86.06 7157.74   86.18
 7193.81   85.92 7223.33   85.98    7243   85.76  7275.8   85.88 7324.99   85.76
 7364.35   85.51 7393.86    85.6 7416.82   85.35 7446.34   85.28  7452.9   85.52
 7459.46   85.03 7466.01   85.39 7488.97   85.54 7515.21   84.97 7521.77   85.08
 7544.72    84.8 7567.68   84.96 7669.35   84.67 7718.54   84.96 7731.66   86.23
 7748.06   85.56 7757.89   86.04 7764.45   85.27 7771.01   84.98 7800.53   84.61
  7836.6   84.62 7846.44   84.83 7862.84   84.61 7872.68   84.88 7882.52   84.62
 7902.19   84.96 7915.31   84.81 7925.15   85.14 7934.99   84.37 7948.11   85.13
 7957.95   84.92 7971.06   85.47 7977.62   85.13 7990.74   85.11  7997.3   84.67
 8020.26   84.79 8036.66   84.63 8043.21   84.37 8053.05   84.59 8069.45   84.46
 8085.85   83.97 8098.97   84.25 8108.81   83.89 8115.36   84.12 8131.76   84.21
 8154.72   83.97 8187.51   83.94 8249.82    84.3 8256.38   84.17  8269.5   84.53
 8289.17   84.18 8315.41   84.22  8331.8   84.94 8341.64   85.79 8351.48   85.75
 8361.32   84.88 8377.71   84.57 8413.79   84.53  8426.9   84.13 8446.58   84.24
 8456.42   85.11 8466.25   84.23 8472.81   84.26 8482.65   84.81 8492.49   84.83
 8508.89   84.12 8518.72   84.63 8531.84   84.54 8541.68   84.14 8544.96   84.37
 8561.35   84.33 8567.91   84.04 8577.75   84.72 8594.15    84.4 8607.26   84.66
 8623.66   83.97 8643.34   83.74 8659.73   84.06 8669.57   83.89 8679.41   84.23
 8689.25   83.37 8705.64   84.66 8722.04   84.67 8731.88   84.12    8745   84.11
 8754.83   83.81 8767.95   84.05 8787.63   83.97 8794.18   83.73 8830.26   84.37
 8836.82   83.88 8846.65   83.92 8859.77   84.76 8872.89   83.92 8889.28   84.57
 8899.12   84.08 8915.52   83.73 8925.36   83.98 8938.47      84 8964.71   83.59
  8981.1   83.63 8994.22   83.87 9030.29   83.62 9053.25   83.92 9059.81   83.75
 9069.65    84.1  9092.6   83.84 9102.44   84.15    9109   83.98 9118.83   83.23
 9138.51   83.82 9154.91   83.53 9184.42   83.87 9194.26   83.52 9210.66   83.59
 9230.33   84.54 9240.17    85.2 9246.73   84.95 9259.84   83.92 9272.96   83.74
 9289.36   84.25 9309.03   83.83 9318.87   84.06 9338.55   84.26 9348.39   83.49
 9354.94   83.51  9361.5   84.03  9377.9   84.45  9394.3   83.94 9410.69   83.82
 9420.53   83.17 9430.37   83.66 9450.04   82.79 9463.16   83.12 9469.72   84.51
 9482.84   89.91 9486.12   90.75 9495.95   91.77 9502.51   91.52 9532.03    92.4
 9535.31   91.87 9541.86   87.79 9545.14   87.27 9666.48   87.27 9676.32   87.74
 9686.15   93.06 9692.71   93.98 9709.11    93.3 9718.95   91.56

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085    6.56    .066  770.97     .07  843.14    .025 1033.14     .07
 1213.16    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        770.97 1213.16           439.55  1691.6 1780.35             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  770.97   83.65       T
 1213.16 9718.95   84.81       T
Left Levee      Station=   13.12      Elevation=   98.04
Right Levee     Station= 9532.03      Elevation=    92.4

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             94.57    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.10    Wt. n-Val.                0.066      0.030     0.066
  W.S. Elev (ft)             94.47    Reach Len. (ft)          439.55    1691.60   1780.35
  Crit W.S. (ft)             87.48    Flow Area (sq ft)       7755.70   10435.33  80344.63
  E.G. Slope (ft/ft)      0.000086    Area (sq ft)            9698.08   10435.33  92516.88
  Q Total (cfs)           125000.00     Flow (cfs)             7731.15   42495.76  74773.09
  Top Width (ft)           9683.39    Top Width (ft)          735.41     442.19    8505.79
  Vel Total (ft/s)            1.27    Avg. Vel. (ft/s)          1.00       4.07      0.93
  Max Chl Dpth (ft)          38.47    Hydr. Depth (ft)         10.55      23.60      9.45
  Conv. Total (cfs)       13501870.0    Conv. (cfs)            835079.6  4590176.0  8076611.0
  Length Wtd. (ft)          1603.47    Wetted Per. (ft)         741.54     458.56    8515.81
  Min Ch El (ft)              56.00    Shear (lb/sq ft)           0.06       0.12      0.05
  Alpha                        3.86    Stream Power (lb/ft s)     0.06       0.50      0.05
  Frctn Loss (ft)             0.16    Cum Volume (acre-ft)    29168.57   19607.55  39894.00
  C & E Loss (ft)             0.02    Cum SA (acres)           6779.30     984.68    6470.86


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 134.33*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   93.24   14.8197.15331   17.74   97.87   22.96   98.01   33.34   95.97
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   40.26   94.89   65.34   92.62   76.59    91.4   85.23   91.16   95.61   90.33
  106.85   89.13  149.33   84.98  179.08   82.81  201.37    81.9  229.66   81.86
  286.75   81.88   324.8   82.17  336.04   81.92  341.23   81.35  345.56    82.3
  367.18   81.49  387.93   80.94  409.56   80.99  424.26    80.8  446.67    80.9
  564.37   81.02  577.34   81.07   580.8   81.87  585.99   82.02  638.74   81.96
  645.66   82.09  673.34   82.13  695.82   82.05  771.93   82.13  797.88   82.09
  815.17   81.96   819.5   81.54  833.34   81.78  865.33   81.89  892.14   81.71
  922.43   82.13  943.17   81.73  973.44   81.64  978.63   81.97  985.55    81.7
 1013.22   81.82 1020.14   82.07 1057.33   82.29  1070.3   82.52 1091.93   82.35
 1118.74    82.8 1128.25   82.66 1141.22    82.8 1170.63   82.48 1212.14   82.31
 1217.33   82.66 1228.58   82.78  1264.9   82.55 1303.82   82.51 1323.84   82.28
  1338.7   81.81 1353.57   80.46    1361   80.21 1390.73   80.23 1398.16    79.9
 1420.58    76.3 1442.77   73.81 1465.07   72.32 1531.98   72.51 1539.41   72.83
 1554.28   74.54 1576.57   78.27 1591.43   81.62 1598.87   82.75  1606.3   82.98
 1658.96    82.6 1681.41   82.56 1687.45   82.71 1691.77   82.25 1717.6282.62907
 1734.08   83.05 1740.12   83.38  1746.1   82.67 1758.07   80.12 1767.05   79.38
 1773.03   79.18 1782.02   79.44    1791   79.07 1793.99   78.43 1799.98   75.34
 1805.96   71.25 1814.11 67.4465 1817.93   65.83 1823.92   64.98 1852.49   59.13
 1863.44   58.66 1869.82   57.96 1889.89   56.55 1908.14   56.61 1916.35   56.08
 1926.39    56.2 1944.63   55.87 1955.22   56.36 1964.07   56.13 1965.46   62.62
 1971.75   64.17  1981.2   68.39 1985.7869.75099 1993.81   72.16 2000.11   73.33
 2015.86   77.17 2019.01   77.43 2022.16   76.74 2028.46   74.24 2031.61   73.54
 2037.91   73.23 2041.06   73.56 2047.36   75.12 2050.51   76.38 2066.26    75.6
 2068.88   75.64    2069   76.72 2077.14   77.12 2085.28   78.11 2100.91   78.71
 2119.81   80.43 2126.12   82.38 2132.41   83.55 2145.02    83.9 2154.46   84.66
 2165.86   84.12 2180.09   84.22 2202.87   84.19  2228.5   83.93 2237.04   84.02
 2274.05   83.64 2279.74   83.73 2313.91   83.57    2368   83.95 2405.02   83.76
 2413.56   83.83 2444.87    83.5  2470.5   83.49 2487.58   83.29 2527.44   83.14
 2547.38   82.93 2592.93   82.97 2607.16   82.78  2621.4   82.84 2647.03   82.74
  2664.1   82.53 2692.58   82.38 2706.81   82.59 2749.55   82.37 2760.96   82.41
 2829.43    82.2 2872.22   82.19  2903.6      82 2923.56   82.15 2943.54   82.11
 2966.36   82.21 2972.07   82.09 2992.03   82.77 3037.68   82.81 3066.21      83
 3106.15   83.12 3174.61   83.23 3194.55   83.21  3260.2   83.78  3308.7   83.84
 3345.78   83.71 3377.17   83.84 3394.29    83.8 3405.69   83.93 3462.75   84.05
 3468.46    84.2 3485.57   84.09 3508.39   84.22 3548.34   84.23 3565.45   84.14
 3596.83    84.3 3608.25   84.21 3639.62   84.23 3682.42   84.08 3710.95   84.26
 3736.62   84.18 3776.56   84.18 3787.98   84.29 3807.94   84.15  3816.5   84.23
 3847.88   83.94    3865   84.09 3904.94   83.79 3939.17   83.72 3944.88   83.55
 3956.29   83.76 3979.11    83.8 4036.17   83.59 4076.11   83.21  4113.2   82.59
 4127.45   82.63 4181.66   81.77 4204.49    81.6 4233.01   81.16 4255.84   81.06
 4275.81   80.63 4284.37    80.7 4312.89   80.51 4330.01   80.56 4349.98   80.41
 4381.36   80.47 4392.77   80.61 4412.74   80.45 4435.57    80.4 4466.94   80.58
 4498.33   80.58 4555.38   80.87 4566.79    80.8 4583.91   81.06 4606.74   81.25
 4652.38   81.51 4680.91   81.79 4720.85   81.92 4732.26   82.62 4740.82   84.51
 4746.52   85.11 4755.07   84.51 4763.63      83 4775.05   84.73 4795.02   84.38
 4806.43   85.67 4829.25   84.78 4837.81   83.98 4846.37   83.79 4860.63   83.83
 4880.59   83.65 4906.27   83.63 4954.77   83.77 4974.74   83.93 5020.38   83.69
 5040.35   83.79 5088.85   83.75 5097.41   83.85 5168.73   83.87 5188.69   83.97
  5200.1   83.88 5214.37   84.04 5237.19   84.03 5251.46   84.77 5279.98    85.2
 5285.69   85.09  5297.1   84.23 5308.51   83.98 5328.48   83.87 5362.71   83.96
  5405.5    83.8 5439.74   83.86 5488.23   83.66 5511.05   83.73 5576.66   83.61
 5596.64   83.69 5633.72   83.49 5656.54   83.45 5687.93   83.57 5693.63   83.46
 5727.86   83.33 5807.74   83.21 5836.26   83.41 5881.91   83.49 5901.88   83.35
 5950.38   83.61  5973.2   83.63 6013.14   83.43 6021.69   83.49 6047.37   83.36
 6121.54   83.31 6161.48    83.4 6192.86   83.35 6241.36   83.67 6255.62   83.54
    6287   83.67 6358.32   83.69 6369.73   83.82    6384   83.61 6409.66   83.81
  6443.9   83.76  6492.4   83.31 6500.96   83.36 6538.04   83.11  6546.6   83.19
 6575.13   82.93 6592.24   82.66 6609.36   81.93 6623.62   82.07 6646.44   81.61
 6666.41   81.01 6700.65   80.27 6723.47   80.21 6743.44    79.9 7091.47   79.86
 7097.17   80.02 7117.15   82.24 7139.97   84.03 7157.08   84.67 7159.93   84.97
 7182.76    85.7 7211.29   85.77 7219.84   85.62 7239.81   85.64 7251.23   85.19
 7254.08   85.54 7259.78   85.09 7262.64   85.92  7271.2    85.3  7282.6    85.5
 7299.72   85.54 7308.28   85.37  7325.4   85.47 7356.77   85.25 7382.45   85.29
 7399.56   85.11 7428.09   85.21 7470.88    85.1 7505.12   84.89 7530.79   84.96
 7550.76   84.75 7576.44   84.69 7582.15   84.89 7587.85   84.48 7593.55   84.78
 7613.52   84.91 7636.35   84.43 7642.05   84.52 7662.02   84.28 7681.99   84.42
 7770.43   84.16 7813.21    84.4 7824.63   85.46 7838.89    84.9 7847.44    85.3
 7858.86   84.41 7884.53    84.1 7915.91   84.11 7924.47   84.28 7938.73    84.1
 7947.29   84.32 7955.85   84.11 7972.96   84.39 7984.38   84.26 7992.94   84.54
  8001.5   83.89 8012.91   84.52 8021.47   84.35 8032.87   84.81 8038.58   84.52
 8049.99    84.5  8055.7   84.14 8075.67   84.24 8095.63   83.88 8104.19   84.07
 8118.46   83.96 8132.72   83.55 8144.13   83.78 8152.69   83.48 8172.66   83.74
 8192.63   83.54 8221.15   83.51 8275.35   83.81 8281.06    83.7 8292.47      84
 8309.58    83.7 8332.41   83.74 8346.66   84.33 8355.22   85.04 8363.78   85.01
 8372.34   84.28  8386.6   84.02 8417.98   83.99 8429.39   83.65  8446.5   83.74
 8455.06   84.47 8463.62   83.73 8477.88   84.21 8486.44   84.23 8500.71   83.64
 8509.26   84.06 8520.67   83.98 8529.23   83.65 8532.08   83.84 8546.34   83.81
 8552.04   83.56  8560.6   84.13 8574.87   83.86 8586.27   84.08 8600.54    83.5
 8617.66   83.31 8631.92   83.57 8640.47   83.43 8649.03   83.71 8657.59      83
 8671.85   84.07 8686.12   84.08 8694.67   83.62 8706.09   83.61 8714.64   83.36
 8726.05   83.56 8743.17   83.49 8748.87   83.29 8780.25   83.82 8785.96   83.41
 8794.51   83.44 8805.92   84.14 8817.33   83.44 8831.59   83.99 8840.15   83.58
 8854.42    83.3 8874.38   83.53  8897.2   83.19 8922.87   83.43 8954.25   83.23
 8974.22   83.49 8979.93   83.35 8988.49   83.64 9008.45   83.43 9017.01    83.7
 9031.27   82.93 9048.38   83.43 9062.65   83.19 9088.32   83.48 9096.88   83.19
 9111.15   83.26 9128.26   84.05 9136.82   84.61 9153.92   83.55 9165.34    83.4
  9179.6   83.83 9196.71   83.48 9222.39   83.85 9230.95   83.21 9256.62   84.02
 9270.89    83.6 9285.14    83.5  9293.7   82.96 9302.26   83.37 9319.37   82.66
 9330.78   82.93 9336.49   84.09  9347.9    88.6 9359.31   90.49 9365.01   90.52
 9390.69   92.31 9393.42   91.86 9398.88   88.47 9401.62   88.03 9502.73   88.03
 9510.93   88.42 9519.12   92.86 9524.59   93.62 9538.26   93.06 9546.46   91.61

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085   14.81    .066 1740.12     .07 1814.11    .025 2077.14     .07
 2154.46    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1740.12 2154.46           439.55  1691.6 1780.35             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1740.12   83.38       T
 2154.46 9546.46   84.65       T
Left Levee      Station=21.32167      Elevation=98.05334
Right Levee     Station=9390.691      Elevation=92.30666

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 134.02*
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INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    90.9    8.95   92.92   23.0597.13678   25.35   97.87    32.8   97.98
   44.94   95.18   48.98   93.93   54.38   93.19   59.77   91.79   70.55   91.04
   77.29   90.21   92.12   89.58   98.86   89.49   102.9      89  112.34   89.08
  116.38   88.74  129.86    89.5  146.04    89.2  182.44   87.22  229.76   84.76
  248.49   83.95  290.28    82.7  310.89   82.33  354.98   82.26  410.25   82.37
  435.87   82.33  443.95   82.17  466.87   82.53  484.39   82.59  499.22    82.3
  503.27   82.64   515.4   82.42  522.14   81.99  528.88      81  535.62   82.91
  543.71   82.78  554.49    81.8  563.93   81.64  569.32   81.28  574.71   81.68
   580.1   80.83  601.67   80.22  628.63   80.25  635.37   80.41  658.29   80.07
  693.22   80.17  741.87   80.16   756.7   80.27  826.79   80.35  864.54   80.59
  876.67   80.51  883.41   80.91  896.89   80.63  903.63   82.44   992.6   82.28
 1003.38   82.52 1020.91   82.57 1033.04   82.45 1046.52   82.56 1081.57   82.46
 1101.79   82.58 1170.54   82.43 1177.27   82.48 1250.07    82.4 1267.59   82.22
 1271.64   81.47  1295.9   81.81 1314.77   81.74 1324.21   81.93 1345.78   81.92
    1366   81.63 1380.82    81.7 1387.56   81.48 1410.48   81.76 1421.27   82.13
 1434.76   82.21 1438.79   81.99 1452.27   81.98  1467.1   81.46  1498.1   81.28
 1514.28   81.34 1522.37   81.99 1533.15   81.42 1552.02   81.38 1576.28   81.55
 1587.07   82.02 1608.64   82.09 1611.33   82.23 1645.03   82.29 1659.86    82.6
    1672   82.62 1698.95   82.09 1707.04   82.35 1717.83   82.32 1740.74   82.74
 1755.57   82.45 1775.79    82.7 1785.23   82.42 1796.01   82.48 1821.63   82.13
 1875.55   82.02 1886.33   81.92 1894.42   82.64 1911.95   82.89 1945.65   82.81
 1968.57   82.65 2029.23   82.66 2060.23   82.46  2083.6   82.06 2106.77   80.95
 2118.35   80.76 2143.81   80.72 2166.73   80.78 2176.27   80.55 2208.52   77.81
 2240.87   75.89 2250.31   75.46 2285.36   74.41 2331.12   74.51 2337.85   74.44
 2363.42   74.56 2378.22   74.53 2396.43   74.84  2415.9   75.93 2449.54   78.72
 2477.52   81.82 2488.57   82.71 2496.64   82.87 2512.79   82.88 2582.77   82.51
 2596.23   82.55 2617.76   82.29 2627.18   82.56 2633.91   81.61 2644.67   81.84
 2658.13   81.79 2674.2482.09964 2699.85   82.59 2709.27    83.1 2714.68   82.49
  2725.5   80.35 2739.02   79.24 2747.14   79.11 2755.26   78.52 2757.96   77.91
 2763.37   75.26 2771.48   70.35 2778.2967.49015 2806.16   60.89 2810.84   59.96
 2820.73   59.41 2841.92   56.87 2861.14   56.53 2868.56   56.05 2877.63    56.1
 2894.12   55.74  2904.3   56.22 2912.81   56.06 2914.14   61.25 2920.19   62.51
 2929.27   65.89 2938.42 68.2319 2962.57      73 2968.62   72.61 2974.68   70.58
  2977.7      70 2983.76   69.79 2992.84   71.34 2995.87   72.35 3013.52   71.82
 3013.64   73.97 3021.46   74.66 3029.28   76.54  3037.1   77.47  3044.3   77.91
 3062.47   80.09 3068.53   81.86 3074.57   83.01 3095.76   84.52 3105.45   84.07
 3136.93    84.1 3158.72   83.88 3165.98   83.94 3197.46   83.62  3202.3   83.69
 3231.35   83.53 3277.36    83.8 3308.83   83.63 3316.09   83.68 3342.72   83.39
 3364.52   83.36 3379.04   83.19 3412.94   83.05 3429.89   82.87 3468.63   82.86
 3480.73    82.7 3514.63   82.65 3529.15   82.47 3553.37   82.36 3565.47   82.53
 3601.82   82.35 3611.52   82.39 3669.75   82.22 3706.13   82.21 3732.82   82.06
  3749.8   82.19 3786.19   82.23 3791.04   82.14 3808.02   82.68 3846.84   82.72
  3871.1   82.87 3905.06   82.98 3980.24   83.05 4034.25   83.86 4077.31   83.91
 4108.85    83.8 4159.79   83.97 4227.72    84.1 4247.13    84.2  4281.1    84.2
 4295.65   84.12 4322.34   84.25 4395.12   84.07 4419.38   84.21 4441.21   84.13
 4475.18   84.13 4484.88   84.22 4509.14   84.17 4535.83   83.93 4550.38   84.05
 4584.34   83.81 4613.46   83.75 4647.42    83.8 4695.94   83.63  4729.9   83.32
 4761.45   82.82 4773.57   82.85 4819.67   82.16 4839.08   82.02 4863.33   81.67
 4882.74   81.58 4899.73   81.24  4962.8   81.05 4989.48   81.09 4999.19    81.2
 5035.58   81.03 5062.27   81.17 5088.95   81.17 5137.47   81.39 5147.18   81.34
 5161.73   81.55 5219.96    81.9 5244.22   82.11 5278.18   82.21 5287.89   82.78
 5295.16   84.28 5300.02   84.77 5307.29   84.29 5314.57   83.07 5324.27   84.46
 5341.26   84.18 5350.96   85.21 5370.36   84.49 5377.64   83.85 5414.03   83.58
 5435.87   83.56  5477.1   83.67 5494.09   83.79  5532.9   83.59 5549.88   83.67
 5591.12   83.64  5598.4   83.71 5685.73   83.73 5717.27   83.85 5729.41   84.43
 5753.66   84.78 5768.22   83.99 5777.92   83.79  5794.9    83.7 5824.02   83.78
  5860.4   83.64 5889.52   83.69 5930.76   83.52 5950.16   83.57 6005.96   83.47
 6022.94   83.53 6073.88   83.33 6100.57   83.43 6134.53   83.23 6202.46   83.12
 6226.72   83.28 6265.54   83.34 6282.51   83.23 6323.76   83.42 6343.16   83.44
 6406.24   83.21 6469.31   83.17 6503.27   83.24 6529.96   83.19  6571.2   83.44
 6583.33   83.33 6610.01   83.43 6670.66   83.44 6680.37   83.54  6692.5   83.38
 6714.33   83.53 6743.44   83.49 6784.68   83.13  6823.5   82.96 6830.77   83.02
 6869.59   82.59 6884.15      82 6896.28   82.11 6915.68   81.75 6932.66   81.27
 6961.78   80.67 6981.18   80.61 6998.17   80.36 7294.12    80.3 7298.98   80.42
 7315.96   82.19 7335.37   83.63 7352.35   84.38 7371.76   84.95 7396.02   85.01
 7420.28    84.9 7437.26   84.46 7439.69   85.12 7446.96   84.63 7456.66   84.79
  7478.5   84.68 7493.06   84.75 7519.74   84.57 7541.57   84.61 7556.12   84.46
 7580.39   84.53 7616.77   84.44 7645.89   84.27 7667.72   84.33  7684.7   84.16
 7706.54    84.1 7716.24   83.93 7721.09   84.17 7738.07   84.27 7757.48   83.89
 7779.31   83.77 7796.29   83.87  7871.5   83.66 7907.89   83.85 7917.59   84.69
 7929.72   84.24    7937   84.56  7946.7   83.85 7968.54    83.6 7995.22    83.6
  8002.5   83.74 8014.63   83.59 8021.91   83.77 8029.19   83.59 8043.74   83.81
 8053.44   83.71 8060.72   83.93    8068   83.42  8077.7   83.92 8084.98   83.78
 8094.68   84.14 8109.24    83.9 8114.09   83.61 8131.07   83.68 8148.05    83.4
 8167.46   83.45 8179.59   83.12  8189.3   83.31 8196.58   83.07 8213.55   83.28
 8230.54   83.11 8254.79   83.09 8300.88   83.32 8315.44   83.47 8329.99   83.23
  8349.4   83.25 8361.53   83.73  8368.8   84.29 8376.08   84.27 8383.36   83.68
 8395.49   83.47 8422.17   83.44 8431.87   83.17 8446.43   83.24 8453.71   83.82
 8460.98   83.23 8473.11   83.62 8480.39   83.63 8492.52   83.15 8499.79   83.49
 8531.33   83.28 8536.18   83.09 8543.46   83.54 8555.59   83.33 8565.29    83.5
 8577.42   83.03 8591.98   82.88  8604.1   83.09 8611.38   82.97 8618.66    83.2
 8625.94   82.62 8638.06   83.48 8650.19   83.48 8657.47   83.12 8674.45   82.91
 8684.15   83.06 8703.55   82.85 8730.24   83.27  8735.1   82.94 8742.37   82.96
 8752.07   83.52 8761.78   82.96  8773.9   83.41 8793.31   82.86 8810.29   83.05
  8829.7   82.79 8851.53      83 8878.21   82.85 8907.32   83.19  8924.3   83.03
 8931.58   83.24  8943.7   82.64 8958.26   83.04 8970.39   82.86 8992.22    83.1
  8999.5   82.87 9011.63   82.93 9033.46   84.01 9048.01   83.17 9057.72   83.06
 9069.85   83.41  9084.4   83.14 9106.23   83.44 9113.51   82.93 9135.34   83.59
 9147.47   83.26  9159.6   83.19 9166.88   82.76 9174.15   83.09  9188.7   82.52
 9198.41   82.75 9203.26   83.68 9212.97   87.28 9222.67   89.21 9227.52   89.51
 9249.35   92.21 9251.54   91.86 9255.91   89.14 9258.09   88.79 9338.99   88.79
 9345.55   89.11  9352.1   92.65 9356.47   93.27 9367.41   92.81 9373.97   91.65

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085    32.8    .066 2709.27     .07 2778.29    .025 2938.42     .07
 3095.76    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2709.27 3095.76          439.55  1691.6 1780.35             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2709.27    83.1       T
 3095.76 9373.97   84.52       T
Left Levee      Station=    32.8      Elevation=   97.98
Right Levee     Station=9249.354      Elevation=92.21333

CROSS SECTION
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RIVER: Rio Grande
REACH: Lower Reach RS: 133.70*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	88.56	3.88	89.61	11.63	91.02	25.2	95.08	31.3	97.276
32.95	97.87	42.65	97.94	59.13	93.76	64.62	91.9	71.95	90.79
79.27	88.69	86.6	87.87	93.92	87.66	103.08	86.63	110.4	86.32
123.22	86.16	132.38	86.36	137.87	85.82	150.69	86.4	156.18	86.09
163.51	86.56	174.49	87.85	179.98	87.64	183.65	88	196.47	88.07
245.91	86.5	269.72	85.85	299.01	84.88	335.64	83.86	350.29	83.77
368.6	83.44	392.4	83	399.73	83.05	425.36	82.73	440.01	82.82
452.84	82.71	469.31	82.79	480.3	82.65	524.25	82.75	540.73	82.66
555.38	82.81	573.69	82.64	590.17	82.72	601.16	82.47	632.29	82.97
656.09	83.03	668.91	82.93	676.24	82.6	681.73	83.11	698.21	82.77
707.37	82.13	711.03	81.1	716.52	80.64	722.01	82.68	725.68	83.51
729.34	83.12	736.67	83.32	747.65	82.5	751.32	81.85	760.47	81.46
764.13	81.61	771.46	81.07	778.79	81.68	786.11	80.4	798.93	80.15
815.41	79.49	822.73	79.82	828.22	79.56	852.03	79.58	861.19	79.82
875.84	79.48	892.32	79.35	1005.85	79.44	1026	79.61	1077.27	79.67
1095.58	79.79	1121.22	79.75	1139.53	79.83	1172.49	80.12	1188.97	80
1198.13	80.61	1209.12	80.59	1216.44	80.19	1225.59	82.9	1234.75	83.02
1249.4	82.89	1291.52	82.76	1304.34	82.8	1346.45	82.61	1361.1	82.95
1384.91	83.01	1401.38	82.82	1419.7	82.99	1467.31	82.86	1487.45	82.89
1494.78	83.04	1522.25	82.98	1544.22	82.79	1553.38	82.86	1588.17	82.78
1597.32	82.85	1646.76	82.79	1648.59	82.73	1696.21	82.74	1710.85	82.45
1720.01	82.48	1725.51	81.36	1729.17	81.22	1740.15	81.62	1758.47	81.84
1784.1	81.72	1796.92	81.99	1826.22	81.95	1853.68	81.49	1873.83	81.58
1882.98	81.24	1914.11	81.63	1928.76	82.19	1947.1	82.28	1952.57	81.96
1970.88	81.95	1991.02	81.19	2007.51	81.06	2022.15	81.12	2033.14	80.95
2055.11	81.05	2066.1	82	2069.76	81.57	2080.75	81.13	2106.39	81.06
2139.35	81.27	2141.18	81.53	2154	81.96	2183.3	82.04	2186.96	82.25
2210.76	82.17	2232.73	82.29	2252.88	82.72	2269.36	82.71	2285.84	82.38
2305.98	81.82	2316.97	82.19	2331.62	82.1	2362.75	82.67	2382.89	82.23
2395.72	82.51	2401.21	82.33	2410.36	82.61	2423.18	82.18	2437.83	82.27
2454.31	82.11	2472.63	81.77	2501.92	81.81	2545.88	81.68	2560.52	81.54
2571.51	82.61	2595.32	82.99	2637.44	82.85	2666.74	82.84	2697.87	82.71
2705.19	82.82	2750.97	82.74	2754.63	82.82	2796.75	82.64	2816.9	82.32
2828.49	82.31	2838.87	81.94	2859.97	81.45	2888.31	81.24	2941.42	81.38
2954.38	81.19	2979.87	80.04	2998.19	79.08	3031.15	77.98	3054.95	77.31
3102.56	76.52	3119.03	76.6	3173.87	76.5	3208.61	76.64	3228.71	76.58
3246.99	76.71	3279.9	77.61	3325.6	79.7	3363.6	82.03	3378.61	82.72
3389.58	82.84	3411.52	82.83	3440.77	82.68	3524.86	82.46	3550.45	82.18
3554.11	82.03	3566.9	82.41	3570.56	81.54	3576.05	80.97	3590.67	81.3
3596.15	81.13	3630.86	81.5599	3665.62	82.12	3678.42	82.82	3683.25	82.3
3692.92	80.57	3719.51	77.97	3721.93	77.4	3726.77	75.19	3734.02	71.08
3742.4667	79562	3746.11	66.99	3765	61.67	3769.18	60.8	3778.03	60.15
3796.96	57.03	3814.14	56.44	3820.77	56.03	3828.88	56	3843.61	55.61
3853.38	56.08	3861.54	55.99	3862.82	59.89	3868.62	60.84	3877.33	63.4
3891.0666	10242	3909.28	68.82	3915.09	68.47	3923.8	66.46	3929.61	66.35
3938.33	67.57	3941.23	68.32	3955.9467	95394	3958.16	68	3958.28	71.21
3962.04	71.31	3965.78	72.19	3973.28	74.96	3980.79	76.4	3987.7	77.11
4005.12	79.74	4010.93	81.33	4016.74	82.48	4029.56	83.87	4037.07	84.37
4045.05	84.03	4070.99	84.02	4094.93	83.87	4120.87	83.59	4148.8	83.5
4186.71	83.65	4218.63	83.52	4240.58	83.28	4298.44	82.95	4312.41	82.8
4344.33	82.76	4414.16	82.33	4424.14	82.46	4510.06	82.24	4540.05	82.24
4562.04	82.13	4606.02	82.26	4610.02	82.19	4624.01	82.6	4656	82.63
4703.98	82.83	4765.93	82.9	4810.43	83.96	4845.92	83.99	4871.91	83.9
4913.89	84.02	4969.87	84.1	4985.86	84.17	5025.85	84.11	5047.84	84.2
5107.81	84.05	5127.81	84.15	5145.8	84.09	5201.77	84.1	5223.77	83.93
5235.76	84.01	5263.75	83.82	5315.73	83.81	5355.72	83.67	5383.7	83.43
5409.69	83.05	5419.68	83.07	5457.67	82.54	5493.66	82.17	5509.65	82.1
5523.65	81.84	5575.62	81.69	5605.61	81.8	5619.61	81.7	5653.59	81.7
5719.56	81.92	5727.56	81.87	5755.55	82.14	5807.53	82.44	5835.52	82.51
5843.51	82.93	5853.51	84.42	5859.5	84.06	5865.5	83.15	5873.5	84.18
5887.49	83.97	5895.49	84.74	5911.48	84.2	5917.48	83.72	5947.46	83.51
5999.44	83.57	6013.44	83.66	6045.42	83.5	6059.42	83.56	6171.37	83.58
6197.36	83.66	6207.35	84.1	6227.34	84.35	6239.34	83.76	6261.33	83.54
6285.32	83.59	6315.3	83.48	6339.3	83.51	6373.28	83.38	6389.27	83.42
6435.25	83.33	6449.25	83.37	6491.23	83.21	6513.22	83.28	6541.21	83.12
6597.18	83.04	6617.17	83.15	6649.16	83.18	6663.15	83.1	6713.13	83.25
6741.12	83.12	6787.09	83.03	6845.07	83.07	6867.06	83.03	6901.05	83.21
6983.01	83.2	7001.01	83.14	7018.99	83.26	7042.99	83.22	7076.97	82.94
7114.95	82.85	7146.94	82.52	7158.93	82.08	7168.93	82.16	7222.91	81.06
7252.89	80.83	7496.78	80.73	7500.78	80.82	7514.78	82.15	7530.77	83.22
7544.76	83.78	7560.76	84.21	7580.75	84.25	7600.74	84.16	7614.73	83.83
7616.73	84.33	7622.73	83.95	7642.72	84.09	7712.69	83.81	7732.68	83.86
7762.67	83.79	7786.66	83.65	7804.65	83.69	7836.64	83.52	7862.62	83.64
7878.62	83.34	7896.61	83.25	7910.6	83.33	7972.58	83.15	8002.56	83.29
8010.56	83.92	8020.56	83.58	8026.55	83.82	8034.55	83.28	8052.54	83.09
8080.53	83.19	8102.52	83.08	8128.51	83.33	8134.5	82.94	8142.5	83.32
8148.5	83.21	8156.49	83.48	8172.49	83.07	8186.48	83.13	8200.47	82.91
8216.47	82.95	8226.46	82.7	8240.46	82.65	8254.45	82.81	8288.43	82.66
8338.41	82.93	8350.4	82.75	8366.4	82.77	8382.39	83.55	8394.38	83.09
8404.37	82.93	8426.37	82.9	8434.36	82.69	8446.36	82.75	8452.35	83.18
8458.35	82.74	8474.34	83.03	8484.34	82.67	8490.33	82.92	8516.32	82.76
8526.31	82.95	8544.3	82.91	8554.3	82.57	8566.29	82.45	8588.28	82.68
8594.28	82.25	8604.27	82.89	8614.27	82.89	8620.27	82.61	8634.26	82.45
8642.25	82.57	8658.24	82.4	8680.24	82.71	8690.23	82.48	8698.22	82.9
8706.22	82.49	8716.21	82.82	8732.21	82.43	8746.2	82.58	8762.19	82.39
8780.18	82.56	8802.17	82.46	8826.16	82.73	8840.15	82.62	8846.15	82.79
8856.14	82.34	8868.14	82.65	8878.13	82.52	8896.12	82.71	8912.12	82.59
8930.11	83.42	8942.1	82.8	8950.09	82.72	8960.09	82.99	8972.08	82.79
8990.07	83.03	8996.07	82.65	9014.06	83.16	9034.05	82.87	9040.05	82.55
9046.05	82.8	9058.04	82.39	9066.03	82.56	9070.03	83.26	9078.03	85.97
9086.02	87.93	9090.02	88.51	9108.02	92.12	9114.57	89.55	9175.24	89.55
9180.16	89.79	9185.08	92.45	9188.36	92.91	9196.55	92.57	9201.47	91.7

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.118	3678.42	.066	3742.46	.015	3955.94	.066	4037.07	.067

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
3678.42 4037.07 439.55 1691.6 1780.35 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	3678.42	82.82	T
4037.07	9201.47	84.37	T

```
Left Levee      Station=   42.65      Elevation=   97.94
Right Levee     Station=9108.016      Elevation=   92.12
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  736.67 3389.58   82.72

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 133.38*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   86.21    4.77   87.49   14.31   89.13   31.02    94.2   39.5597.48146
   45.33   98.06   52.49   97.91   73.32   92.34   80.26   89.86   89.52   88.39
   98.78   85.59  108.03    84.5  117.29   84.29  128.87   83.06  138.12   82.75
  149.69   82.99  154.32   82.75  165.89   83.22  172.84   82.64  189.03   83.72
  195.98   83.43  200.61   84.24  205.24   84.24  212.18   84.99  219.12    86.2
  226.06   86.04   230.7   86.58  246.89   86.94  272.35   86.64  276.98   86.42
  309.38   85.78  323.27   85.61  362.61   84.91   376.5   84.57  411.21   83.92
  422.78   83.78   441.3   83.86  459.81   83.53  478.33   83.59  494.53    83.3
  503.79   83.42  536.18   83.15   554.7   83.27  570.91   83.12  591.73   83.22
  605.62   83.05  626.45   83.24  631.07   83.14  661.16   83.18  681.99   83.06
  700.51   83.25  723.65   83.01  730.59   83.16  744.48   83.11  758.37   82.76
  767.62   82.79  776.88   83.11  797.71   83.41  828.29   83.47  843.99   83.33
  853.26   82.91   860.2   83.59  881.03   83.13   892.6   82.27  897.23    80.9
  904.17   80.29  906.48   80.68  911.11   83.01  915.74   84.11  920.37    83.6
  929.63   83.87  943.51   82.77  948.15   81.89  959.72   81.38  964.34   81.58
   973.6   80.86  982.86   81.67  992.12   79.97 1008.31   79.63 1019.89   78.98
 1029.15   78.77  1038.4    79.2 1045.34   78.87 1075.43   78.91 1087.01   79.24
 1105.52   78.78 1126.35   78.62 1142.55   78.72 1163.38   78.61 1198.09   78.74
 1207.35   78.67 1251.33    78.7 1260.58   78.84 1269.84   78.71  1295.3   78.95
 1302.24   78.89 1330.01   79.06  1360.1   79.03 1383.25    79.2 1415.65   79.15
  1424.9    79.3 1438.79   79.26  1473.5   79.52 1480.44   79.65 1501.27   79.49
 1512.84    80.3 1526.73   80.29 1535.99   79.74 1540.62      81 1545.25   82.94
 1547.56   83.36 1559.14   83.51  1570.7   83.25 1577.65   83.34 1630.88   83.15
 1647.08    83.2 1679.48   83.07 1684.11   82.88  1700.3   82.93 1718.82   83.39
 1744.28   83.32 1748.91   83.45 1769.73    83.2 1792.88   83.42 1853.05   83.27
 1862.31    83.4 1878.51   83.31 1887.77   83.51 1901.65   83.39 1922.48   83.42
 1950.25   83.16 1975.71   83.25  2005.8   83.13 2017.37   83.22 2056.71   83.19
 2082.17   83.06 2142.34   83.08 2160.86    82.7  2167.8   82.96 2172.43   82.74
 2179.37   81.24    2184   81.06 2197.88   81.58 2221.03   81.87 2239.54   81.89
 2253.43   81.69 2269.63   82.05 2306.66   81.98 2341.37   81.35 2357.58   81.27
 2366.83   81.46  2378.4      81 2403.86   81.42 2417.74   81.51 2436.26   82.25
 2459.44   82.36 2466.35   81.93 2489.49   81.93 2501.07   81.59 2514.95   80.91
 2535.78   80.75 2554.29   80.84 2568.17   80.61 2579.75   80.82 2595.95   80.76
 2609.84   82.02 2614.47   81.44 2628.35   80.85 2656.12   80.83 2660.75   80.74
 2681.58   80.96 2690.84   80.85 2702.41   80.99 2704.72   81.34 2720.93    81.9
 2739.44   82.02 2757.95   81.98 2762.58   82.27 2792.67   82.14 2820.44   82.29
  2845.9   82.84 2866.73    82.8 2887.55   82.34 2903.76   81.69 2913.01   81.56
  2926.9   82.03 2945.41   81.89 2954.67   82.13 2984.76   82.61 2998.65   82.13
 3010.22   82.02 3026.42   82.39 3033.36   82.15 3044.93   82.51 3061.14   81.93
 3079.65   82.05 3095.85   81.78 3100.48   81.85 3123.62   81.41 3160.65   81.49
  3216.2   81.34 3234.71   81.16 3239.35   81.36  3248.6   82.59 3278.69   83.09
 3331.92   82.94 3368.95   82.96 3408.29   82.82 3417.55   82.96 3475.41   82.85
 3480.04   82.97 3533.61   82.81 3558.73   82.51 3579.56   82.48 3605.02   82.01
 3648.99   81.77 3655.93   81.87 3676.77   81.77 3686.02   81.91 3706.85   81.81
 3716.11   81.98 3729.99   81.87 3757.77   81.15 3764.71   81.08 3787.85   80.35
 3792.48   80.37 3829.52   79.62 3878.12   78.96 3898.95   78.85 3905.89   78.66
 3940.58   78.72 3952.13   78.61 3982.17    78.6 3998.34    78.7 4009.89   78.56
 4053.79   78.73  4079.2   78.63 4083.83   78.75 4102.31   78.72  4123.1   79.08
 4143.89    79.3 4155.45   79.66 4201.66   80.68 4249.69   82.23 4268.66   82.74
 4310.25   82.77 4347.21   82.61 4365.69   82.67 4386.49   82.49 4453.49   82.37
 4485.84   81.97 4490.46   81.77 4502.01   81.96 4506.63   82.26 4511.25    81.1
 4518.18   80.34 4536.67   80.76 4543.59   80.52 4559.77   80.61 4566.71   80.89
 4587.4781.02998 4605.98   81.36  4610.6   81.29 4631.39   81.65 4647.56   82.55
 4660.34    80.8 4665.51   80.39 4670.99   79.35 4683.77   77.41 4690.16   75.11
 4696.55    71.8 4702.94   69.15 4706.64 68.1666 4723.85   62.45 4728.33   61.51
 4732.82   61.32  4738.3   60.32    4752    57.2 4772.98   56.01 4793.11   55.49
 4802.45   55.94 4810.27   55.92  4811.5   58.53 4817.05   59.18  4825.4   60.91
 4836.53   62.65 4843.6963.45807    4856   64.64 4861.55   64.33  4869.9   62.91
 4875.46   62.91 4886.59   64.29 4902.81   64.18 4902.92   68.46 4903.54  68.479
 4906.51   68.57  4910.1   69.73 4917.29   73.38 4924.47   75.34 4931.09   76.31
 4947.78    79.4  4958.9   81.95 4971.18   83.78 4978.37   84.22 4984.65   83.98
 5005.05   83.93 5044.28   83.57 5066.25   83.46 5096.06   83.51 5121.17   83.37
 5147.85   83.09 5194.93   82.74 5220.03   82.66 5259.26   82.36  5282.8   82.39
 5391.26   82.19    5429   82.24    5440   82.52  5502.9   82.68 5551.62   82.74
 5586.62   84.05 5634.97      84 5712.02    84.1 5756.04   84.09 5773.34   84.15
 5820.51   84.03 5836.24   84.09 5894.41   84.04 5943.16   83.84 5984.04   83.81
 6015.49   83.71  6037.5   83.55 6057.94   83.28  6065.8    83.3 6095.68   82.93
 6147.57   82.45 6188.45   82.33 6212.03   82.39 6249.77   82.31 6301.65   82.44
 6370.84   82.77 6392.85    82.8 6399.14   83.08    6407   84.07 6416.43   83.22
 6422.72   83.91 6433.73   83.77 6440.02   84.28 6457.32   83.59  6480.9   83.44
 6532.79   83.52 6557.94   83.41  6600.4   83.45    6657   83.42 6677.44   83.47
  6685.3   83.76 6701.02   83.93 6710.46   83.53 6727.75   83.37 6746.62    83.4
 6789.08   83.34  6815.8   83.24 6875.55   83.21 6908.57    83.1 6925.87   83.13
 6947.88   83.02  6991.9   82.95 7032.78   83.03 7043.79   82.97 7083.09   83.06
 7141.27   82.89 7204.17   82.87 7230.89   82.98 7342.53   82.95 7369.26   82.75
 7399.13   82.68 7424.29   82.46 7433.72   82.16 7441.58   82.21 7484.04   81.46
 7507.62    81.3 7699.44   81.16 7726.17   82.82 7749.76   83.47  7781.2   83.42
 7792.21    83.2 7814.22   83.36 7869.25   83.16 7908.56   83.13 7966.74   82.93
 7987.17      83 7999.75    82.8 8073.65   82.65 8097.24   82.73 8103.53   83.15
  8116.1   83.08 8122.39   82.72 8136.54   82.59 8158.56   82.64 8175.85   82.56
 8196.29   82.72 8201.01   82.46  8218.3   82.82 8230.88   82.54 8265.47   82.45
 8273.34   82.28 8295.35   82.34 8322.07   82.23 8361.38    82.4 8383.39   82.28
 8395.97    82.8 8413.26   82.38 8446.28   82.25    8451   82.53 8455.71   82.24
 8468.29   82.43 8476.15   82.19 8480.87   82.35  8501.3   82.24 8523.31   82.33
 8540.61   82.01 8557.91   82.17 8562.62   81.88 8570.48    82.3 8594.06      82
 8612.93   81.96 8630.23   82.16 8638.08   82.01 8644.38   82.28 8650.67   82.01
 8658.52   82.24  8671.1   81.99 8682.11    82.1 8694.69      82 8708.83   82.12
 8726.13   82.08 8760.72   82.33 8768.58   82.04 8778.01   82.26 8800.02   82.33
  8812.6   82.26 8826.75   82.83 8836.18   82.42 8850.33   82.57 8859.76   82.45
 8873.92   82.62 8878.63   82.38 8892.78   82.73 8917.94   82.52 8927.37   82.25
 8933.66   82.38  8936.8   82.85  8944.8   84.95 8966.68   92.03 8971.05   90.32
 9011.49   90.32 9014.77   90.47 9018.05   92.25  9025.7   92.33 9028.98   91.75

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .118 4647.56    .066 4706.64    .015 4843.69    .066 4978.37    .067
```

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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4647.56 4978.37           439.55  1691.6 1780.35             .1       .3
Left Levee      Station=45.92667      Elevation=98.09334
Right Levee     Station=8966.677      Elevation=92.02666
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  797.48  4268.5   82.32

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 133.07*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   83.87    5.67   85.38      17   87.23   36.83   93.31   47.7997.72109
   53.83   98.09   62.33   97.88   65.13   97.38   73.52   94.66   79.12   93.35
   87.51   90.92    95.9   87.83   107.1   85.99  118.28   82.49  129.47   81.13
  140.66   80.91  154.65   79.48  165.84   79.18  179.83   79.58  185.42   79.33
  199.41   80.09   207.8   79.46  227.38   81.04  230.18   80.69  235.78   80.78
  241.37   81.85  246.97   81.91  255.36   82.96  263.75   84.55  272.14   84.43
  277.74   85.17  297.32   85.81   328.1   85.74  333.69   85.52  356.07   85.33
  372.86   85.07  409.23   84.84  437.19   84.54     440   84.63  453.98   84.26
  473.56   84.09  495.95   83.77  509.93   83.69  532.32   83.95  554.69   83.69
  560.29   83.91  577.08   83.88  596.65    83.6  607.85   83.79  647.01   83.57
  669.39   83.72  688.98   83.53  714.15   83.66  730.93   83.44  756.11   83.69
  761.71   83.56  798.08    83.6  823.26   83.45  840.04   83.49  845.63   83.69
  865.22   83.57  873.61   83.38     882   83.56  893.19   83.36  898.79   83.49
  915.57   83.06  926.76   83.08  937.95   83.49  963.13   83.85  985.51   83.79
   999.5   83.92 1013.48   83.68 1019.08   83.74 1030.27   83.21 1038.66   84.06
 1047.05   83.74 1063.84   83.49 1075.03   82.79 1077.83   82.42 1083.42    80.7
 1091.81   79.94 1094.61   80.42 1100.21   83.34 1105.81   84.72  1111.4   84.08
 1122.59   84.41 1139.37   83.03 1144.97   81.94 1153.36   81.72 1158.96    81.3
 1164.55   81.55 1175.74   80.65 1178.54   81.15 1186.94   81.66 1198.12   79.53
  1217.7   79.12  1220.5   78.78  1231.7   78.31 1242.88   78.04 1254.07   78.59
 1262.46   78.17 1298.83   78.24 1312.82   78.65 1321.21   78.54  1335.2   78.09
 1360.38    77.9 1379.96   78.02 1405.14   77.87  1447.1   78.01 1458.29   77.94
 1511.45   77.98 1522.64   78.15 1533.82   77.99  1564.6   78.29 1572.99   78.22
 1606.56   78.43 1642.93    78.4 1670.91   78.61 1710.07   78.55 1721.26   78.73
 1738.04   78.68 1780.01   79.02  1788.4   79.18 1813.58   78.98 1827.56       80
 1844.35   79.98 1852.74   79.21 1855.54    79.3 1861.13   80.88 1866.73   83.29
 1869.52   83.83 1883.52   84.01  1897.5   83.68 1905.89   83.79 1928.28   83.64
 1936.67   83.73 1970.24   83.55 1989.82    83.6 2028.98   83.43 2034.58   83.19
 2042.97   83.36 2054.16   83.25 2076.54   83.82 2107.32   83.73 2112.91    83.9
  2124.1   83.66 2138.08   83.57 2166.06   83.85 2202.43    83.8 2216.41   83.67
  2238.8   83.68 2261.17   83.86 2269.56   83.72 2280.76   83.97 2297.54   83.82
 2322.72   83.85 2356.29   83.52 2387.06   83.63 2392.65   83.52 2423.43   83.47
 2437.41   83.58  2448.6   83.45    2457   83.55 2484.97   83.54 2515.74   83.38
 2588.48   83.41 2610.86   82.94 2619.25   83.28 2624.85   82.99 2633.24   81.13
 2638.84    80.9 2655.62   81.55 2683.59    81.9 2705.97   81.92 2722.76   81.67
 2742.34   82.11 2770.32   82.08 2778.71   81.91  2787.1   82.01 2829.06   81.22
 2848.65   81.11 2859.84   81.34 2873.82   80.77 2885.01   80.84  2904.6   81.28
 2921.38   81.39 2943.76    82.3 2971.77   82.44 2980.13   81.91  3008.1    81.9
 3013.69   81.55 3022.09   81.49 3030.48   80.93 3038.87   80.64 3047.27   80.68
 3064.06   80.45 3086.43   80.55 3103.21   80.28 3117.21   80.54  3125.6   80.37
 3136.78   80.46 3142.38   80.86 3147.97   81.67 3153.57   82.04 3159.17   81.31
 3167.56   80.79 3175.95   80.57 3209.52   80.54 3215.12   80.41  3240.3   80.69
 3251.48   80.55 3265.47   80.72 3268.27   81.15 3287.85   81.85 3299.04    81.8
 3310.23   81.99 3332.61   81.93 3338.21   82.28 3374.57   82.12 3408.14   82.29
 3422.13    82.5 3438.91   82.96  3450.1   83.03 3464.09    82.9 3480.88   82.39
 3489.27   82.29 3508.85   81.46 3520.04   81.29 3536.82   81.87 3559.21   81.68
 3570.39   81.97 3606.76   82.54 3623.55   81.95 3637.54    81.8 3657.13   82.26
 3665.52   81.96  3679.5   82.42 3699.09   81.69 3707.48   81.63 3721.46   81.84
 3741.05   81.49 3746.64   81.58 3774.62   81.05  3802.6   81.05 3819.38   81.18
 3886.53   81.01 3892.12   81.07  3908.9   80.77  3914.5   81.02 3925.69   82.56
 3945.27   82.98 3962.06   83.19 4026.41   83.03    4032   83.17 4045.98   83.05
 4071.17   83.09 4118.72   82.92 4129.91    83.1 4160.68      83 4199.85   82.97
 4205.44   83.12 4241.81   83.08 4300.57    82.7 4306.16   82.82 4325.74   82.77
 4334.14   82.54 4345.33   82.64 4356.51   82.44  4378.9   82.48 4409.67   82.29
 4418.06   82.43 4443.24    82.3 4454.43   82.48 4471.21   82.48 4479.61   82.35
  4490.8   82.57 4499.19   82.41 4507.58   82.51 4541.15   82.08 4549.54   82.11
 4577.52   81.63 4583.12   81.73 4611.09   81.46 4619.48    81.5 4627.88   81.25
 4655.85   81.19 4664.24   81.03 4678.24   81.08 4686.63    80.9 4711.81   80.92
  4720.2   80.73 4731.39   80.91 4736.98   80.73 4762.14   80.84  4776.1    80.7
 4781.68   80.83 4792.85   80.69 4812.41   80.68 4831.95    80.8 4845.92   80.62
 4898.98   80.81  4929.7   80.68 4935.28   80.83 4957.62   80.74 4982.76   80.98
 5007.89   80.98 5021.86   81.25 5077.71   81.67  5086.1   81.86 5127.98   82.29
 5158.71   82.75 5167.08   82.59 5175.46   82.77 5186.63   82.67 5208.97   82.72
 5220.14   82.62 5253.66   82.54    5276   82.62 5287.17   82.47 5345.82   82.37
  5354.2   82.26 5382.13   82.28 5421.22   81.76 5426.81    81.5 5440.77   81.73
 5446.35   82.11 5451.94   80.66 5460.32    79.7 5482.66   80.21 5491.04   79.92
 5510.59   80.01 5518.97   80.36 5530.14   80.51 5544.0980.50001 5566.44   80.88
 5572.03   80.77 5588.79   81.15 5597.17   81.19 5608.34   81.69 5616.71   82.28
 5632.24   80.66 5649.87   76.37 5666.1669.76344 5682.69   63.23 5686.57   62.33
 5690.46   62.14  5695.2   61.03 5707.05   57.36  5718.9    56.3  5742.6   55.36
 5753.08   55.85    5759   55.86 5760.17   57.16 5765.49   57.51  5784.1   59.48
 5796.3360.39533 5808.02    60.2 5815.99   59.37 5821.31   59.47 5831.95   60.26
 5847.45   60.35 5847.55   65.71 5850.99   65.84 5854.42   67.27 5861.29   71.81
 5868.16   74.27 5881.89   77.07 5888.77   78.76 5901.06   81.42  5912.8    83.7
 5919.67   84.08 5983.69   83.43 6005.42   83.36 6077.44   82.67 6124.31    82.3
 6141.46   82.32 6220.48   82.26 6245.68   82.32 6255.99   82.44 6337.31   82.58
 6362.81   84.15 6398.04   84.09 6463.33   84.12 6498.85    84.1 6533.21   84.01
 6587.05   83.98 6622.56   83.85 6675.26   83.75 6711.91   83.52 6771.48   83.05
 6835.63   82.93 6883.75   82.97 6950.19    83.1  6960.5   83.73 6967.37    83.3
 6971.95   83.64 6979.97   83.56 6984.55   83.81 6997.15   83.46 7014.33   83.37
 7052.14   83.39 7078.48   83.33 7157.52   83.29  7174.7    83.5 7194.18   83.21
  7340.8   82.96 7386.62   82.86 7453.06   82.87 7495.44   82.75 7541.27   82.71
 7560.74   82.75 7642.07   82.68 7701.63   82.39 7745.17   81.86 7762.35   81.76
  7902.1    81.6 7921.57   82.41 7938.75   82.72 7961.66   82.68 7969.68   82.56
 7985.72   82.64 8120.89   82.26 8174.73   82.14 8191.91   82.17 8196.49   82.38
 8220.55   82.08 8249.19   82.05 8264.08   82.12 8267.51   81.98 8280.11   82.15
 8289.28   82.01 8320.21   81.85 8355.72   81.81 8384.35   81.87 8400.39    81.8
 8409.55   82.05 8422.15   81.83 8453.08   81.74 8462.24   81.83 8486.29   81.72
 8502.33   81.75 8514.93   81.58 8536.69   81.71 8567.62   81.52 8590.53   81.66
    8610   81.56 8650.09   81.69 8675.29   81.88 8713.09   81.93  8723.4   82.24
 8730.27   82.05  8771.5    82.3  8796.7   82.12 8803.57   82.43  8809.4    83.5
 8825.34   91.93 8827.52   91.08 8847.75   91.08 8851.03   92.04 8856.49   91.79
```

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.118	5544.09	.066	5666.16	.015	5796.33	.066	5919.67	.067

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
5616.71	5919.67	439.55	1691.6 1780.35	.1	.3

Left Levee Station=54.12834 Elevation=98.10667
Right Levee Station=8825.338 Elevation=91.93333
Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
74.58	1881.81	84.05	2558.81	3964.43	83.09	3975.9	3987.38	83.27
4893.86	5622.49	75.33						

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 132.75

INPUT
Description: Cross-Section data supplemented on the right by IBWC cross-section 132.75 from station 6897. 6897=7001-140 feet (the approximate difference at the relative bank stations). Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.53	6.56	83.26	19.68	85.33	42.65	92.43	55.77	97.87
62.33	98.12	72.17	97.85	75.46	97.25	85.3	93.99	91.86	92.42
101.7	89.5	111.54	85.79	124.67	83.59	131.23	81.69	137.79	79.39
144.35	78.38	150.91	77.76	164.03	77.54	180.44	75.9	193.56	75.61
209.96	76.17	216.52	75.92	232.93	76.96	242.77	76.28	246.05	76.82
252.61	77.08	265.73	78.36	269.01	77.97	275.58	78.12	282.14	79.46
288.7	79.59	298.54	80.92	308.38	82.9	318.22	82.82	324.79	83.75
347.75	84.68	364.15	84.69	383.84	84.84	390.4	84.62	416.65	84.55
436.33	84.35	456.01	84.38	478.98	84.33	511.78	84.17	515.07	84.3
531.47	83.95	554.43	83.88	580.68	83.62	587.24	83.8	597.08	83.6
623.33	84.04	649.57	83.85	656.13	84.14	675.82	84.18	698.78	83.9
711.91	84.16	738.15	84.12	757.83	83.99	764.4	84.12	784.08	84.17
807.05	83.94	836.57	84.1	856.25	83.84	885.78	84.13	892.34	83.98
934.99	84.03	964.52	83.85	984.2	83.89	990.76	84.13	1013.73	83.98
1023.57	83.75	1033.41	83.97	1046.53	83.72	1053.1	83.88	1072.78	83.35
1085.9	83.38	1099.02	83.86	1128.55	84.29	1131.83	84.19	1154.8	84.21
1171.2	84.36	1187.6	84.07	1194.16	84.15	1207.29	83.51	1217.13	84.53
1226.97	84.15	1240.09	84.07	1246.66	83.85	1259.78	83.01	1263.06	82.56
1269.62	80.5	1279.46	79.59	1282.74	80.17	1289.3	83.67	1295.87	85.32
1302.43	84.55	1315.55	84.95	1335.23	83.3	1341.8	81.99	1351.64	81.72
1358.2	81.22	1364.76	81.52	1371.32	80.81	1377.88	80.44	1381.16	81.04
1391.01	81.65	1400.85	79.54	1404.13	79.1	1427.09	78.6	1430.37	78.2
1443.5	77.63	1456.62	77.32	1469.74	77.98	1479.58	77.48	1492.71	77.42
1502.55	77.56	1522.23	77.57	1538.64	78.07	1548.48	77.94	1564.88	77.4
1594.41	77.17	1617.37	77.33	1646.9	77.14	1696.11	77.29	1709.23	77.2
1771.57	77.25	1784.69	77.46	1797.81	77.27	1833.9	77.63	1843.74	77.54
1883.11	77.8	1925.76	77.76	1958.57	78.02	2004.5	77.95	2017.62	78.17
2037.3	78.11	2086.51	78.52	2096.35	78.71	2125.88	78.47	2135.72	79.02
2142.28	79.69	2161.97	79.67	2171.81	78.75	2175.09	78.86	2181.65	80.75
2188.21	83.65	2191.49	84.29	2194.77	84.2	2207.9	84.51	2224.3	84.11
2234.14	84.24	2260.39	84.06	2270.23	84.16	2309.6	83.94	2332.56	84
2355.52	83.93	2358.81	83.81	2378.49	83.79	2385.05	83.5	2394.89	83.7
2408.01	83.57	2434.26	84.25	2470.35	84.14	2476.91	84.34	2490.03	84.06
2506.43	83.95	2539.24	84.28	2549.08	84.1	2555.64	84.23	2581.89	84.23
2598.29	84.07	2624.54	84.09	2637.66	84.28	2650.78	84.3	2660.62	84.14
2673.75	84.44	2693.43	84.25	2699.99	84.34	2722.96	84.29	2762.32	83.89
2778.73	84.02	2798.41	84.01	2804.97	83.88	2831.22	83.9	2841.06	83.82
2857.46	83.95	2870.58	83.79	2880.43	83.91	2913.23	83.89	2919.79	83.78
2946.04	83.81	2949.32	83.7	2975.57	83.69	2982.13	83.78	3005.09	83.74
3011.65	83.84	3034.62	83.75	3060.86	83.19	3070.7	83.59	3077.27	83.25
3087.11	81.01	3093.67	80.74	3113.35	81.51	3123.19	81.73	3146.16	81.93
3172.4	81.95	3192.09	81.64	3215.05	82.17	3247.86	82.13	3257.7	81.92
3267.54	82.04	3280.66	81.89	3287.23	81.6	3316.75	81.08	3339.72	80.95
3352.84	81.22	3369.24	80.53	3382.36	80.62	3405.33	81.14	3425.01	81.27
3434.85	81.57	3451.26	82.36	3484.06	82.52	3493.91	81.88	3500.47	82
3513.59	81.82	3526.71	81.88	3533.27	81.46	3543.12	81.38	3552.96	80.72
3562.8	80.37	3572.64	80.42	3592.33	80.14	3605.45	80.11	3618.57	80.27
3638.25	79.94	3641.54	80.14	3654.66	80.26	3664.5	80.06	3677.62	80.17
3684.18	80.65	3690.74	81.61	3697.31	82.06	3703.87	81.18	3713.71	80.55
3723.55	80.29	3746.52	80.2	3762.92	80.24	3769.48	80.09	3799.01	80.41
3812.13	80.24	3828.53	80.44	3831.81	80.96	3854.78	81.79	3867.9	81.73
3881.02	81.95	3907.27	81.88	3913.83	82.3	3936.79	82.2	3953.2	81.98
3956.48	82.09	3995.84	82.29	4012.25	82.54	4031.93	83.08	4045.05	83.16
4061.46	82.99	4081.14	82.37	4090.98	82.25	4113.95	81.24	4127.07	81.03
4146.75	81.71	4173	81.47	4186.12	81.81	4215.65	82.21	4228.77	82.48
4248.46	81.76	4264.86	81.59	4277.98	82.01	4287.83	82.14	4297.67	81.78
4314.07	82.32	4337.04	81.45	4346.88	81.38	4363.28	81.62	4376.41	81.51
4386.25	81.21	4392.81	81.32	4405.93	81.03	4419.06	80.92	4425.62	80.69
4458.43	80.71	4478.11	80.87	4484.67	80.73	4501.08	80.82	4510.92	80.68
4524.04	80.77	4556.85	80.67	4563.41	80.74	4583.09	80.39	4589.66	80.69
4602.78	82.54	4625.74	83.04	4645.43	83.29	4691.36	83.21	4707.76	83.26
4720.89	83.12	4727.45	83.29	4743.85	83.15	4773.38	83.21	4783.22	83.05
4796.34	83.14	4829.15	83.03	4842.27	83.24	4878.36	83.12	4884.92	83.36
4891.48	83.14	4924.29	83.09	4930.85	83.27	4953.82	83.19	4973.5	83.25
4999.75	83.05	5006.31	83.17	5019.43	82.99	5042.4	82.89	5048.96	83.05
5071.92	83.06	5081.77	82.84	5094.89	83.04	5108.01	82.87	5134.26	83.02
5170.35	82.82	5180.19	82.98	5209.72	82.83	5222.84	83.04	5232.68	82.92
5242.52	83.04	5252.37	82.89	5265.49	83.17	5275.33	83	5285.17	83.15
5301.58	83	5311.42	83.13	5324.54	83.01	5334.38	83.15	5344.23	83
5367.19	82.9	5373.75	83.09	5406.56	82.99	5416.4	83.11	5426.25	82.88
5445.93	82.89	5459.05	83.04	5468.89	82.89	5485.3	83.02	5495.14	82.84
5514.83	82.86	5524.67	82.99	5534.51	82.81	5547.63	83.05	5554.19	82.84
5567.31	82.96	5573.86	82.81	5583.69	82.96	5600.06	82.79	5606.61	82.95
5619.71	82.77	5642.64	82.76	5665.56	82.9	5668.84	82.71	5681.94	82.68
5691.76	82.86	5698.31	82.74	5717.97	82.76	5744.17	82.9	5780.19	82.73
5786.74	82.91	5812.94	82.75	5826.04	82.89	5842.42	82.88	5871.89	82.66
5888.27	82.84	5934.12	82.68	5943.95	82.78	5953.77	82.65	5963.6	82.78
5979.97	82.67	6012.72	82.6	6048.75	82.76	6058.57	82.54	6068.4	82.73
6081.5	82.59	6107.7	82.66	6120.8	82.55	6160.1	82.47	6186.3	82.58
6199.4	82.4	6205.95	82.56	6215.78	82.34	6228.88	82.46	6238.7	82.32
6268.18	82.3	6278.01	82.17	6310.76	82.19	6317.31	81.97	6330.41	81.94
6356.61	81.55	6363.16	81.24	6379.53	81.51	6386.08	81.96	6392.63	80.22
6402.46	79.06	6418.83	79.53	6428.66	79.67	6438.48	79.31	6461.41	79.42
6471.24	79.83	6484.34	80	6500.71	79.97	6526.91	80.39	6533.46	80.26
6553.11	80.69	6562.94	80.72	6576.04	81.31	6585.86	82	6598.96	80.94
6608.79	77.33	6618.61	74.47	6628.44	70.49	6634.99	67.06	6641.54	64.01

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 6644.81   63.14 6648.09   62.96 6652.09   61.73 6662.09   57.53 6672.09   56.23
 6692.09   55.23 6702.09   55.73 6722.09   55.93 6742.09   56.73 6752.09   56.13
 6762.09   55.83 6772.09   56.23 6782.09   56.23 6792.09   56.53 6792.19   62.96
 6795.47    63.1 6798.74   64.81 6805.29   70.23 6811.84   73.21 6824.94   76.47
  6831.5   78.39 6841.32   80.42 6854.42   83.61 6860.97   83.93    6987   82.24
    7123   82.42    7139   84.24    8538   81.04    8674   82.04    8684   91.84

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .118 6500.71    .066 6634.99    .015 6798.74    .066    6987    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6585.86 6860.97           755.05    1535 1364.62             .1      .3
Left Levee      Station=   62.33      Elevation=   98.12
Right Levee     Station=    8684      Elevation=   91.84
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   39.44 4642.25   83.29 6861.97 8946.48   84.04 8946.48 9211.27   83.99

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)              93.32    Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.15    Wt. n-Val.                 0.116      0.040      0.067
  W.S. Elev (ft)              93.17    Reach Len. (ft)           755.05    1535.00    1364.62
  Crit W.S. (ft)              86.81    Flow Area (sq ft)       64078.38    7672.63   16608.82
  E.G. Slope (ft/ft)       0.000250    Area (sq ft)            64078.38    7672.63   16608.82
  Q Total (cfs)           125000.00     Flow (cfs)              59577.77   40040.55   25381.69
  Top Width (ft)           8595.28    Top Width (ft)           6497.14     275.11    1823.03
  Vel Total (ft/s)            1.41    Avg. Vel. (ft/s)            0.93       5.22       1.53
  Max Chl Dpth (ft)          37.94    Hydr. Depth (ft)            9.86      27.89       9.11
  Conv. Total (cfs)       7907972.0     Conv. (cfs)             3769114.0  2533116.0  1605742.0
  Length Wtd. (ft)         1160.91    Wetted Per. (ft)         6499.97     290.45    1827.68
  Min Ch El (ft)             55.23    Shear (lb/sq ft)            0.15       0.41       0.14
  Alpha                       4.80    Stream Power (lb/ft s)      0.14       2.15       0.22
  Frctn Loss (ft)             0.27    Cum Volume (acre-ft)    26762.09   17481.98   26246.69
  C & E Loss (ft)             0.01    Cum SA (acres)           6560.24     901.11    5204.40


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 132.46*

INPUT
Description:
Station Elevation Data    num=     490
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   83.65    1.56   85.04   12.19   86.78    30.8   92.44   41.43   96.71
   46.75   96.99   54.87   96.57   57.58   96.04    65.7   93.36   71.12   91.97
   79.24   89.46   87.36   86.36    98.2   84.34  109.03   80.85  119.85   79.29
  130.68   78.87  144.23   77.37  155.05   77.05  168.59   77.41     174   77.22
  187.55   78.02  195.67   77.52  214.62   79.08  217.32   78.78  222.75   78.94
  228.16   79.96  233.57   80.03  241.69   80.98  249.82   82.41  257.94   82.39
  263.36   83.15  282.31   83.87  312.09   83.98  317.51   83.81  339.17   83.76
  355.41   83.62  390.61   83.58  417.68   83.48   420.4   83.58  433.93   83.32
  452.88   83.27  474.55   83.06  488.08   83.04  509.75   83.38   531.4   83.24
  536.82   83.46  553.07   83.49  572.02    83.3  582.85   83.49  620.75   83.34
  642.42   83.48  661.37   83.31  685.74   83.43  701.98   83.24  726.35   83.48
  731.76   83.37  766.96    83.4  791.34   83.25  807.58   83.29  812.99   83.47
  831.95   83.36  840.07   83.19  848.19   83.36  859.02   83.17  864.44   83.29
  880.68   82.89  891.51   82.89  902.34   83.26  926.71   83.59  948.38   83.53
  961.91   83.64  975.45   83.43  980.86    83.5   991.7   83.02  999.82   83.79
 1007.94   83.52 1024.19    83.3 1037.72   82.35 1043.14    80.8 1051.26   80.11
 1053.97   80.54 1059.38   83.16  1064.8   84.39 1070.22   83.81 1081.04   84.11
 1097.29   82.88 1102.71    81.9 1116.24   81.35 1121.66   81.57 1132.49   80.75
 1135.19   81.19 1143.32   81.64 1154.15   79.72  1173.1   79.35 1175.81   79.05
 1186.64   78.62 1197.47   78.39  1208.3   78.88 1216.42   78.51 1251.62   78.58
 1265.16   78.97 1273.28   78.88 1286.82   78.46 1311.19   78.29 1330.14   78.42
 1354.51   78.28 1395.12   78.39 1405.95   78.31  1457.4   78.39 1468.23   78.55
 1479.06    78.4 1508.84   78.66 1516.97    78.6 1549.46   78.79 1584.66   78.76
 1611.74   78.97 1649.64   78.94 1660.47    79.1 1676.71   79.04 1717.33   79.33
 1725.45   79.48 1749.82   79.31 1763.35   80.23  1779.6   80.23 1787.73   79.55
 1790.43   79.63 1795.85   81.05 1801.26   83.23 1803.97   83.71 1817.51   83.86
 1831.05   83.54 1839.17   83.63 1860.83   83.51 1868.95   83.58 1901.44   83.41
 1920.39   83.46  1958.3   83.32 1963.71   83.11 1971.84   83.26 1982.66   83.14
 2004.33   83.64 2034.11   83.56 2039.53   83.72 2063.89   83.45 2090.97    83.7
 2126.17   83.65  2139.7   83.53 2161.37   83.54 2183.02   83.71 2191.15    83.6
 2201.98   83.82 2218.22   83.66  2242.6    83.7 2275.08   83.42 2288.62   83.51
 2340.06   83.36  2353.6   83.48 2399.63   83.45 2405.04   83.36 2426.71   83.39
 2451.08   83.28 2480.85   83.41 2499.81   83.35 2521.47   82.93 2529.59   83.22
 2535.01   82.97 2543.13   81.29 2548.55   81.09 2564.79   81.68 2591.87   82.01
 2613.52   82.01 2629.77   81.79 2648.72   82.19  2675.8   82.15 2683.92   81.99
 2702.87   81.99 2708.29   81.77 2732.66   81.37 2751.61   81.27 2762.44   81.48
 2775.98   80.97 2786.81   81.04 2805.76   81.42 2822.01   81.52 2843.67   82.33
 2870.74   82.46 2878.87      82 2905.94      82 2911.35   81.69 2919.48   81.63
 2935.72   80.87 2943.85    80.9  2960.1   80.68 2981.75   80.77 2997.99   80.53
 3011.54   80.77 3019.66   80.62 3030.49   80.69 3041.31   81.79 3046.74   82.14
 3052.15   81.48 3060.27   81.01 3068.39   80.82 3100.89   80.78  3106.3   80.67
 3130.67   80.92  3141.5   80.81 3155.03   80.97 3157.74   81.36  3176.7      82
 3187.53   81.96 3198.36   82.12 3220.02   81.94 3225.43   82.22 3260.63   82.11
 3293.12   82.25 3306.66   82.45  3322.9   82.86 3333.73   82.93 3347.27   82.81
 3363.52   82.34 3371.64   82.25  3390.6   81.49 3401.42   81.34 3417.67   81.85
 3439.33   81.67 3450.16   81.94 3485.36    82.4 3501.61   81.91 3515.14   81.79
  3534.1    82.2 3542.22   81.91 3555.76   82.32 3574.71   81.67 3582.83   81.62
 3596.37    81.8 3615.33    81.5 3620.74   81.59 3647.82   81.12  3674.9   81.13
 3691.14   81.25 3756.13   81.13 3761.54   81.18 3777.78   80.91  3783.2   81.13
 3794.03   82.51 3812.98    82.9 3829.23   83.09 3866.72   83.01 3896.92   83.08
 3910.46   82.96 3934.83      83 3980.86    82.9 3991.69   83.06 4021.47   82.95
 4059.38   82.95 4064.79   83.09 4099.99   83.09 4121.66   82.91 4156.85   82.77
 4162.27   82.89 4181.22   82.91 4189.35   82.75 4200.18   82.91    4211   82.79
 4232.67   82.88 4262.45   82.73 4270.57   82.86 4294.95   82.75 4305.77   82.91
 4330.15   82.82 4340.97   83.01 4349.09   82.88 4357.22      83 4370.76    82.9
 4397.83   83.02 4424.91   82.85 4430.32   82.99  4457.4   82.89 4465.52   82.99
 4473.65   82.82 4489.89   82.84 4500.72   82.98 4508.84   82.87 4522.39   82.95
 4530.51   82.81 4554.88   82.92    4563   82.78 4573.83   82.96 4579.24    82.8
 4603.78   82.89  4617.1   82.77  4622.5   82.89 4652.24   82.74 4671.16   82.85
 4684.67   82.68 4736.03   82.85 4765.76   82.73 4771.17   82.87 4792.79   82.77
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4817.12	82.87	4841.44	82.7	4854.96	82.83	4909.02	82.69	4917.13	82.79
4957.67	82.64	4987.41	82.76	4995.51	82.6	5003.62	82.74	5014.44	82.64
5036.06	82.67	5046.87	82.59	5079.31	82.54	5100.93	82.66	5125.26	82.49
5168.51	82.43	5176.62	82.33	5203.65	82.35	5241.49	81.88	5246.89	81.65
5260.4	81.87	5265.81	82.21	5271.21	80.91	5279.33	80.03	5300.95	80.47
5309.06	80.19	5327.98	80.29	5336.09	80.6	5360.41	80.69	5382.04	81.04
5387.44	80.95	5411.77	81.35	5422.59	81.88	5430.69	82.51	5444.13	81.02
5454.22	77.39	5464.3	74.48	5476.41	69.57	5482.5	65.79	5485.55	64.38
5491.18	62.61	5494.55	62.09	5498.65	60.69	5508.91	56.67	5519.17	55.5
5539.69	54.6	5549.87	55.02	5565.21	55.11	5583.1	55.6	5595.26	56.19
5605.26	56.22	5606.92	57.63	5618.1	57.96	5626.47	59.97	5629.27	60.32
5637.71	60.05	5648.33	60.29	5648.43	65.11	5651.92	65.25	5655.39	66.56
5662.34	70.72	5669.29	73.03	5673.95	73.96	5690.71	78.12	5700.58	79.74
5714.48	82.3	5721.43	82.54	5730.85	82.48	5740.27	81.97	5768.52	81.83
5787.36	82.02	5796.77	81.96	5815.61	82.08	5834.44	82.01	5872.12	82
5922.94	81.72	6022.8	81.74	6060.47	81.7	6126.39	81.75	6140.38	81.72
6165.96	83.07	6229.99	82.92	6239.41	83.03	6258.24	83.03	6267.66	83.93
6314.75	83.89	6361.83	83.77	6399.51	83.75	6427.76	83.66	6521.94	83.47
6550.19	83.45	6569.02	83.36	6653.78	83.39	6700.87	83.35	6795.05	83.18
6823.3	82.99	6842.14	82.76	6860.97	82.66	6917.48	82.56	6936.31	82.6
6983.4	82.51	7049.33	82.55	7105.83	82.49	7115.25	82.55	7143.5	82.96
7200.01	82.99	7228.26	82.82	7294.19	82.71	7369.53	82.54	7463.7	82.6
7482.54	82.7	7491.96	80.76	7510.79	80.24	7557.88	80.24	7623.8	80.17
7652.06	80.27	7661.47	80.84	7670.89	80.83	7680.31	82.43	7699.15	82.43
7708.56	82.2	7727.4	82.18	7736.82	81.66	7746.23	81.56	7783.9	81.52
7793.32	81.96	7802.74	81.18	7812.16	81.17	7830.99	80.67	7840.41	80.89
7859.25	80.82	7878.08	80.87	7887.5	81.08	7896.92	80.53	7925.17	80.57
7934.59	80.88	7953.42	80.98	7962.84	80.67	7981.68	80.42	8000.51	80.54
8009.93	80.8	8028.76	81.81	8047.6	81.86	8057.02	80.63	8075.85	80.4
8094.69	80.32	8104.11	80.71	8132.36	80.56	8160.61	80.58	8179.45	80.83
8217.12	80.92	8226.54	81.29	8245.37	81.47	8264.21	81.42	8273.62	82
8283.04	81.99	8320.71	82.31	8339.55	82.26	8348.97	80.4	8358.38	80.63
8386.64	80.59	8396.05	80.39	8414.89	80.74	8433.72	80.63	8443.14	80.78
8461.98	81.74	8471.4	81.77	8480.81	81.53	8490.23	81.59	8518.48	81.49
8527.9	81.25	8537.32	82.14	8565.57	82.2	8574.99	82.38	8612.66	83.33
8620.22	83.91	8627.26	87.71	8636.21	92.05	8643.21	88.24	8648.71	87.79
8658.71	89.63	8668.71	91.77	8678.71	90.57	8698.71	89.87	8708.71	89.66
8778.71	89.58	8798.71	89.5	8848.71	89.43	8858.71	89.35	8888.71	89.37

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.118	5430.69	.066	5476.41	.015	5626.47	.066	5721.43	.067

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
5430.69	5721.43	755.05	1535 1364.62	.1	.3

Left Levee Station= 46.75 Elevation= 96.99
Right Levee Station=8636.205 Elevation= 92.0475
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
74.58	3815.26	83.09	7475.62	8691.91	82.68

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 132.18*

INPUT
Description:
Station Elevation Data num= 490

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.82	18.96	92.45	27.1	95.55	31.17	95.87	39.71	94.83
56.78	89.43	63.18	86.94	71.72	85.09	80.26	82.3	88.8	80.82
97.33	80.19	108.01	78.84	116.55	78.49	127.22	78.64	131.48	78.53
142.16	79.08	148.56	78.75	163.5	79.8	169.91	79.75	174.18	80.47
178.45	80.47	184.85	81.03	191.25	81.92	197.65	81.96	201.93	82.55
216.87	83.06	240.35	83.12	244.61	83	261.69	82.98	293.34	82.83
323.59	82.79	379.09	82.48	396.16	82.71	413.24	82.62	417.5	82.77
430.32	82.8	445.25	82.7	453.8	82.82	483.67	82.69	500.75	82.78
515.7	82.67	534.9	82.76	547.71	82.64	566.92	82.82	583.85	82.83
590.94	82.73	605.1	82.76	630.95	82.68	635.22	82.81	656.57	82.63
662.97	82.75	675.78	82.71	688.59	82.43	697.22	82.41	705.66	82.65
724.87	82.89	752.62	82.92	767.56	82.84	776.1	82.54	782.5	83.06
797.44	82.86	810.25	82.35	816.65	81.11	823.06	80.64	825.19	80.92
829.46	82.65	833.73	83.46	838	83.06	846.54	83.27	859.34	82.46
863.62	81.81	874.29	81.48	878.56	81.62	887.09	81.05	895.63	81.62
904.17	80.35	919.11	80.1	929.79	79.61	938.32	79.46	946.86	79.79
953.26	79.54	981.01	79.6	991.69	79.87	1008.76	79.52	1027.97	79.42
1042.91	79.51	1062.12	79.42	1086.93	79.5	1102.68	79.43	1143.23	79.52
1151.77	79.64	1160.31	79.53	1183.79	79.69	1215.81	79.78	1243.55	79.75
1264.9	79.92	1316.12	79.98	1348.14	80.15	1354.54	80.25	1373.76	80.14
1384.43	80.77	1397.24	80.79	1405.77	80.4	1410.04	81.36	1414.31	82.81
1416.44	83.12	1427.12	83.2	1437.79	82.97	1467.67	83.01	1493.29	82.88
1508.23	82.93	1538.11	82.86	1557.32	82.71	1574.4	83.02	1597.88	82.98
1602.14	83.09	1621.35	82.95	1642.7	83.12	1698.2	82.99	1730.21	83.2
1743.02	83.08	1762.23	83.12	1787.84	82.95	1798.52	83.01	1839.07	82.89
1849.74	83	1907.37	82.97	1923.05	82.87	1950.06	82.98	1965	82.94
1982.08	82.66	1988.48	82.86	1992.75	82.69	1999.15	81.57	2003.42	81.44
2022.63	81.98	2037.57	82.09	2054.65	82.08	2067.46	81.93	2082.4	82.22
2103.74	82.17	2110.14	82.06	2125.08	82.08	2148.56	81.66	2163.51	81.58
2172.04	81.74	2182.71	81.42	2206.2	81.71	2219	81.76	2236.08	82.29
2257.42	82.41	2263.83	82.12	2285.17	82.13	2295.85	81.88	2308.65	81.36
2327.86	81.22	2344.93	81.26	2357.74	81.12	2368.42	81.29	2383.35	81.21
2396.16	82.21	2400.43	81.78	2413.24	81.34	2438.85	81.32	2443.12	81.25
2462.33	81.43	2470.87	81.37	2481.54	81.5	2483.67	81.76	2498.62	82.22
2518.26	82.27	2532.77	82	2553.68	82.19	2564.79	82.14	2589.1	82.21
2613.88	82.65	2633.09	82.63	2652.3	82.26	2667.24	81.75	2675.78	81.64
2688.58	81.98	2705.66	81.88	2714.2	82.07	2741.94	82.33	2754.76	82.06
2765.43	81.99	2780.37	82.25	2786.77	82.05	2797.44	82.32	2812.39	81.89
2829.46	81.99	2844.4	81.79	2848.67	81.85	2870.02	81.55	2891.37	81.55
2904.17	81.64	2955.4	81.58	2972.47	81.42	2976.75	81.56	2985.28	82.48
3013.03	82.9	3042.92	82.81	3053.59	82.9	3102.68	82.71	3132.56	82.77
3141.1	82.87	3164.58	82.79	3194.47	82.81	3198.73	82.9	3226.48	82.93
3243.56	82.76	3271.31	82.65	3305.46	82.79	3331.08	82.74	3354.56	82.65
3360.96	82.73	3380.17	82.67	3388.71	82.79	3407.92	82.75	3416.46	82.85
3439.94	82.8	3461.28	82.9	3474.82	82.78	3486.89	82.89	3521.05	82.75
3531.52	82.76	3542.39	82.93	3565.87	82.78	3600.02	82.87	3634.14	82.75
3638.4	82.84	3661.84	82.72	3676.75	82.79	3678.89	82.69	3710.85	82.72
3727.9	82.8	3751.33	82.73	3755.59	82.83	3772.64	82.79	3781.16	82.88
3811	82.74	3836.2	82.82	3864.27	82.74	3870.66	82.8	3902.62	82.68
3938.85	82.76	3947.37	82.68	3998.51	82.61	4028.34	82.75	4034.74	82.63
4068.83	82.57	4075.23	82.49	4096.53	82.51	4126.36	82.21	4130.63	82.07

4141.28	82.23	4145.54	82.46	4149.8	81.59	4156.2	81	4173.24	81.27
4179.63	81.08	4194.55	81.16	4200.95	81.37	4218.83	81.41	4237.17	81.7
4241.43	81.64	4260.61	81.99	4268.44	82.39	4275.52	83.02	4281.77	82.29
4289.3	81.1	4300.52	77.19	4309.98	74.49	4322.4	69.69	4328.65	65.16
4331.78	63.71	4341	61.22	4352.05	56.76	4355.73	55.81	4366.25	54.77
4387.3	53.97	4392.3	53.97	4400.41	54.45	4408.53	54.54	4416.64	54.37
4435.57	54.94	4448.43	55.64	4457.21	55.89	4459.01	56.28	4460.77	59.16
4469.63	59.53	4472.59	60.03	4481.45	63.74	4484.41	64.41	4493.27	63.88
4504.57	64.05	4504.68	67.27	4508.36	67.4	4512.03	68.31	4516.9	70.18
4519.39	71.21	4526.74	72.85	4531.67	73.62	4540.53	75.85	4548.81	77.66
4559.83	79.06	4567.12	80.18	4574.54	80.98	4581.9	81.14	4594.84	81.1
4607.79	80.18	4620.73	80.05	4633.68	80.16	4646.62	80.12	4659.57	80.31
4672.51	80.66	4685.46	80.62	4711.35	81.02	4737.24	81.04	4763.13	81.26
4789.02	81.34	4814.91	81.25	4827.85	81.3	4858.87	81.19	4892.58	81.22
4944.36	81.19	4970.25	81.14	4996.14	81.17	5047.92	81.05	5138.54	81.09
5157.76	81.03	5192.93	81.9	5229.15	81.76	5255.04	81.78	5280.93	81.68
5293.88	81.92	5319.77	81.96	5332.71	83.77	5397.44	83.75	5449.22	83.66
5462.16	83.59	5513.94	83.6	5552.78	83.46	5630.45	83.3	5656.34	83.31
5682.23	83.21	5721.07	83.21	5746.96	83.06	5785.79	83.16	5876.41	83.22
5928.19	83.23	5967.02	83.17	5979.97	83.2	5992.91	83.09	6005.86	83.14
6057.64	83.01	6083.53	82.69	6096.47	82.68	6122.36	82.26	6148.25	82.08
6225.93	81.95	6251.82	82.05	6290.65	82.02	6316.54	81.94	6368.32	82.07
6407.16	82.12	6484.83	82.08	6497.77	82.22	6510.72	82.56	6523.66	82.76
6536.61	83.09	6601.33	83.23	6614.28	83.23	6653.11	82.91	6679	82.91
6691.95	82.84	6717.84	82.83	6756.68	82.74	6834.35	82.62	6912.02	82.64
6976.74	82.82	6989.69	83.05	7002.63	83.05	7015.58	79.19	7041.47	78.16
7067.36	78.16	7106.19	78.24	7145.03	78.18	7157.97	78.23	7196.81	78.19
7209.75	78.37	7235.64	78.42	7248.59	79.58	7261.54	79.57	7274.48	82.78
7287.43	82.87	7300.37	82.81	7313.32	82.38	7339.21	82.36	7352.15	81.32
7365.1	81.13	7390.99	81.17	7416.88	81.11	7429.82	82	7442.77	80.47
7455.71	80.46	7468.66	80.05	7481.6	79.48	7494.55	79.93	7520.44	79.82
7533.38	80	7546.33	79.96	7559.27	80.37	7572.22	79.29	7585.16	79.28
7598.11	79.42	7611.05	79.41	7624	80.06	7636.94	80.28	7649.89	80.28
7662.83	79.66	7675.78	79.56	7688.72	79.21	7701.67	79.46	7714.61	79.46
7727.56	80.01	7753.45	82.04	7766.39	82.17	7779.34	82.16	7792.29	79.73
7805.23	79.61	7818.17	79.29	7844.07	79.16	7857.01	79.95	7882.9	79.86
7895.85	79.69	7934.68	79.77	7960.57	80.31	7973.52	80.3	7986.46	80.49
8012.35	80.54	8025.3	81.29	8038.24	81.28	8051.19	81.67	8077.08	81.59
8090.02	82.78	8102.97	82.78	8128.86	83.11	8141.8	83.1	8154.75	83.47
8180.64	83.39	8193.58	79.68	8206.53	80.16	8219.47	80.04	8245.36	80.11
8258.31	79.74	8284.2	80.39	8297.14	80.41	8310.09	80.07	8323.04	80.34
8335.98	81.39	8348.92	82.17	8361.87	82.19	8374.82	81.67	8387.76	81.74
8413.65	81.39	8426.6	81.41	8439.54	80.89	8452.49	82.62	8491.32	82.62
8504.27	82.92	8556.05	84.65	8566.43	85.77	8576.11	89.06	8588.41	92.25
8602.41	84.64	8613.41	83.74	8633.41	87.43	8653.41	91.69	8673.41	89.3
8713.41	87.9	8733.41	87.48	8753.41	87.52	8813.41	87.35	8833.41	87.38
8873.41	87.33	8913.41	87.16	9013.41	87.01	9033.41	86.85	9093.41	86.9

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.118	4275.52	.07	4331.78	.015	4516.9	.07	4581.9	.067

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4275.52	4581.9	755.05	1535 1364.62	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	4275.52	83.02	T
4581.9	9093.41	81.14	T

Left Levee Station= 31.17 Elevation= 95.87
Right Levee Station= 8588.41 Elevation= 92.255
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
57.37	3017.79	82.5	7010.9	8548.48	83.15

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 131.89*

INPUT
Description:
Station Elevation Data num= 490

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.69	7.11	92.46	12.76	94.39	15.58	94.74	21.83	93.62
29.64	91.08	39	87.51	45.25	85.84	51.5	83.76	57.74	82.35
71.8	80.3	78.04	79.92	88.97	79.83	96.78	80.13	101.46	79.99
112.39	80.51	117.08	80.57	120.2	80.97	123.32	80.9	132.69	81.44
134.8	81.36	140.5	81.95	151.42	82.25	168.6	82.25	176.26	82.15
191.82	82.19	207.37	82.06	228.09	82.1	270.09	81.93	282.58	82.05
324.74	82.15	346.59	82.03	359.09	82.09	393.44	82.04	419.88	82.24
425.06	82.09	435.42	82.16	444.97	82.06	457.45	82.14	473.07	82.07
487.12	82.12	502.8	81.92	523.03	82.19	554.26	82.19	560.51	82.05
565.19	82.32	579.25	82.21	587.05	81.92	590.17	81.41	594.86	81.16
602.67	82.54	605.79	82.32	612.03	82.43	621.4	82.04	624.53	81.72
635.45	81.67	641.7	81.36	647.95	81.61	654.19	80.97	665.12	80.85
679.17	80.53	685.42	80.69	690.1	80.56	710.4	80.61	718.21	80.77
730.7	80.58	744.75	80.54	787.88	80.62	799.4	80.54	829.07	80.66
863.42	80.72	870.82	80.82	902.45	80.75	918.07	80.87	946.17	80.95
974.48	80.94	983.64	81.02	997.7	80.98	1005.5	81.31	1014.87	81.35
1021.12	81.18	1028.92	82.54	1044.54	82.4	1057.41	82.44	1085.13	82.35
1096.06	82.39	1125.73	82.37	1131.97	82.29	1144.46	82.41	1155.9	82.37
1194.43	82.54	1235.02	82.44	1258.45	82.59	1264.74	82.5	1281.87	82.53
1338.07	82.43	1345.88	82.53	1388.04	82.56	1399.5	82.46	1420.23	82.56
1442.68	82.39	1450.49	82.41	1455.18	81.85	1458.3	81.79	1477.25	82.15
1495.77	82.14	1503.17	82.06	1516.07	82.24	1536.37	82.12	1547.29	82.18
1564.47	81.96	1575.74	81.9	1581.65	82.01	1589.45	81.86	1616	82.01
1628.49	82.26	1644.1	82.35	1648.79	82.23	1664.4	82.25	1681.57	81.86
1701.87	81.73	1717.48	81.7	1726.05	81.8	1736.22	81.73	1745.59	82.29
1748.71	82.08	1758.08	81.87	1779.94	81.83	1808.04	82.03	1820.54	82.43
1834.9	82.43	1850.45	82	1860.81	82.2	1886.72	82.17	1904.85	82.43
1918.9	82.45	1950.13	81.95	1959.5	82.12	1971.99	82.08	1980.03	82.21
1998.53	82.25	2015.71	82.19	2026.64	82.31	2031.32	82.18	2039.13	82.32
2050.06	82.12	2062.55	82.17	2076.6	82.12	2099.24	81.94	2117.2	82.02
2157.8	82.05	2170.29	82	2176.54	82.44	2187.46	82.61	2202.91	82.72
2218.69	82.61	2228.82	82.73	2243.68	82.59	2262.41	82.54	2290.52	82.69
2307.69	82.62	2332.68	82.72	2358.4	82.76	2365.47	82.62	2385.77	82.54
2410.75	82.66	2425.78	82.59	2462.07	82.58	2487.98	82.71	2496.62	82.64
2513.8	82.76	2534.64	82.7	2543.47	82.79	2555.37	82.7	2576.11	82.7
2586.47	82.89	2601.24	82.76	2626.22	82.78	2638.71	82.71	2664.22	82.77
2669.4	82.7	2690.14	82.68	2719.76	82.75	2736.9	82.74	2757.51	82.87
2780.55	82.78	2798.98	82.84	2847.57	82.72	2874.07	82.77	2897.46	82.66

2917.72	82.68	2930.19	82.82	2989.42	82.67	3014.36	82.48	3025.27	82.71
3033.06	81.97	3045.53	82.07	3050.21	81.96	3065.8	82.14	3078.88	82.12
3084.06	82.27	3104.8	82.45	3115.17	82.96	3120.35	83.53	3126.75	82.67
3133.16	81.49	3136.36	80.61	3145.97	77.25	3152.38	75.65	3168.4	69.81
3171.6	67.49	3174.8	64.52	3178	63.05	3181.21	62.61	3187.46	60.35
3198.78	55.64	3202.55	54.94	3207.57	54.36	3213.34	54.04	3234.91	53.33
3242.41	53.33	3250.96	53.87	3259.52	53.92	3268.08	53.64	3278.53	54.04
3288.04	54.27	3310.86	55.7	3312.76	56.33	3314.61	60.68	3317.73	60.71
3323.96	61.36	3327.08	62.1	3336.42	67.5	3339.54	68.5	3342.65	68.49
3348.96	67.7	3360.8	67.81	3360.92	69.42	3364.81	69.54	3368.68	70.06
3376.43	71.69	3380.05	72.27	3386.27	72.78	3389.39	73.28	3398.74	75.64
3404.96	76.93	3414.31	77.86	3426.77	79.27	3434.6	79.67	3442.36	79.74
3458.83	79.73	3475.3	78.38	3491.78	78.23	3508.25	78.44	3524.72	78.42
3541.19	78.73	3557.67	79.31	3574.14	79.29	3590.61	79.71	3607.08	79.96
3623.56	79.94	3640.03	80.07	3672.97	80.47	3705.92	80.68	3738.86	80.62
3755.34	80.74	3821.23	80.65	3837.7	80.7	3903.59	80.63	3936.53	80.56
3969.48	80.59	4018.9	80.42	4035.37	80.4	4134.21	80.41	4150.68	80.44
4175.15	80.33	4219.89	80.72	4233.04	80.72	4265.99	80.54	4298.93	80.59
4315.4	80.43	4331.88	80.45	4348.35	80.82	4364.82	80.89	4381.29	80.88
4397.77	83.61	4430.71	83.63	4480.13	83.62	4546.02	83.51	4562.49	83.4
4595.44	83.45	4628.38	83.44	4677.8	83.25	4710.74	83.22	4727.22	83.15
4760.16	83.12	4776.63	83.06	4809.58	83.08	4842.53	82.95	4875.47	82.92
4891.94	82.96	4924.89	82.76	4957.83	82.83	4974.31	82.92	5040.2	83.01
5073.14	83.1	5089.61	83.07	5155.5	83.1	5171.98	83.05	5204.92	83.04
5221.39	83.09	5237.87	82.94	5254.34	83.01	5287.28	82.95	5320.23	82.85
5353.17	82.37	5369.65	82.37	5386.12	81.97	5402.59	81.75	5435.54	81.49
5517.9	81.35	5534.37	81.35	5567.32	81.51	5583.79	81.46	5616.74	81.48
5633.21	81.38	5649.68	81.38	5682.63	81.49	5699.1	81.49	5715.57	81.6
5764.99	81.69	5814.41	81.68	5830.88	81.65	5863.82	81.67	5880.3	81.89
5896.77	82.4	5913.24	82.72	5929.71	83.21	5946.19	83.2	5962.66	83.3
6012.08	83.46	6028.55	83.46	6061.49	83.13	6077.97	83.01	6110.91	83.02
6127.38	82.92	6193.27	82.88	6209.75	82.8	6275.64	82.71	6292.11	82.64
6308.58	82.66	6325.06	82.58	6341.53	82.67	6374.47	82.74	6407.42	82.74
6423.89	82.87	6440.36	82.87	6489.78	83.03	6506.25	83.4	6522.73	83.39
6539.2	77.61	6555.67	76.91	6572.14	76.08	6605.09	76.09	6621.56	76.17
6654.51	76.23	6670.98	76.18	6703.92	76.17	6720.4	76.24	6769.81	76.21
6786.29	76.48	6802.76	76.47	6819.23	76.57	6835.71	78.31	6852.18	78.31
6868.65	83.13	6885.12	83.27	6901.6	83.19	6918.07	82.55	6951.01	82.54
6967.49	80.99	6983.96	80.71	7016.9	80.78	7033.38	80.65	7049.85	80.7
7066.32	82.05	7082.79	79.75	7099.27	79.75	7115.74	79.13	7132.21	78.3
7148.68	78.98	7165.16	78.83	7181.63	78.83	7198.1	79.09	7214.57	79.04
7231.05	79.67	7247.52	78.05	7263.99	78.05	7280.46	78.26	7296.94	78.26
7313.41	79.23	7329.88	79.58	7346.35	79.57	7362.83	78.66	7379.3	78.51
7395.77	77.99	7412.24	78.38	7428.72	78.38	7445.19	79.21	7461.66	80.7
7478.13	82.28	7494.61	82.48	7511.08	82.47	7527.55	78.82	7544.02	78.65
7560.5	78.18	7576.97	78	7593.44	78	7609.92	79.2	7626.39	79.07
7642.86	79.07	7659.33	78.82	7675.81	78.82	7692.28	78.96	7708.75	78.96
7741.7	79.78	7758.17	79.78	7774.64	80.07	7807.59	80.16	7824.06	81.29
7840.53	81.29	7857	81.88	7873.48	81.9	7889.95	81.77	7906.42	83.56
7922.89	83.56	7955.84	84.07	7972.31	84.07	7988.78	84.62	8005.26	84.62
8021.73	84.52	8038.2	78.96	8054.67	79.69	8071.15	79.52	8087.62	79.51
8104.09	79.64	8120.56	79.08	8137.04	79.63	8153.51	80.03	8169.98	80.04
8186.45	79.52	8202.93	79.89	8219.4	81.46	8235.87	82.59	8252.34	82.6
8268.82	81.8	8285.29	81.89	8318.24	81.32	8334.71	81.33	8351.18	80.53
8367.65	83.1	8384.13	83.04	8417.07	83.03	8433.54	83.47	8499.43	85.97
8512.65	87.64	8524.97	90.41	8532.38	91.25	8540.62	92.46	8550.37	87.29
8561.62	81.05	8578.12	79.69	8608.12	85.22	8638.12	91.62	8668.12	88.03
8728.12	85.94	8758.12	85.3	8788.12	85.37	8818.12	85.25	8878.12	85.1
8908.12	85.15	8938.12	85.05	8968.12	85.07	9028.12	84.83	9058.12	84.83
9088.12	84.75	9178.12	84.6	9208.12	84.35	9268.12	84.45	9298.12	84.43

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	3120.35	.07	3178	.025	3336.42	.07	3442.36	.066

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3120.35	3442.36		755.05	1535 1364.62	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	3120.35	83.53	T
3442.36	9298.12	79.74	T

Left Levee Station= 15.58 Elevation= 94.74
Right Levee Station=8540.615 Elevation=92.46249

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 131.6

INPUT
Description: Cross-Section data supplemented on the right by IBWC cross-section
131.6 from right bank station. 2302.82=3380-1077.18 feet (the
approximate difference at the relative bank stations). Bathymetric
elevations translated from IBWC 2008 Cross-sections

Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.61	6.56	91.63	16.4	87.41	26.25	84	29.53	83.09
36.09	81.66	42.65	81.09	59.05	81.28	62.33	81.21	65.62	81.51
75.46	80.86	78.74	81.35	88.58	81.48	101.7	81.34	111.55	81.46
121.39	81.3	134.51	81.4	150.92	81.43	157.48	81.36	183.72	81.41
190.28	81.52	206.69	81.38	232.93	81.41	246.06	81.48	255.9	81.65
259.18	81.45	265.74	81.55	272.3	81.46	301.83	81.55	308.39	81.43
324.8	81.51	334.64	81.48	364.16	81.72	374.01	81.57	387.13	81.64
390.41	81.75	400.25	81.6	436.34	81.59	449.46	81.71	452.74	81.64
488.83	81.74	495.39	81.65	518.36	81.82	534.76	81.74	541.33	81.88
547.89	81.76	561.01	81.74	583.97	81.91	606.94	81.77	623.34	81.82
639.75	81.98	656.15	81.77	659.43	81.88	675.84	81.82	702.08	81.94
708.64	81.82	721.77	81.77	738.17	81.98	777.54	81.88	784.1	82.02
790.66	81.89	813.63	82.01	836.59	81.96	843.15	82.07	869.4	82.14
875.96	82.05	889.08	82.13	912.05	82.13	925.17	82.26	941.58	82.18
944.86	82.29	964.54	82.18	971.1	82.3	987.51	82.21	994.07	82.31
1026.88	82.21	1033.44	82.35	1049.84	82.39	1069.53	82.25	1082.65	82.32
1089.21	82.25	1095.77	82.38	1122.02	82.42	1144.98	82.67	1151.55	82.6
1161.39	81.91	1167.95	82.21	1184.35	82.14	1204.04	82.27	1233.56	82.25
1243.41	82.33	1256.53	82.16	1259.81	82.35	1269.65	82.42	1276.21	82.31
1315.58	82.41	1318.86	82.36	1354.95	82.5	1368.08	82.41	1384.48	82.54
1394.32	82.41	1400.88	82.57	1407.45	82.42	1423.85	82.36	1436.97	82.52
1450.1	82.45	1482.9	82.62	1489.47	82.4	1505.87	82.43	1518.99	82.57
1525.55	82.46	1548.52	82.49	1564.92	82.62	1568.2	82.5	1584.61	82.67
1594.45	82.61	1597.73	82.72	1607.57	82.59	1620.7	82.64	1627.26	82.87
1630.54	82.74	1663.35	82.67	1676.47	82.77	1679.75	82.68	1706	82.68

1725.68	82.75	1735.52	82.87	1755.21	82.8	1761.77	82.87	1797.86	82.74		
1810.98	82.79	1824.1	82.69	1840.51	82.77	1847.07	82.96	1873.32	82.81		
1893	82.85	1906.12	82.97	1922.53	82.83	1929.09	82.93	1938.93	82.84		
1942.21	82.99	1955.34	83.04	1961.9	83.52	1965.18	84.04	1971.74	83.06		
1978.3	81.64	1981.58	80.71	1988.14	78.31	1991.42	77.3	1997.99	75.75		
2007.83	72.14	2014.39	69.93	2017.67	67.35	2020.95	63.89	2024.23	62.38		
2027.51	62.21	2045.51	54.52	2054.51	53.5	2073.51	52.87	2082.51	52.7		
2092.51	52.7	2101.51	53.3	2110.51	53.3	2119.51	52.9	2130.51	53.4		
2140.51	53.6	2158.51	54.8	2164.51	55.51	2166.51	56.39	2168.46	62.21		
2171.74	62.27	2178.29	63.19	2181.57	64.17	2191.4	71.27	2194.68	72.59		
2197.95	72.57	2204.51	71.53	2211.06	71.4	2230.72	71.96	2237.28	72.49		
2243.83	72.49	2247.11	72.94	2256.94	75.43	2263.49	76.65	2266.77	76.99		
2273.32	77.29	2286.43	78.36	2302.82	78.35	2322.82	78.35	2342.82	76.58		
2362.82	76.41	2382.82	76.71	2402.82	76.71	2422.82	77.16	2442.82	77.95		
2462.82	77.95	2482.82	78.54	2502.82	78.9	2522.82	78.9	2542.82	79.1		
2562.82	79.43	2582.82	79.69	2602.82	79.82	2622.82	80.02	2662.82	79.99		
2682.82	80.18	2702.82	80.15	2742.82	80.15	2762.82	80.11	2782.82	80.18		
2822.82	80.11	2862.82	80.08	2902.82	79.98	2942.82	80.01	2982.82	79.88		
3002.82	79.78	3022.82	79.75	3142.82	79.75	3162.82	79.78	3202.82	79.58		
3222.82	79.55	3262.82	79.55	3302.82	79.32	3322.82	79.39	3342.82	79.39		
3362.82	79.19	3382.82	79.22	3402.82	79.71	3422.82	79.81	3442.82	79.81		
3462.82	83.45	3482.82	83.42	3502.82	83.49	3562.82	83.48	3602.82	83.42		
3622.82	83.35	3642.82	83.35	3662.82	83.22	3682.82	83.22	3702.82	83.29		
3742.82	83.29	3802.82	83.05	3842.82	83.02	3862.82	82.92	3902.82	82.89		
3922.82	82.82	3962.82	82.86	4002.82	82.69	4042.82	82.66	4062.82	82.72		
4082.82	82.56	4102.82	82.46	4122.82	82.56	4142.82	82.56	4162.82	82.69		
4202.82	82.75	4222.82	82.82	4242.82	82.82	4282.82	82.95	4302.82	82.92		
4382.82	82.98	4402.82	82.91	4442.82	82.91	4462.82	82.98	4482.82	82.78		
4502.82	82.88	4522.82	82.81	4542.82	82.81	4582.82	82.68	4622.82	82.06		
4642.82	82.06	4662.82	81.53	4682.82	81.24	4722.82	80.91	4742.82	80.91		
4762.82	80.84	4822.82	80.74	4842.82	80.74	4882.82	80.97	4902.82	80.91		
4942.82	80.94	4962.82	80.81	4982.82	80.81	5022.82	80.97	5042.82	80.97		
5062.82	81.13	5122.82	81.26	5182.82	81.26	5202.82	81.23	5242.82	81.26		
5262.82	81.56	5282.82	82.25	5302.82	82.67	5322.82	83.33	5342.82	83.33		
5362.82	83.46	5422.82	83.69	5442.82	83.69	5482.82	83.26	5502.82	83.1		
5542.82	83.13	5562.82	83	5602.82	83	5642.82	82.96	5662.82	82.86		
5702.82	82.83	5722.82	82.76	5742.82	82.76	5762.82	82.67	5782.82	82.7		
5802.82	82.6	5822.82	82.73	5842.82	82.73	5862.82	82.83	5882.82	82.79		
5902.82	82.83	5922.82	83.02	5942.82	83.02	5962.82	83.12	6002.82	83.25		
6022.82	83.74	6042.82	83.74	6062.82	76.03	6082.82	75.11	6102.82	74		
6142.82	74.03	6162.82	74.13	6202.82	74.23	6222.82	74.16	6262.82	74.16		
6282.82	74.26	6302.82	74.23	6342.82	74.23	6362.82	74.59	6382.82	74.59		
6402.82	74.72	6422.82	77.05	6442.82	77.05	6462.82	83.48	6482.82	83.67		
6502.82	83.57	6522.82	82.72	6562.82	82.72	6582.82	80.65	6602.82	80.29		
6622.82	80.39	6642.82	80.39	6662.82	80.22	6682.82	80.29	6702.82	82.09		
6722.82	79.04	6742.82	79.04	6762.82	78.22	6782.82	77.11	6802.82	78.02		
6822.82	77.83	6842.82	77.83	6862.82	78.19	6882.82	78.12	6902.82	78.97		
6922.82	76.81	6942.82	76.81	6962.82	77.1	6982.82	77.1	7002.82	78.41		
7022.82	78.87	7042.82	78.87	7062.82	77.66	7082.82	77.46	7102.82	76.77		
7122.82	77.3	7142.82	77.3	7162.82	78.41	7182.82	80.41	7202.82	82.51		
7222.82	82.78	7242.82	82.78	7262.82	77.92	7282.82	77.69	7302.82	77.07		
7322.82	76.84	7342.82	76.84	7362.82	78.44	7382.82	78.28	7402.82	78.28		
7422.82	77.95	7442.82	77.95	7462.82	78.15	7482.82	78.15	7502.82	78.67		
7522.82	79.26	7542.82	79.26	7562.82	79.65	7602.82	79.78	7622.82	81.29		
7642.82	81.29	7662.82	82.08	7682.82	82.11	7702.82	81.95	7722.82	84.34		
7742.82	84.34	7762.82	84.74	7782.82	85.03	7802.82	85.03	7822.82	85.78		
7842.82	85.78	7862.82	85.65	7882.82	78.24	7902.82	79.22	7922.82	78.99		
7942.82	78.99	7962.82	79.16	7982.82	78.43	8002.82	79.16	8022.82	79.68		
8042.82	79.68	8062.82	78.96	8082.82	79.45	8102.82	81.52	8122.82	83.02		
8142.82	83.02	8162.82	81.94	8182.82	82.04	8202.82	81.61	8222.82	81.25		
8242.82	81.25	8262.82	80.17	8282.82	83.58	8302.82	83.48	8342.82	83.45		
8362.82	84.01	8442.82	87.29	8460.82	89.78	8473.82	91.76	8482.82	92.02		
8492.82	92.67	8505.82	85.78	8520.82	77.45	8542.82	75.64	8582.82	83.02		
8622.82	91.55	8662.82	86.76	8702.82	85.35	8742.82	83.97	8782.82	83.12		
8822.82	83.21	8862.82	83.05	8902.82	82.98	8942.82	82.85	8982.82	82.92		
9022.82	82.79	9062.82	82.82	9142.82	82.49	9182.82	82.49	9222.82	82.39		
9342.82	82.19	9382.82	81.86	9462.82	81.99	9502.82	81.96				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	1965.18	.07	2017.67	.025	2191.4	.07	2286.43	.066

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1971.74	2286.43	1454.61	1509.52 1621.49	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1971.74	83.06	T
2286.43	9502.82	78.36	T

Left Levee Station= .07 Elevation= 93.59
Right Levee Station= 8492.82 Elevation= 92.67

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	92.45	Element	0.066	0.048	0.066
Vel Head (ft)	0.04	Wt. n-Val.	1454.61	1509.52	1621.49
W.S. Elev (ft)	92.41	Reach Len. (ft)	18271.02	8805.79	69787.18
Crit W.S. (ft)	83.35	Flow Area (sq ft)	20042.01	8805.79	71871.26
E.G. Slope (ft/ft)	0.000106	Area (sq ft)	18660.76	25315.84	81023.40
Q Total (cfs)	125000.00	Flow (cfs)	1967.75	314.69	6202.34
Top Width (ft)	8484.79	Top Width (ft)	1.02	2.87	1.16
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)	9.29	27.98	11.25
Max Chl Dpth (ft)	39.71	Hydr. Depth (ft)	1815571.0	2463067.0	7883052.0
Conv. Total (cfs)	12161690.0	Conv. (cfs)	1969.95	328.98	6209.76
Length Wtd. (ft)	1561.13	Wetted Per. (ft)	0.06	0.18	0.07
Min Ch El (ft)	52.70	Shear (lb/sq ft)	0.06	0.51	0.09
Alpha	1.62	Stream Power (lb/ft s)	23825.19	16305.64	20595.75
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	6266.95	858.33	4654.70
C & E Loss (ft)	0.02	Cum SA (acres)			

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 131.35

INPUT
Description: Cross-Section data supplemented on the right by IBWC cross-section
131.35 from station. 2912.94=2950-37.06 feet (the approximate

difference at the relative location). Bathymetric elevations
translated from IBWC 2008 Cross-sections

Station Elevation Data num= 270

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.56	3.28	82.18	9.84	84.65	19.68	89	26.24	91.16
32.8	92.9	36.08	93.59	39.36	93.89	49.2	94.03	52.49	93.56
59.05	92.09	65.61	90.78	68.89	89.68	75.45	85.67	78.73	84.09
85.29	82.36	91.85	81.24	98.41	80.71	104.97	79.9	114.81	79.42
121.37	79.46	124.65	78.83	131.21	76.61	134.49	76.48	662.63	76.48
665.91	76.49	669.19	77	672.47	77.99	675.75	78.36	682.31	77.83
692.15	77.46	705.27	76.73	708.55	76.74	721.67	77.28	734.79	77.2
754.48	77.34	761.04	77.29	767.6	77.38	780.72	77.38	793.84	77.29
800.4	77.36	813.52	77.31	823.36	77.42	846.32	77.29	852.89	77.38
872.57	77.38	879.13	77.47	885.69	77.39	918.49	77.47	934.89	77.4
938.17	77.52	944.73	77.42	967.7	77.48	984.1	77.35	997.22	77.46
1033.3	77.46	1043.14	77.4	1049.71	77.45	1056.27	77.37	1066.11	77.54
1072.67	77.47	1095.63	77.47	1112.03	77.35	1115.31	77.44	1125.15	77.37
1131.71	77.43	1148.12	77.38	1151.4	77.49	1164.52	77.36	1190.76	77.39
1200.6	77.44	1223.56	77.33	1236.68	77.47	1243.25	77.35	1246.53	77.44
1269.49	77.39	1272.77	77.45	1295.73	77.48	1305.57	77.39	1312.13	77.45
1328.53	77.38	1335.1	77.52	1338.38	77.46	1351.5	77.6	1361.34	77.46
1371.18	77.65	1390.86	77.52	1403.98	77.6	1420.38	77.55	1443.35	77.64
1449.91	77.6	1463.03	77.66	1466.31	77.58	1482.71	77.72	1499.11	77.66
1512.23	77.75	1518.79	77.71	1535.2	77.79	1561.44	78.07	1584.4	78.18
1587.68	78.28	1597.52	78.22	1607.36	78.56	1613.92	78.53	1623.77	78.72
1630.33	79.07	1633.61	79.44	1643.45	80.92	1650.01	81.68	1663.13	81.91
1682.81	82.06	1689.37	82.24	1695.93	82.19	1738.58	82.56	1741.86	82.48
1754.98	82.53	1768.1	82.66	1774.66	82.55	1787.78	82.69	1794.34	82.64
1800.9	82.72	1817.31	82.69	1830.43	82.75	1836.99	82.9	1853.39	82.81
1869.79	82.84	1879.63	82.63	1892.75	82.6	1899.31	82.74	1919	82.66
1938.68	82.71	1945.24	82.66	1958.36	82.72	1968.2	82.83	1984.6	82.79
2004.29	82.82	2027.25	81.94	2033.81	81.43	2040.37	81.15	2046.93	81.15
2053.49	81.02	2060.05	80.74	2066.61	80.85	2109.26	81.15	2122.38	81.01
2132.22	81.22	2138.78	81.56	2148.62	81.68	2155.18	80.81	2158.46	80.63
2165.02	81.14	2174.86	81.05	2181.42	81.23	2187.98	81.1	2194.54	80.61
2201.1	80.63	2204.39	80.83	2214.23	80.76	2220.79	80.99	2227.35	80.85
2247.03	80.95	2260.15	80.84	2269.99	80.97	2279.83	80.9	2289.67	80.25
2292.95	80.41	2302.79	80.47	2306.07	80.58	2312.64	80.48	2325.76	79.26
2332.32	78.51	2352	77.18	2355.28	77.11	2361.84	77.77	2374.96	79.3
2381.52	79.74	2384.8	80.12	2391.36	79.82	2397.92	79.33	2401.2	78.78
2411.05	74.84	2414.33	73.81	2420.89	72.51	2424.17	71.63	2430.73	68.93
2434.01	67.21	2437.29	64.94	2440.57	63.25	2447.13	62.24	2450.41	62.02
2458.41	58.54	2468.41	58.34	2478.41	57.84	2488.41	57.54	2498.41	57.84
2508.41	57.84	2518.41	57.44	2528.41	57.04	2538.41	56.84	2548.41	56.84
2558.41	56.54	2568.41	56.04	2578.41	55.84	2588.41	55.54	2598.41	55.74
2608.41	55.44	2618.41	55.24	2628.41	56.74	2630.83	62.21	2634.11	63.59
2637.39	65.64	2640.67	67.03	2647.23	69.03	2650.51	70.29	2657.07	73.84
2660.35	76.45	2663.63	78.48	2666.91	79.15	2670.19	79.12	2683.32	78.09
2689.88	78.01	2706.28	78.46	2712.84	78.47	2735.8	78.81	2742.36	78.64
2752.2	78.55	2758.76	78.59	2775.17	78.48	2785.01	78.65	2798.13	78.6
2824.37	78.58	2837.49	78.82	2847.33	78.91	2853.89	79.11	2867.02	79.07
2876.86	79.32	2886.7	79.44	2893.26	80.18	2899.82	81.44	2906.38	83.46
2909.66	84.22	2912.94	84.59	2918.94	83.04	2939.94	82.64	4093.94	77.74
4109.94	81.94	5856.94	81.74	5862.94	81.64	5881.94	83.14	5891.94	82.34
5962.94	82.34	6062.94	82.74	6108.94	83.34	6115.94	83.94	6151.94	74.84
6162.94	74.44	6175.94	74.04	6262.94	74.04	6362.94	74.64	6462.94	75.14
6516.94	75.44	6556.94	83.94	6576.94	82.94	7866.94	81.44	7876.94	84.64
7896.94	84.64	8504.94	83.64	8548.94	84.64	8575.94	92.64	8583.94	92.64

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.099	2391.36	.066	2437.29	.015	2663.63	.066	2689.88	.088

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2384.8 2666.91 2159.16 2175 2278.61 .1 .3
Left Levee Station= 49.2 Elevation= 94.03
Right Levee Station= 8575.94 Elevation= 92.64
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
33.8	2005.63	82.84	2929.58	8298.59	82.88

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	92.21	Element			
Vel Head (ft)	0.26	Wt. n-Val.	0.099	0.030	0.088
W.S. Elev (ft)	91.95	Reach Len. (ft)	2159.16	2175.00	2278.61
Crit W.S. (ft)	85.86	Flow Area (sq ft)	21924.85	8367.50	53515.01
E.G. Slope (ft/ft)	0.000181	Area (sq ft)	21924.85	8367.50	53515.01
Q Total (cfs)	125000.00	Flow (cfs)	19771.88	52183.79	53044.34
Top Width (ft)	8513.89	Top Width (ft)	2325.07	282.11	5906.72
Vel Total (ft/s)	1.49	Avg. Vel. (ft/s)	0.90	6.24	0.99
Max Chl Dpth (ft)	36.71	Hydr. Depth (ft)	9.43	29.66	9.06
Conv. Total (cfs)	9279210.0	Conv. (cfs)	1467739.0	3873795.0	3937676.0
Length Wtd. (ft)	2215.47	Wetted Per. (ft)	2327.60	294.11	5909.26
Min Ch El (ft)	55.24	Shear (lb/sq ft)	0.11	0.32	0.10
Alpha	7.54	Stream Power (lb/ft s)	0.10	2.01	0.10
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	23124.49	16008.08	18262.04
C & E Loss (ft)	0.06	Cum SA (acres)	6195.27	847.99	4429.32

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 130.93

INPUT
Description: Cross-Section data supplemented on the right by IBWC cross-section
131.93 from right bank station. 2655.70=3740-1084.3 feet (the
approximate difference at the relative bank stations). Bathymetric
elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 458

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	93.31	6.56	93.13	9.84	92.66	16.39	91.2	19.67	90.69
22.95	89.94	29.51	86.35	32.78	84.78	36.06	83.52	42.62	82.13
49.18	81.43	52.46	81.39	55.73	81.12	65.57	78.99	72.13	78.12
75.41	77.8	78.68	77.75	957.32	77.75	967.16	78.19	977	78.17
990.11	78.23	999.95	78.17	1009.78	78.46	1029.45	78.22	1039.29	78.32
1049.12	78.31	1058.96	77.91	1072.07	77.8	1095.02	77.75	1262.23	77.75

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  1265.5   77.88 1268.78   78.34 1275.34   79.83 1278.62   80.28  1281.9   80.24
 1291.73   79.88 1301.57   79.26  1311.4   79.26 1324.52   79.13 1337.63    79.1
 1350.74   79.14 1360.58   79.22 1376.97   79.22 1390.09   79.26 1399.92   79.34
 1416.31   79.29 1422.87    79.4 1435.99   79.41 1442.54   79.47 1458.94   79.45
    1495   79.58 1501.56   79.56 1524.51   79.62 1527.78   79.69 1557.29   79.74
 1563.85   79.71 1580.24   79.83  1586.8    79.8 1603.19    79.9 1619.58   79.87
  1632.7      80 1645.81   80.05 1649.09      80 1668.76   80.09 1675.32   80.04
 1691.71   80.15 1704.82   80.13 1714.66   80.22 1724.49   80.17 1734.33   80.27
 1744.17   80.23    1754   80.33 1770.39   80.31 1790.06   80.43 1796.62    80.4
 1809.73    80.5 1819.57   80.46 1842.52   80.59 1852.36   80.55 1868.75   80.67
 1878.58   80.64 1885.14   80.71 1908.09   80.76 1960.55   81.07 1973.66   81.03
 1996.61   81.28 2026.12   81.37 2035.95   81.56 2045.79   81.53 2062.18   81.71
 2072.02   82.16 2078.57   82.88 2081.85   83.02 2085.13   82.77 2098.24   80.52
  2104.8   79.49 2108.08   79.12 2111.36   79.02 2117.91   79.04 2124.47   78.78
 2127.75   78.75 2137.59   78.92 2190.04   78.83  2196.6   78.88 2203.16   78.73
 2212.99   78.81 2219.55   78.78 2226.11   78.89 2232.66   78.87 2245.78   78.71
 2258.89   78.79 2262.17   78.86 2278.56   78.64 2285.12    78.7 2308.07   79.22
 2311.35   79.11 2321.18   78.44 2324.46   78.51 2331.02    78.9  2334.3   78.99
 2340.85   78.03 2344.13   77.75 2347.41   77.09 2353.97   75.35 2360.53   74.29
  2363.8   74.13 2367.08   74.23 2373.64   72.61 2376.92   73.57  2380.2   75.26
 2383.48   76.75 2386.76   77.27 2390.04   76.88 2393.32   75.36 2399.88   71.03
 2403.16   69.03 2406.44   67.74    2413   66.63 2416.28    65.9 2419.56   64.73
 2422.84   63.22 2426.12   62.18 2462.56   57.57 2477.56    57.2 2477.56   57.21
 2482.56   56.68 2487.56    56.3 2489.56   56.34 2496.56   56.46 2498.56    56.5
 2502.56   56.43 2508.56   56.31 2509.56    56.3 2515.56   56.41 2520.56    56.5
 2522.56   56.52 2529.56   56.57 2532.56    56.6 2536.56   56.43 2543.56    56.1
 2543.56   56.13 2549.56    56.1 2555.56    56.1 2556.56   56.13 2563.56   56.25
 2567.56    56.3 2570.56   56.14 2577.56   55.84 2578.56    55.8 2584.56   55.85
 2590.56    55.9 2591.56   55.91 2598.56   55.97 2602.56      56 2605.56   56.03
 2612.56   56.09 2613.56    56.1 2614.56   56.39 2615.56    56.7 2616.06   56.76
 2616.35   57.18 2616.35   62.17 2619.62   62.57  2622.9   64.47 2626.18   67.63
 2629.46   70.25 2632.74    72.1 2636.02   73.49  2639.3   74.26 2645.86   75.43
 2649.14   76.27  2655.7    79.5  2675.7   83.53  2695.7    81.5  2715.7   81.36
  2755.7   81.36  2775.7    81.1  2795.7   81.03  2815.7      81  2835.7      81
  2855.7   80.77  2875.7   80.51  2895.7   80.54  2915.7   80.47  2935.7   80.47
  2955.7   80.31  2975.7   80.34  2995.7   80.44  3015.7   80.28  3035.7   80.28
  3055.7   80.37  3075.7   80.21  3095.7   80.18  3115.7   80.05  3135.7   80.05
  3155.7   79.85  3175.7   79.78  3195.7   79.81  3215.7   79.52  3235.7   79.52
  3255.7   79.45  3275.7   79.32  3295.7   79.12  3315.7   79.06  3335.7   79.06
  3355.7   79.35  3375.7   79.12  3395.7   79.02  3415.7   78.93  3435.7   78.93
  3455.7   78.66  3475.7    78.7  3495.7   78.56  3515.7    78.2  3535.7    78.2
  3555.7    78.3  3575.7   78.23  3595.7      78  3615.7   77.84  3635.7   77.84
  3655.7   77.25  3675.7   77.05  3695.7   77.41  3715.7   77.12  3735.7   77.12
  3755.7   76.72  3775.7   76.89  3795.7   76.72  3815.7   76.66  3835.7   76.66
  3855.7   76.26  3875.7   76.59  3935.7   76.59  3955.7   76.62  3975.7   76.59
  3995.7   76.36  4015.7   76.78  4035.7   76.78  4055.7   77.05  4075.7   76.72
  4135.7   76.72  4155.7   76.68  4175.7   76.68  4195.7   76.72  4215.7   76.81
  4235.7   76.81  4255.7   77.11  4275.7   76.95  4295.7   77.21  4315.7   81.64
  4335.7   80.98  4355.7   79.83  4375.7   80.91  4395.7   81.86  4415.7   82.52
  4435.7   82.52  4455.7   83.01  4475.7   83.47  4495.7   83.24  4515.7   82.85
  4535.7   82.85  4555.7   82.49  4575.7   82.35  4595.7   82.16  4615.7   82.03
  4655.7   82.03  4675.7   82.02  4695.7   81.93  4715.7   81.89  4735.7   81.89
  4755.7   82.02  4775.7   82.22  4795.7   82.22  4815.7   82.65  4835.7   82.65
  4855.7   82.68  4875.7   82.68  4895.7   82.61  4915.7   82.64  4935.7   82.64
  4955.7   82.61  4975.7   82.45  4995.7   82.31  5015.7   82.28  5035.7   82.28
  5055.7   82.25  5075.7   82.15  5095.7   82.15  5115.7   82.05  5135.7   82.05
  5155.7   82.02  5175.7   81.89  5195.7   81.85  5215.7   81.69  5235.7   81.69
  5255.7   81.59  5275.7   81.59  5295.7   81.46  5315.7   81.36  5335.7   81.36
  5355.7   81.33  5375.7   81.19  5395.7   81.13  5415.7      81  5435.7      81
  5455.7   81.03  5475.7   80.86  5495.7   80.73  5515.7   80.67  5535.7   80.67
  5555.7   80.73  5575.7    80.7  5595.7   80.37  5615.7   81.88  5635.7   81.88
  5655.7   83.52  5675.7   84.17  5695.7   84.27  5715.7   84.11  5735.7   84.11
  5755.7   84.07  5775.7   84.24  5795.7   84.11  5815.7   84.27  5835.7   84.27
  5855.7   84.24  5875.7   84.24  5895.7   83.94  5915.7   83.58  5955.7   83.58
  5975.7   83.45  5995.7   84.24  6035.7   84.24  6055.7    84.3  6075.7   84.37
  6095.7   84.46  6115.7   84.43  6135.7   84.43  6155.7   84.56  6235.7   84.56
  6255.7   84.49  6275.7   84.53  6295.7   84.56  6315.7   84.53  6335.7   84.53
  6355.7   84.36  6375.7    84.3  6395.7   84.33  6415.7   84.23  6435.7   84.23
  6455.7   84.13  6475.7   84.33  6495.7   84.43  6515.7   84.39  6535.7   84.39
  6555.7   84.49  6575.7   84.46  6595.7   84.36  6615.7   84.32  6635.7   84.32
  6655.7   84.26  6675.7   84.32  6695.7   84.26  6715.7   84.19  6775.7   84.19
  6795.7   84.32  6835.7   84.32  6855.7   84.42  6875.7   84.26  6895.7   84.26
  6915.7   84.42  6935.7   84.42  6955.7   84.45  6975.7   84.42  6995.7   84.15
  7015.7   84.12  7035.7   84.12  7055.7   84.02  7075.7   83.92  7095.7   83.76
  7115.7   83.63  7135.7   83.63  7155.7   83.23  7175.7   83.23  7195.7    83.2
  7215.7   83.13  7235.7   83.13  7255.7    83.1  7275.7    83.1  7295.7   82.94
  7315.7   83.49  7335.7   83.49  7355.7   83.53  7424.7   79.88  7446.7   87.21
  7461.7   91.41  7475.7   91.67  7484.7   91.79  7495.7   84.68  7513.7   74.92
  7575.7   79.98  7595.7   90.67  7615.7      89  7635.7      89  7655.7   82.37
  7675.7   82.08  7695.7   82.99  7735.7   80.93  7755.7    80.7  7775.7   80.83
  7795.7   81.12  7815.7   81.09  7835.7   81.09  7855.7   81.05  7915.7   81.05
  7935.7   81.02  7955.7   80.95  7975.7   80.99  8015.7   80.85  8055.7   80.82
  8075.7   80.89  8095.7   81.21  8115.7   81.21  8135.7   81.77  8155.7   81.31
  8175.7   81.31  8215.7   75.93  8235.7    73.6  8255.7   79.11  8275.7   80.06
  8295.7   82.03  8315.7   82.03  8335.7   80.59  8355.7   79.67  8435.7   79.73
  8455.7   79.79  8475.7   79.76  8495.7    79.7

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2331.02     .07 2419.56    .025 2616.35     .07  2655.7    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2340.85  2655.7          2220.46 2174.42  1705.8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2340.85   78.03       T
  2655.7  8495.7    79.5       T
Left Levee      Station=       0      Elevation=   93.31
Right Levee     Station=  7484.7      Elevation=   91.79

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             91.82    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                 0.066      0.045     0.066
  W.S. Elev (ft)             91.76    Reach Len. (ft)          2220.46    2174.42   1705.80
  Crit W.S. (ft)             82.62    Flow Area (sq ft)       29581.02    9043.13  46845.91
  E.G. Slope (ft/ft)      0.000126    Area (sq ft)            29886.03    9043.13  48953.12
  Q Total (cfs)           125000.00     Flow (cfs)             40686.91   30454.36  53858.74
  Top Width (ft)           7468.67    Top Width (ft)          2326.98     314.85   4826.84
  Vel Total (ft/s)            1.46    Avg. Vel. (ft/s)           1.38       3.37      1.15
  Max Chl Dpth (ft)          35.96    Hydr. Depth (ft)          12.71      28.72      9.71
  Conv. Total (cfs)       11132380.0     Conv. (cfs)            3623538.0  2712237.0 4796609.0
```

Length Wtd. (ft)	2003.01	Wetted Per. (ft)	2329.95	329.94	4830.09
Min Ch El (ft)	55.80	Shear (lb/sq ft)	0.10	0.22	0.08
Alpha	1.85	Stream Power (lb/ft s)	0.14	0.73	0.09
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	21840.42	15573.41	15582.00
C & E Loss (ft)	0.02	Cum SA (acres)	6079.98	833.09	4148.59

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 130.51

INPUT
Description: Cross-Section data supplemented on the right by IBWC cross-section
131.51 from station. 3443.55=3685-241.45 feet (the approximate
difference at the relative location). Bathymetric elevations
translated from IBWC 2008 Cross-sections
Station Elevation Data num= 308

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	90.48	3.28	91.15	6.56	91.48	16.4	91.84	22.96	91.59
26.24	91.09	29.52	90.2	42.64	85.66	52.47	81.85	55.75	81.18
62.31	80.34	65.59	80.16	72.15	80.28	78.71	80.16	101.67	80.41
114.79	80.16	127.91	80.2	137.74	80.35	147.58	80.22	154.14	80.32
160.7	80.22	173.82	80.3	180.38	80.19	190.22	80.32	206.62	80.37
219.73	80.22	242.69	80.4	259.09	80.24	291.89	80.23	314.84	80.19
331.24	80.27	344.36	80.21	364.04	80.26	383.72	80.23	400.11	80.32
406.67	80.22	423.07	80.18	432.91	80.28	449.31	80.29	459.15	80.2
465.71	80.26	488.66	80.11	498.5	80.2	505.06	80.04	511.62	80.18
521.46	80.12	534.58	80.18	557.54	80.09	570.65	80.21	580.49	80.08
603.45	80.18	610.01	80.09	632.97	80.18	649.36	80.05	675.6	80.2
685.44	80.11	695.28	80.2	714.96	80.07	734.63	80.17	741.19	80.09
757.59	80.13	764.15	80.31	770.71	80.17	780.55	80.29	793.67	80.24
800.23	80.32	806.79	80.18	816.62	80.25	823.18	80.11	839.58	80.19
849.42	80.12	855.98	80.19	872.38	80.05	892.06	80.06	898.61	80.14
911.73	80.01	918.29	80.1	928.13	80.05	944.53	80.11	954.37	80
967.49	80.14	977.33	80.06	997	80.04	1003.56	80.21	1019.96	80
1023.24	80.13	1036.36	80.04	1042.92	80.11	1052.76	80	1069.15	80.03
1082.27	80.14	1085.55	80.05	1101.95	79.99	1115.07	80.08	1121.63	80.01
1131.47	80.11	1141.31	79.93	1160.98	79.91	1164.26	79.99	1187.22	80.09
1193.78	79.98	1200.34	80.07	1213.46	80.01	1249.53	80.18	1269.21	80.58
1275.77	80.61	1285.61	80.12	1302.01	80.15	1311.84	80	1324.96	79.96
1347.92	80.11	1374.16	80.04	1393.83	80.14	1400.39	80.04	1406.95	80.11
1420.07	80.01	1423.35	80.11	1439.75	80.06	1449.59	80.14	1456.15	80.06
1492.22	80.09	1515.18	80.06	1528.3	80.11	1554.54	80.06	1564.37	80.16
1570.93	80.09	1613.57	80.19	1620.13	80.11	1646.36	80.23	1656.2	80.12
1679.16	80.29	1685.72	80.18	1702.12	80.24	1705.4	80.32	1718.52	80.18
1738.19	80.29	1741.47	80.16	1754.59	80.31	1761.15	80.17	1787.39	80.25
1793.95	80.32	1810.34	80.29	1816.9	80.35	1830.02	80.25	1836.58	80.38
1856.26	80.2	1862.82	80.29	1879.22	80.21	1889.05	80.37	1892.33	80.19
1912.01	80.34	1921.85	80.19	1928.41	80.38	1941.53	80.27	1948.09	80.39
1964.48	80.28	1967.76	80.38	1974.32	80.24	1994	80.4	2000.56	80.27
2007.12	80.38	2013.68	80.26	2020.24	80.38	2030.08	80.29	2043.2	80.44
2046.48	80.32	2066.15	80.51	2079.27	80.35	2102.23	80.48	2112.07	80.28
2128.47	80.4	2148.15	80.32	2154.71	80.45	2167.82	80.42	2177.66	80.51
2180.94	80.39	2187.5	80.6	2200.62	80.43	2207.18	80.54	2223.58	80.42
2230.14	80.54	2243.26	80.42	2249.82	80.54	2256.38	80.41	2276.05	80.47
2285.89	80.34	2289.17	80.54	2305.57	80.35	2308.85	80.45	2328.53	80.4
2331.81	80.5	2351.49	80.53	2364.61	80.43	2381	80.45	2397.4	80.58
2407.24	80.45	2423.64	80.6	2449.88	80.56	2459.72	80.65	2466.28	80.55
2479.4	80.68	2489.23	80.54	2508.91	80.6	2525.31	80.59	2535.15	80.74
2554.83	80.6	2564.67	80.73	2567.95	80.66	2607.3	80.72	2613.86	80.64
2630.26	80.63	2636.82	80.76	2643.38	80.68	2649.94	80.77	2666.34	80.68
2679.46	80.92	2689.3	80.7	2702.42	80.76	2718.81	80.95	2728.65	81.21
2741.77	81.28	2745.05	81.72	2751.61	83.14	2754.89	83.33	2761.45	82.97
2768.01	83.59	2771.29	83.21	2777.84	81.72	2784.4	81.26	2790.96	81.44
2800.8	80.93	2813.92	80.77	2820.48	80.98	2830.31	80.98	2843.43	81.14
2849.99	80.93	2856.55	81.06	2863.11	80.81	2866.39	80.88	2872.94	80.49
2879.5	80.55	2905.74	80.3	2912.3	80.36	2931.97	80.19	2954.93	80.52
2964.77	80.4	3007.4	80.18	3013.96	80.24	3020.51	80.85	3033.63	81.15
3043.47	82.14	3050.03	82.12	3053.31	81.73	3056.59	80.19	3063.15	75.83
3066.43	73.85	3069.71	72.3	3076.26	68.73	3082.82	64.51	3086.1	62.69
3089.38	62.17	3093.38	61.85	3103.38	58.35	3113.38	57.85	3123.38	57.55
3133.38	57.35	3143.38	57.25	3153.38	57.75	3163.38	57.85	3173.38	58.15
3193.38	58.35	3203.38	59.05	3213.38	58.85	3223.38	58.85	3233.38	58.95
3253.38	59.55	3263.38	60.35	3273.38	60.85	3295.98	62.17	3299.26	62.24
3305.82	64.16	3309.1	66.18	3312.38	67.63	3315.66	68.74	3322.21	70.46
3328.77	71.19	3335.33	72.63	3341.89	74.65	3348.45	77.62	3351.73	78.68
3355.01	78.85	3368.12	77.95	3374.68	77.38	3394.36	77.68	3414.04	77.33
3417.32	77.15	3430.43	75.94	3436.99	75.57	3443.55	75.39	3482.55	76.53
3996.55	78.75	4158.55	76.74	4589.55	77.24	5039.55	74.54	5134.55	84.24
5439.55	82.44	5440.55	92.74	7263.55	92.74				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.074	3050.03	.066	3082.82	.015	3305.82	.066	3355.01	.067

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3050.03	3355.01	1031.28	2400.25 3908.06	.1	.3

Left Levee Station= 16.4 Elevation= 91.84
Right Levee Station= 7263.55 Elevation= 92.74
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
18.03	2767.32	83.58	3997.75	5304.79	78.71

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	91.47	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.26	Wt. n-Val.	0.074	0.034	0.067	
W.S. Elev (ft)	91.21	Reach Len. (ft)	1031.28	2400.25	3908.06	
Crit W.S. (ft)	82.62	Flow Area (sq ft)	23777.71	8621.96	25289.08	
E.G. Slope (ft/ft)	0.000226	Area (sq ft)	23777.71	8621.96	25289.08	
Q Total (cfs)	125000.00	Flow (cfs)	28356.07	52277.38	44366.54	
Top Width (ft)	5414.95	Top Width (ft)	3024.58	304.98	2085.39	
Vel Total (ft/s)	2.17	Avg. Vel. (ft/s)	1.19	6.06	1.75	
Max Chl Dpth (ft)	33.96	Hydr. Depth (ft)	7.86	28.27	12.13	
Conv. Total (cfs)	8318418.0	Conv. (cfs)	1887021.0	3478921.0	2952476.0	
Length Wtd. (ft)	2594.53	Wetted Per. (ft)	3026.26	313.86	2093.80	
Min Ch El (ft)	57.25	Shear (lb/sq ft)	0.11	0.39	0.17	

Alpha	3.58	Stream Power (lb/ft s)	0.13	2.35	0.30
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	20472.67	15132.51	14128.35
C & E Loss (ft)	0.08	Cum SA (acres)	5943.58	817.62	4013.25

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.3

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85.91	6.56	88.46	9.84	89.47	16.39	90.89	19.67	91.17
32.79	91.6	36.07	91.48	39.35	91.06	42.62	90.37	45.9	89.42
55.74	86.27	59.02	84.98	65.58	82.22	68.85	81.29	72.13	80.64
78.69	79.89	85.25	79.92	95.08	79.53	104.92	79.55	111.48	79.39
127.87	79.26	134.43	79.29	147.55	79.23	154.1	79.32	163.94	79.17
183.61	79.16	190.17	79.08	200.01	79.14	213.12	79.12	219.68	79.04
239.35	79.21	259.02	79.12	278.7	79.14	285.25	79	295.09	78.98
301.65	79.08	318.04	79.01	321.32	78.95	334.44	78.95	340.99	79.03
350.83	78.93	357.39	78.93	363.94	79.02	377.06	78.99	383.62	79.08
396.73	78.95	413.13	79.01	422.96	78.93	429.52	78.96	442.64	78.91
465.59	78.96	475.42	78.92	491.82	79.09	501.65	78.97	508.21	79.03
521.33	78.92	534.44	78.96	541	78.91	547.56	78.96	560.67	78.86
567.23	78.98	573.79	78.9	586.9	78.92	593.46	78.98	613.13	78.94
619.69	78.97	639.36	78.9	645.92	78.95	659.04	78.96	665.59	78.87
672.15	78.96	675.43	78.89	681.99	78.96	688.54	78.86	701.66	78.88
711.5	78.82	724.61	78.89	731.17	78.82	750.84	78.92	763.96	78.79
783.63	78.87	803.3	78.91	826.25	78.81	836.09	78.85	842.65	78.96
849.21	78.87	862.32	78.83	868.88	78.9	878.71	78.9	885.27	78.77
888.55	78.87	895.11	78.82	901.67	78.86	908.22	78.8	914.78	78.85
921.34	78.77	934.45	78.82	941.01	78.77	950.85	78.86	957.41	78.74
967.24	78.84	973.8	78.79	980.36	78.89	993.47	78.81	1000.03	78.72
1009.87	78.71	1019.7	78.9	1026.26	78.82	1049.21	78.73	1052.49	78.76
1065.6	78.68	1075.44	78.78	1082	78.66	1098.39	78.7	1108.23	78.65
1114.79	78.74	1121.34	78.68	1131.18	78.74	1134.46	78.68	1141.02	78.74
1147.57	78.69	1170.53	78.67	1180.36	78.58	1186.92	78.59	1203.31	78.81
1213.15	78.76	1216.43	78.83	1229.54	78.72	1232.82	78.77	1239.38	78.67
1245.94	78.73	1252.5	78.68	1262.33	78.77	1265.61	78.71	1272.17	79.01
1278.73	79.22	1282	79.23	1298.4	79.63	1304.96	79.47	1311.51	79.47
1318.07	79.56	1321.35	79.47	1337.74	79.41	1344.3	79.51	1350.86	79.38
1360.7	79.48	1363.97	79.36	1370.53	79.42	1380.37	79.33	1386.93	79.52
1400.04	79.36	1409.88	79.39	1413.16	79.32	1419.71	79.45	1436.11	79.41
1445.94	79.48	1452.5	79.39	1462.34	79.4	1482.01	79.52	1495.1	79.43
1511.46	79.49	1518.01	79.43	1537.64	79.43	1547.45	79.31	1550.73	79.4
1560.54	79.48	1563.81	79.43	1576.9	79.5	1586.72	79.44	1589.99	79.48
1603.08	79.45	1609.62	79.53	1622.71	79.59	1635.8	79.49	1645.61	79.62
1652.15	79.59	1668.51	79.68	1675.06	79.57	1684.87	79.66	1688.15	79.61
1704.5	79.56	1707.78	79.63	1724.14	79.49	1750.31	79.63	1756.85	79.53
1769.94	79.53	1773.21	79.6	1779.76	79.48	1786.3	79.62	1805.93	79.52
1822.29	79.56	1832.11	79.63	1838.65	79.58	1851.74	79.62	1864.83	79.49
1877.91	79.56	1891	79.53	1900.82	79.65	1920.45	79.61	1930.26	79.71
1933.54	79.63	1946.62	79.63	1962.98	79.52	1966.25	79.63	1976.07	79.59
1985.89	79.71	1998.97	79.62	2015.33	79.67	2018.6	79.74	2025.15	79.62
2044.78	79.5	2048.05	79.55	2067.68	79.53	2077.5	79.6	2087.31	79.48
2097.13	79.53	2113.49	79.74	2120.03	79.64	2126.58	79.8	2129.85	80.13
2139.66	81.63	2142.94	82.02	2149.48	82.31	2156.02	82.21	2159.3	82.25
2162.57	82.06	2169.11	81.14	2178.93	80.68	2188.74	80.49	2201.83	80.35
2224.73	80.24	2234.55	80.55	2244.36	80.28	2260.72	80.36	2267.27	80.2
2277.08	80.17	2280.36	80.07	2286.9	80.3	2290.17	80.29	2296.72	80.07
2306.53	79.97	2309.8	80.11	2322.89	81.58	2329.43	81.82	2335.98	82.19
2339.25	82.11	2342.52	81.53	2345.79	80.64	2349.07	79.39	2355.61	77.67
2362.15	76.62	2365.43	76.27	2371.97	75.98	2375.24	75.33	2378.51	74.41
2381.78	72.97	2391.6	67.73	2398.14	63.26	2405.42	60.29	2415.42	56.79
2425.42	56.29	2435.42	55.99	2445.42	55.79	2455.42	55.69	2465.42	56.19
2475.42	56.29	2485.42	56.59	2505.42	56.79	2515.42	57.49	2525.42	57.29
2535.42	57.29	2545.42	57.39	2565.42	57.99	2575.42	58.79	2585.42	59.29
2595.42	61.93	2601.13	62.1	2604.4	62.5	2607.68	63.97	2614.23	67.64
2617.51	69.21	2624.06	71.84	2630.62	73.29	2637.17	74.29	2650.28	75.99
2656.83	76.49	2669.94	77.77	2673.22	78.48	2676.49	79.56	2679.77	80.38
2683.05	80.79	2689.6	80.56	2699.43	80.35	2702.71	80.12	2709.26	80.07
2715.81	80.14	2725.64	80.01	2738.75	79.94	2758.41	80.04	2774.79	79.74
2784.62	79.81	2794.46	79.5	2801.01	79.5	2807.56	79.67	2814.12	79.98
2823.95	79.67	2830.5	79.76	2840.33	79.74	2846.88	79.86	2856.71	79.59
2866.54	79.21	2879.65	79.12	2905.86	79.04	2909.14	79.13	2925.53	78.91
2928.8	78.96	2938.63	78.87	2964.85	78.85	2971.4	79.03	2974.68	79.01
2977.95	79.22	2984.51	79.45	2994.34	79.68	3004.17	80.3	3010.72	80.87
3014	81.45	3020.55	81.74	3023.83	81.76	3027.1	81.59	3033.66	81.56
3050.04	81.31	3063.15	81.44	3079.53	81.34	3092.64	81.42	3095.92	81.36
3105.75	81.43	3118.85	81.43	3141.79	81.19	3154.9	81.36	3164.73	81.27
3174.56	81.27	3181.11	81.33	3187.66	81.23	3194.22	81.24	3210.6	81.12
3217.15	81.18	3220.43	81.09	3230.26	81.15	3246.64	81.04	3253.2	81.12
3259.75	81.04	3289.24	81.09	3292.52	81.01	3299.07	81.05	3305.63	80.97
3312.18	80.77	3318.73	80.83	3331.84	80.74	3344.95	80.79	3351.5	80.53
3367.88	80.35	3374.44	80.41	3380.99	80.26	3387.54	79.76	3397.37	79.93
3403.93	79.55	3407.21	79.52	3420.31	79.73	3426.87	80.36	3430.14	80.39
3436.7	79.5	3439.97	79.46	3446.53	80.22	3449.8	80.37	3453.08	80.22
3456.36	79.88	3466.19	79.55	3472.74	79.64	3482.57	79.92	3489.12	79.99
3495.68	80.29	3502.23	79.97	3512.06	79.7	3521.89	79.86	3535	79.92
3538.27	79.99	3548.11	79.77	3551.38	79.89	3564.49	79.67	3571.04	79.14
3577.6	79.61	3580.87	79.73	3593.98	78.41	3597.26	78.38	3603.81	78.54
3616.92	78.37	3623.47	78.41	3630.02	78.31	3636.58	78.32	3643.13	78.48
3652.96	78.53	3659.51	78.46	3666.07	78.52	3675.9	78.48	3682.45	78.52
3692.28	78.47	3698.83	78.51	3705.39	78.42	3718.5	78.4	3725.05	78.31
3731.6	78.4	3741.43	78.27	3747.99	78.29	3757.82	78.41	3764.37	78.32
3770.92	78.41	3777.48	78.34	3787.21	78.44	3793.7	78.37	3800.19	78.46
3809.93	78.39	3826.15	78.54	3835.89	78.33	3842.38	78.3	3845.62	78.43
3852.11	78.45	3858.6	78.6	3868.34	78.54	3874.83	78.33	3878.07	78.12
3884.56	78.57	3887.81	78.99	3891.05	80	3894.3	80.65	3904.04	81.17
3917.02	81.66	3930	83.51	3936.49	84.78	3939.73	85.74	3942.98	86.99
3949.47	89.85	3952.71	90.46	3962.45	90.78	3975.43	90.57	3978.67	90.35
3981.92	89.85	3985.16	88.87	3991.65	86.34	3994.9	85.51	4007.88	82.92
4011.12	82.55	4014.37	82.95	4020.86	84.36	4024.1	84.88	4027.35	84.84
4030.59	84.2	4037.08	82.4	4040.33	81.79	4046.82	81.24	4050.06	80.78

Manning's n Values num= 6

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     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .068 2306.53    .068 2335.98    .066 2398.14    .025 2607.68    .066
 2683.05     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2335.98 2683.05          1060.66    1050 1065.26             .1       .3
Left Levee      Station=   32.79      Elevation=    91.6
Right Levee     Station= 3962.45      Elevation=   90.78
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
    2.82 2152.11   82.35

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             91.14    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                 0.068      0.044      0.060
  W.S. Elev (ft)             91.14    Reach Len. (ft)          1060.66    1050.00    1065.26
  Crit W.S. (ft)             64.28    Flow Area (sq ft)       20370.49    9245.13   14644.21
  E.G. Slope (ft/ft)      0.000010    Area (sq ft)            20370.49    9245.13   14644.21
  Q Total (cfs)           20000.00    Flow (cfs)               5958.54    8570.24    5471.22
  Top Width (ft)           4011.31    Top Width (ft)           2297.23     347.07    1367.01
  Vel Total (ft/s)            0.45    Avg. Vel. (ft/s)            0.29       0.93       0.37
  Max Chl Dpth (ft)          35.45    Hydr. Depth (ft)            8.87      26.64      10.71
  Conv. Total (cfs)       6398275.0    Conv. (cfs)              1906220.0   2741739.0   1750317.0
  Length Wtd. (ft)         1056.44    Wetted Per. (ft)         2299.00     355.59    1381.20
  Min Ch El (ft)             55.69    Shear (lb/sq ft)            0.01       0.02       0.01
  Alpha                       2.12    Stream Power (lb/ft s)      0.00       0.01       0.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)    19950.07   14640.25   12337.01
  C & E Loss (ft)             0.00    Cum SA (acres)           5880.59     799.65    3858.38


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 129.27

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   90.91    3.26   90.28    9.78    88.6   13.04   87.45    16.3   86.38
   19.56   85.23   26.07   82.77   29.33   81.82   32.59   81.11   35.85   80.54
   39.11   80.03   42.37   79.62   45.63   79.48   52.15   79.36   61.92    78.9
   78.22   78.88      88    78.8  101.03   78.86  114.07   78.78  120.59    78.8
  123.85   78.75  130.37    78.8  136.88   78.72  146.66   78.73  153.18   78.68
   159.7   78.75  162.96   78.74  172.74   78.79  182.51   78.75  189.03    78.8
  195.55   78.78  205.33    78.7  211.85   78.82  218.36   78.73  221.62   78.79
  224.88   78.78  228.14   78.66   231.4   78.65  237.92   78.75  244.44   78.68
  254.21   78.73  267.25   78.57  270.51    78.6  273.77   78.57  277.03   78.64
  283.55   78.67  286.81   78.63  293.32   78.63  296.58   78.67   303.1   78.57
  306.36   78.61  312.88   78.59  316.14   78.54  329.18   78.58  335.69   78.64
  342.21   78.58  345.47   78.59  358.51   78.55  365.03   78.64  368.29    78.6
   374.8   78.62  378.06   78.66  384.58   78.54  387.84   78.64   391.1   78.55
  397.62    78.6  400.88   78.55  404.14   78.59   407.4   78.54  413.91   78.61
  417.17   78.56  423.69    78.6  426.95   78.51  433.47   78.59  436.73   78.53
  443.25   78.51  446.51   78.47  453.02    78.6  459.54   78.59  466.06    78.5
  472.58   78.58   479.1    78.5  485.62   78.54  492.16   78.48   498.7   78.45
  501.97   78.48  505.25   78.41  511.79   78.48  515.06   78.43  521.61   78.54
  524.88   78.43  528.15    78.4  531.42   78.47  541.24   78.47  547.78   78.35
   557.6   78.26  567.41   78.39  570.68   78.39  577.23   78.32   580.5   78.35
  587.04   78.25  590.32   78.25  593.59   78.31  596.86   78.25   603.4   78.22
  613.22   78.38  616.49   78.36  619.76   78.25  629.58   78.26  632.85   78.23
  642.67   78.24  649.21   78.23  652.48   78.26  659.03   78.27   662.3   78.31
  668.84   78.27  675.39   78.26   685.2   78.31  688.47   78.23  695.02   78.22
  698.29   78.19  704.83   78.27  711.38    78.3  721.19   78.17  731.01   78.15
  734.28   78.18  740.82   78.14  747.37   78.17  753.91   78.14  757.18   78.22
  760.45   78.22     767   78.08  773.54   78.14  776.81   78.11  786.63   78.13
   789.9    78.1  796.45   78.16  799.72    78.1  809.53   78.12  812.81   78.18
  816.08   78.16  822.62   78.22  829.16   78.13  832.44   78.11  842.25   78.11
   848.8   78.15  855.34   78.12  858.61   78.15  861.88    78.1  881.52   78.05
  888.06   77.98  904.42   78.07  910.96   78.03  917.51   77.95  924.05   77.95
  933.87      78  940.41   77.94  943.68      78  946.95   77.96   953.5   77.96
  956.77   78.01  963.31   78.02  966.58   77.99  969.86   78.02  973.13   77.97
   976.4   77.98  982.94   78.07  989.49      78  996.03    78.1   999.3   77.97
 1002.58   77.92 1005.85   77.94 1012.39   77.91 1018.94   77.97 1022.21   78.06
 1025.48   77.93 1028.75   77.88  1035.3   77.89 1038.57   77.83 1045.11   77.86
 1051.65   77.74 1054.93   77.88  1058.2    77.8 1068.01   77.85 1071.29   77.83
 1074.56   77.69 1077.83   77.78  1081.1   77.74 1087.65   77.86 1100.73   78.18
 1107.28   78.43 1117.09   78.69 1123.64   78.81 1126.91   78.96 1130.18   79.34
 1133.45   79.86    1140   82.07 1143.27   82.38 1146.54   82.43 1149.81   82.57
 1156.36   82.59 1159.63   82.38  1162.9   81.85 1169.44   80.56 1172.71   80.05
 1175.99   79.77 1182.53    79.3  1185.8   79.14 1192.35   78.63 1198.89   78.02
 1202.16   77.79 1205.43   77.77 1215.25    77.6 1218.52   77.59 1225.07   77.76
 1228.34   77.73 1234.88   77.42 1241.42   77.31 1247.97   77.45 1251.24   77.45
 1254.51   77.52 1261.06   77.56  1267.6    77.5 1270.87   77.44 1277.42   77.42
 1283.96   77.49 1287.23   77.66 1293.78   77.57 1297.05   77.36 1300.32   77.28
 1306.86   77.33 1310.14   77.43 1316.68   77.51 1323.22   77.52 1329.77   77.69
 1333.04   77.55 1339.58    77.5 1342.85    77.4 1346.13   77.19 1352.67   77.16
 1375.57   77.83 1378.85   77.87 1382.12   77.81 1385.39   77.86 1388.66   78.16
 1391.93   78.31  1395.2   78.33 1398.48   78.16 1401.75   78.12 1408.29   78.32
 1411.56   78.35 1418.11   78.56 1421.38   78.55 1427.92   78.65 1437.74   79.21
 1441.01   79.37 1444.28   79.44 1450.83   79.23  1454.1   79.24 1457.37   79.34
 1463.91   79.46 1470.46   79.74 1473.73   79.91    1477   79.99 1480.27   80.01
 1483.55   79.37 1486.82   78.49 1490.09   77.45 1493.36   76.03 1499.91   72.27
 1503.18   70.31 1506.45   69.01 1509.72   68.18 1512.99   67.61 1516.26   67.13
 1519.54   66.45 1522.81   64.75 1526.08   62.77 1529.35   55.65 1531.07    55.7
 1542.07   55.41 1547.07    55.3 1560.07    55.2 1572.07      55 1584.07    55.3
 1597.07    55.7 1609.07      56 1621.07    55.4 1624.07    55.6 1631.07   56.01
 1632.07    56.1 1638.07   56.24 1643.07    56.4 1651.07   56.53 1654.07    56.6
 1657.07   56.83 1663.07   57.37 1664.07    57.5 1674.07    57.7 1683.07    57.7
 1693.23   61.85 1696.51   62.01 1699.79   63.27 1703.07   64.97 1706.35   66.87
 1709.63   68.48 1716.19      71 1719.47   72.38 1722.75   73.93 1726.03   74.72
 1732.59   75.91 1735.87   76.53 1739.15   76.91 1742.44   77.04    1749   76.95
 1755.56   76.99 1758.84   76.93 1762.12   77.04 1771.96   77.97 1775.24    78.3
 1778.52   78.56  1781.8   78.94 1788.36   81.33 1791.64   82.07 1794.92   82.13
 1801.49   81.23 1804.77   81.03 1808.05    81.1 1811.33   81.08 1814.61   80.82
 1817.89   80.49 1821.17    80.3 1824.45   80.28 1827.73   80.31 1831.01   80.23
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 1840.85    80.2 1844.13   80.25 1850.69   80.19 1853.98   80.24 1863.82   80.17
 1870.38   80.21 1876.94    80.2 1880.22   80.13 1886.78   80.11 1890.06   80.15
 1896.62   80.17  1899.9   80.09 1906.47   80.09 1913.03   80.02 1916.31   80.03
 1919.59   79.98 1929.43   79.97 1932.71   80.05 1935.99   80.05 1939.27   79.96
 1942.55   79.97 1949.11   79.88 1952.39   79.86 1958.95   79.96 1972.08      80
 1975.36   79.93  1985.2   79.85 1988.48   79.87 1995.04   79.86  2001.6   79.79
 2008.16   79.83 2014.72   79.84 2021.29   79.78 2027.85   79.76 2034.41    79.7
 2040.97   79.73 2044.25    79.7 2047.53    79.6 2054.09   79.66 2057.37   79.62
 2060.65    79.7 2063.93   79.73  2070.5   79.63 2077.06   79.59 2083.62   79.71
  2086.9   79.64 2090.18    79.7 2093.46    79.7 2100.02   79.61  2103.3   79.59
 2109.86   79.65 2113.14   79.74 2116.43   79.74 2122.99   79.64 2132.83   79.64
 2136.11   79.66 2139.39   79.74 2142.67   79.72 2145.95   79.63 2152.51   79.63
 2159.07   79.71 2168.92   79.66  2172.2   79.73 2178.76   79.62 2185.32    79.7
 2191.88   79.65 2195.16   79.68 2208.28    79.6 2218.13    79.7 2227.97   79.63
 2234.53   79.63 2241.09   79.69 2247.65   79.71 2250.93   79.66  2257.5   79.71
 2260.78   79.67 2267.34    79.7  2273.9    79.7 2280.46   79.67 2287.02   79.74
 2293.58   79.75 2300.14   79.72 2303.43   79.79 2309.99   79.69 2313.27   79.72
 2319.83    79.7 2323.11   79.64 2329.67   79.68 2332.95   79.61 2339.51   79.67
 2346.07   79.61 2355.92   79.65 2362.48   79.75 2369.04   79.64 2378.88   79.82
 2382.16   79.81 2388.72   79.92 2395.28   79.95 2398.56   80.03 2401.85   80.03
 2408.41   79.88 2411.69   79.92 2414.97   80.02 2418.25   80.23 2421.53   80.54
 2424.81   80.76 2431.37   81.32 2434.65   81.55 2437.93    81.9 2441.21   82.42
 2444.49   83.11 2447.78   83.93 2451.06   84.93 2454.34   85.99 2457.62    87.1
  2460.9   88.36 2464.18   89.36 2467.46   89.84 2470.74      90 2474.02    90.4
  2477.3   90.62 2483.86   90.72 2487.14   90.73 2490.42   90.68

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085    3.26    .066 1156.36     .07    1477     .07 1493.36    .025
 1709.63     .07 1791.64    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1480.27 1791.64           704.22    1050 1152.61             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 1480.27   80.01       T
 1791.64 2490.42   82.07       T
Left Levee      Station=       0      Elevation=   90.91
Right Levee     Station= 2487.14      Elevation=   90.73

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             91.13    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                0.067      0.041      0.066
  W.S. Elev (ft)             91.12    Reach Len. (ft)          704.22    1050.00    1152.61
  Crit W.S. (ft)             63.97    Flow Area (sq ft)       16162.79    8359.71    6020.56
  E.G. Slope (ft/ft)      0.000016    Area (sq ft)            18527.76    8359.71    7412.94
  Q Total (cfs)           20000.00    Flow (cfs)               7112.13   10600.92    2286.95
  Top Width (ft)           2490.42    Top Width (ft)           1480.27     311.37     698.78
  Vel Total (ft/s)            0.65    Avg. Vel. (ft/s)            0.44       1.27       0.38
  Max Chl Dpth (ft)          36.12    Hydr. Depth (ft)           10.92      26.85       8.62
  Conv. Total (cfs)       4973221.0    Conv. (cfs)              1768509.0  2636036.0   568675.7
  Length Wtd. (ft)           994.39    Wetted Per. (ft)         1483.07     324.03     700.60
  Min Ch El (ft)              55.00    Shear (lb/sq ft)            0.01       0.03       0.01
  Alpha                        2.19    Stream Power (lb/ft s)      0.00       0.03       0.00
  Frctn Loss (ft)              0.02    Cum Volume (acre-ft)    19476.49   14428.07   12067.30
  C & E Loss (ft)              0.01    Cum SA (acres)           5834.60     791.72    3833.12


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 129.23

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      34
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.64    3275   91.64    3307   91.64    3308   81.64    3320   74.54
    3327   73.84    3332   66.34    3336   64.82    3345   61.39    3349   59.74
    3359   56.24    3369   55.74    3379   55.44    3389   55.24    3399   55.14
    3409   55.64    3419   55.74    3429   56.04    3439   56.14    3449   56.24
    3459   56.94    3469   56.74    3479   56.74    3489   56.84    3509   57.44
    3519   58.24    3529   58.74    3539   61.38    3541   63.54    3553   64.86
    3571   66.84    3615   76.74    3616   91.64    7505   91.64

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .144    3275    .144    3308    .066    3336    .025    3553    .066
    3615     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          3308    3615            57.04      70   79.73             .1       .3
Left Levee      Station=       0      Elevation=   91.64
Right Levee     Station=    7505      Elevation=   91.64

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             91.10    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                0.144      0.040      0.060
  W.S. Elev (ft)             91.02    Reach Len. (ft)           57.04      70.00      79.73
  Crit W.S. (ft)             63.74    Flow Area (sq ft)          4.40    9055.73       6.85
  E.G. Slope (ft/ft)      0.000040    Area (sq ft)               4.40    9055.73       6.85
  Q Total (cfs)           20000.00    Flow (cfs)                 0.17   19999.17       0.66
  Top Width (ft)            308.90    Top Width (ft)             0.94     307.00       0.96
  Vel Total (ft/s)            2.21    Avg. Vel. (ft/s)           0.04       2.21       0.10
  Max Chl Dpth (ft)          35.88    Hydr. Depth (ft)           4.69      29.50       7.14
  Conv. Total (cfs)       3154924.0    Conv. (cfs)               27.3   3154793.0      103.7
  Length Wtd. (ft)            70.00    Wetted Per. (ft)           9.43     317.51      14.32
  Min Ch El (ft)              55.14    Shear (lb/sq ft)           0.00       0.07       0.00
  Alpha                        1.00    Stream Power (lb/ft s)     0.00       0.16       0.00
  Frctn Loss (ft)              0.00    Cum Volume (acre-ft)    19326.69   14218.18   11969.14
  C & E Loss (ft)              0.00    Cum SA (acres)           5822.62     784.26    3823.86
```

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.22

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.64	3275	91.64	3307	91.64	3308	81.64	3320	74.54
3327	73.84	3332	66.34	3336	64.82	3345	61.39	3349	59.74
3359	56.24	3369	55.74	3379	55.44	3389	55.24	3399	55.14
3409	55.64	3419	55.74	3429	56.04	3439	56.14	3449	56.24
3459	56.94	3469	56.74	3479	56.74	3489	56.84	3509	57.44
3519	58.24	3529	58.74	3539	61.38	3541	63.54	3553	64.86
3571	66.84	3615	76.74	3616	91.64	7505	91.64		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.144	3275	.144	3308	.066	3336	.025	3553	.066
3615	.06								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
3308 3615 79.88 70 67.66 .1 .3
Left Levee Station= 0 Elevation= 91.64
Right Levee Station= 7505 Elevation= 91.64

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	91.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.144	0.040	0.060
W.S. Elev (ft)	91.02	Reach Len. (ft)	79.88	70.00	67.66
Crit W.S. (ft)	63.74	Flow Area (sq ft)	4.40	9054.85	6.84
E.G. Slope (ft/ft)	0.000040	Area (sq ft)	4.40	9054.85	6.84
Q Total (cfs)	20000.00	Flow (cfs)	0.17	19999.17	0.66
Top Width (ft)	308.90	Top Width (ft)	0.94	307.00	0.96
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)	0.04	2.21	0.10
Max Chl Dpth (ft)	35.88	Hydr. Depth (ft)	4.69	29.49	7.14
Conv. Total (cfs)	3154418.0	Conv. (cfs)	27.3	3154287.0	103.6
Length Wtd. (ft)	70.03	Wetted Per. (ft)	9.43	317.51	14.31
Min Ch El (ft)	55.14	Shear (lb/sq ft)	0.00	0.07	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00	0.16	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	19326.69	14203.62	11969.13
C & E Loss (ft)	0.07	Cum SA (acres)	5822.62	783.77	3823.86

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.216

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.64	100	91.64	100	55.64	140	55.64	140	91.64
145	91.64	145	55.64	227	55.64	227	91.64	232	91.64
232	55.64	272	55.64	272	91.64	372	91.64		

Manning's n Values num= 1

Sta	n Val
0	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
145 227 15.43 20 21.58 .2 .5
Left Levee Station= 0 Elevation= 91.64
Right Levee Station= 372 Elevation= 91.64
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
100	140	87.64	232	272	87.64

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	91.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.015	0.015	0.015
W.S. Elev (ft)	90.30	Reach Len. (ft)	15.43	20.00	21.58
Crit W.S. (ft)	67.92	Flow Area (sq ft)	106.33	2841.99	106.33
E.G. Slope (ft/ft)	0.000097	Area (sq ft)	106.33	2841.99	106.33
Q Total (cfs)	20000.00	Flow (cfs)	183.58	19632.84	183.58
Top Width (ft)	162.00	Top Width (ft)	40.00	82.00	40.00
Vel Total (ft/s)	6.55	Avg. Vel. (ft/s)	1.73	6.91	1.73
Max Chl Dpth (ft)	34.66	Hydr. Depth (ft)	2.66	34.66	2.66
Conv. Total (cfs)	2026421.0	Conv. (cfs)	18600.5	1989220.0	18600.5
Length Wtd. (ft)	20.00	Wetted Per. (ft)	45.32	151.32	45.32
Min Ch El (ft)	55.64	Shear (lb/sq ft)	0.01	0.11	0.01
Alpha	1.09	Stream Power (lb/ft s)	0.02	0.79	0.02
Frctn Loss (ft)		Cum Volume (acre-ft)	19326.59	14194.07	11969.04
C & E Loss (ft)		Cum SA (acres)	5822.58	783.46	3823.83

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

INLINE STRUCTURE

RIVER: Rio Grande
REACH: Lower Reach RS: 129.215

INPUT
Description: Retamal Dam

```
Distance from Upstream XS =       5
Deck/Roadway Width        =       5
Weir Coefficient          =    3.58
 Weir Embankment Coordinates    num =        2
     Sta    Elev     Sta    Elev
       0   91.64     372   91.64

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins        =
Weir crest shape                           =  Ogee

INLINE STRUCTURE GATE    Gate #1
      Height            =   13.75
      Width             =      82
      Invert            =   58.64
      Gate Type         = Radial      Radial Coefficient=      .6
      Trunion Exponent  =     .16
      Opening Exponent  =     .72
      Head Exponent     =     .62
      Trunion Height    =      24
      Weir Coefficient  =    3.58
      Weir crest shape  = Ogee
Number of Gate Openings =       1
     Sta
     186


CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 129.214

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.64     100   91.64     100   55.64     140   55.64     140   91.64
     145   91.64     145   55.64     227   55.64     227   91.64     232   91.64
     232   55.64     272   55.64     272   91.64     372   91.64

Manning's n Values        num=       1
     Sta   n Val
       0    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          145     227            25.03   25.01   25.62             .2       .5
Left Levee      Station=       0      Elevation=   91.64
Right Levee     Station=     372      Elevation=   91.64
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     100     140   87.64     232     272   87.64

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             84.40    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               1.22    Wt. n-Val.                           0.015
  W.S. Elev (ft)             83.18    Reach Len. (ft)           25.03      25.01      25.62
  Crit W.S. (ft)             67.92    Flow Area (sq ft)                  2258.03
  E.G. Slope (ft/ft)      0.000191    Area (sq ft)                       2258.03
  Q Total (cfs)           20000.00    Flow (cfs)                        20000.00
  Top Width (ft)             82.00    Top Width (ft)                       82.00
  Vel Total (ft/s)            8.86    Avg. Vel. (ft/s)                      8.86
  Max Chl Dpth (ft)          27.54    Hydr. Depth (ft)                     27.54
  Conv. Total (cfs)       1448159.0     Conv. (cfs)                     1448159.0
  Length Wtd. (ft)           25.01    Wetted Per. (ft)                    137.07
  Min Ch El (ft)             55.64    Shear (lb/sq ft)                      0.20
  Alpha                       1.00    Stream Power (lb/ft s)                1.74
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)    19326.59   14193.22   11969.04
  C & E Loss (ft)             0.23    Cum SA (acres)           5822.58     783.42    3823.82


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
         sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 129.213

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   91.64     100   91.64     100   55.64     140   55.64     140   91.64
     145   91.64     145   55.64   160.5   55.64   160.5   91.64   170.5   91.64
   170.5   55.64   201.5   55.64   201.5   91.64   211.5   91.64   211.5   55.64
     227   55.64     227   91.64     232   91.64     232   55.64     272   55.64
     272   91.64     372   91.64

Manning's n Values        num=       1
     Sta   n Val
       0    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          145     227            25.03   25.01   25.62             .2       .5
Left Levee      Station=       0      Elevation=   91.64
Right Levee     Station=     372      Elevation=   91.64
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     100     140   87.64     232     272   87.64

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             84.16    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               2.36    Wt. n-Val.                           0.015
```

W.S. Elev (ft)	81.79	Reach Len. (ft)	25.03	25.01	25.62	
Crit W.S. (ft)	70.42	Flow Area (sq ft)		1621.48		
E.G. Slope (ft/ft)	0.001074	Area (sq ft)		1621.48		
Q Total (cfs)	20000.00	Flow (cfs)		20000.00		
Top Width (ft)	62.00	Top Width (ft)		62.00		
Vel Total (ft/s)	12.33	Avg. Vel. (ft/s)		12.33		
Max Chl Dpth (ft)	26.15	Hydr. Depth (ft)		26.15		
Conv. Total (cfs)	610335.6	Conv. (cfs)		610335.6		
Length Wtd. (ft)	25.01	Wetted Per. (ft)		218.92		
Min Ch El (ft)	55.64	Shear (lb/sq ft)		0.50		
Alpha	1.00	Stream Power (lb/ft s)		6.12		
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	19326.59	14192.10	11969.04	
C & E Loss (ft)	0.00	Cum SA (acres)	5822.58	783.38	3823.82	

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.212

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.64	100	91.64	100	55.64	140	55.64	140	91.64
145	91.64	145	55.64	160.5	55.64	160.5	91.64	170.5	91.64
170.5	55.64	201.5	55.64	201.5	91.64	211.5	91.64	211.5	55.64
227	55.64	227	91.64	232	91.64	232	55.64	272	55.64
272	91.64	372	91.64						

Manning's n Values num= 1

Sta	n Val
0	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
145 227 10.01 10.01 10.25 .2 .5
Left Levee Station= 0 Elevation= 91.64
Right Levee Station= 372 Elevation= 91.64
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
100	140	87.64	232	272	87.64

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	84.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.37	Wt. n-Val.		0.015	
W.S. Elev (ft)	81.76	Reach Len. (ft)	10.01	10.01	10.25
Crit W.S. (ft)	70.42	Flow Area (sq ft)		1619.35	
E.G. Slope (ft/ft)	0.001077	Area (sq ft)		1619.35	
Q Total (cfs)	20000.00	Flow (cfs)		20000.00	
Top Width (ft)	62.00	Top Width (ft)		62.00	
Vel Total (ft/s)	12.35	Avg. Vel. (ft/s)		12.35	
Max Chl Dpth (ft)	26.12	Hydr. Depth (ft)		26.12	
Conv. Total (cfs)	609381.9	Conv. (cfs)		609381.9	
Length Wtd. (ft)	10.01	Wetted Per. (ft)		218.71	
Min Ch El (ft)	55.64	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)		6.15	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	19326.59	14191.17	11969.04
C & E Loss (ft)	1.11	Cum SA (acres)	5822.58	783.34	3823.82

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.211

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
28	87.14	100	55.64	272	55.64	344	87.14

Manning's n Values num= 1

Sta	n Val
28	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
28 344 112.99 100 95.7 .2 .5
Left Levee Station= 28 Elevation= 87.14
Right Levee Station= 344 Elevation= 87.14

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	83.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.015	
W.S. Elev (ft)	82.87	Reach Len. (ft)	112.99	100.00	95.70
Crit W.S. (ft)	62.88	Flow Area (sq ft)		6377.34	
E.G. Slope (ft/ft)	0.000018	Area (sq ft)		6377.34	
Q Total (cfs)	20000.00	Flow (cfs)		20000.00	
Top Width (ft)	296.46	Top Width (ft)		296.46	
Vel Total (ft/s)	3.14	Avg. Vel. (ft/s)		3.14	
Max Chl Dpth (ft)	27.23	Hydr. Depth (ft)		21.51	
Conv. Total (cfs)	4765105.0	Conv. (cfs)		4765105.0	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		307.85	
Min Ch El (ft)	55.64	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.07	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	19326.59	14190.25	11969.04
C & E Loss (ft)	0.02	Cum SA (acres)	5822.58	783.30	3823.82

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.21

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
14	87.14	86	55.64	286	55.64	358	87.14

Manning's n Values num= 1

Sta	n Val
14	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
14 358 472.44 400 409.67 .2 .5
Left Levee Station= 14 Elevation= 87.14
Right Levee Station= 358 Elevation= 87.14

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	83.00	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.12	Wt. n-Val.		0.015		
W.S. Elev (ft)	82.88	Reach Len. (ft)	472.44	400.00	409.67	
Crit W.S. (ft)	62.24	Flow Area (sq ft)		7144.21		
E.G. Slope (ft/ft)	0.000014	Area (sq ft)		7144.21		
Q Total (cfs)	20000.00	Flow (cfs)		20000.00		
Top Width (ft)	324.53	Top Width (ft)		324.53		
Vel Total (ft/s)	2.80	Avg. Vel. (ft/s)		2.80		
Max Chl Dpth (ft)	27.24	Hydr. Depth (ft)		22.01		
Conv. Total (cfs)	5432504.0	Conv. (cfs)		5432504.0		
Length Wtd. (ft)	408.14	Wetted Per. (ft)		335.92		
Min Ch El (ft)	55.64	Shear (lb/sq ft)		0.02		
Alpha	1.00	Stream Power (lb/ft s)		0.05		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19326.59	14174.73	11969.04	
C & E Loss (ft)	0.04	Cum SA (acres)	5822.58	782.59	3823.82	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.2

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.75	13.06	84.01	32.66	89.48	52.25	90.03	55.52	89.08
58.78	83.98	62.05	82.1	78.37	81.94	101.33	79.88	111.17	80.94
143.97	81.42	150.53	80.55	157.09	81.2	170.21	81.05	216.13	81
225.97	80.8	235.81	81.43	252.21	81.18	278.45	81.21	321.09	81.66
334.21	82.38	350.61	82.65	373.57	81.73	380.13	82.24	399.81	81.81
426.05	82.31	471.96	82.02	494.92	82.23	534.28	81.88	540.84	82.12
586.76	81.94	599.88	82.07	681.88	82.09	734.36	81.96	750.76	82.2
826.19	81.96	852.43	81.73	868.83	81.99	924.59	82.05	954.11	81.84
970.51	82.08	996.75	81.59	1006.59	81.96	1065.63	81.86	1088.59	82.01
1098.43	81.69	1114.83	81.99	1137.79	81.7	1150.91	82.02	1209.94	81.78
1232.9	81.98	1272.26	81.93	1278.82	81.66	1295.22	81.94	1324.74	81.83
1357.54	82.07	1367.38	81.87	1403.46	81.98	1423.14	81.73	1442.82	82.01
1449.38	81.22	1459.22	81.72	1475.62	81.85	1485.46	81.33	1495.3	77.37
1501.86	75.81	1514.98	75.77	1521.54	78.16	1528.09	79.39	1541.21	79.15
1567.45	77.67	1590.41	78.16	1626.49	78.03	1682.25	78.22	1711.77	78.04
1744.57	78.13	1810.17	78.08	1856.08	78.2	1875.76	78.05	1928.24	78.26
1938.08	78.18	2003.68	78.43	2059.44	78.23	2072.56	78.47	2111.92	78.51
2151.28	78.36	2157.84	78.65	2210.32	78.8	2223.43	79.02	2243.11	80.05
2252.95	80.94	2275.91	80.7	2289.03	81.17	2308.71	81.29	2351.35	81.15
2367.75	81.36	2436.63	81.22	2443.19	81.48	2472.71	81.22	2538.31	81.43
2557.99	81.23	2590.79	81.46	2623.59	81.29	2672.78	81.41	2735.1	81.32
2754.78	81.49	2781.02	81.3	2833.5	81.26	2876.14	81.59	2899.1	81.17
2912.22	80.36	2935.18	77.75	2945.02	78.24	2964.7	77.89	2981.1	78.3
3013.9	78.37	3043.42	78.22	3168.05	78.29	3213.97	78.21	3266.45	78.27
3279.57	78.48	3332.05	78.45	3341.89	78.29	3417.33	78.45	3450.13	78.25
3473.08	78.39	3502.6	78.3	3525.56	78.46	3597.72	78.28	3722.36	78.74
3725.64	78.15	3742.04	78.75	3794.52	79.18	3810.92	79.18	3830.6	78.67
3850.28	78.86	3896.19	78.52	3984.75	78.73	4033.95	78.61	4073.31	78.64
4079.87	78.83	4155.31	78.6	4188.11	78.85	4240.59	78.64	4286.51	78.87
4312.75	78.73	4358.67	78.88	4371.79	78.67	4414.43	78.76	4434.11	78.56
4473.47	79	4506.27	78.71	4555.47	78.93	4578.43	78.78	4607.94	79.02
4627.62	79.45	4647.3	78.79	4670.26	78.69	4693.22	78.86	4719.46	78.7
4729.3	78.88	4758.82	78.47	4781.78	78.71	4808.02	78.59	4827.7	78.95
4863.78	78.61	4886.74	78.94	4922.82	78.71	4935.94	78.96	4972.02	78.91
5011.38	78.48	5037.62	78.64	5050.74	79.05	5083.54	78.17	5119.62	78.15
5145.86	78.71	5155.7	78.34	5168.82	76.43	5172.1	77.3	5185.22	78.24
5198.34	78.39	5211.46	77.74	5221.3	78.09	5244.26	77.56	5267.22	78.05
5293.46	78.11	5316.42	77.82	5362.34	78.01	5372.18	77.83	5398.42	78.38
5404.98	78.03	5431.22	78.03	5447.62	78.27	5467.3	78	5506.66	78.24
5526.34	78.2	5536.18	78.57	5559.14	78.08	5585.38	78.55	5598.5	78.13
5614.9	78.34	5654.25	78.12	5660.81	78.36	5687.05	78.38	5703.45	78.05
5778.89	78.25	5792.01	78.63	5811.69	78.38	5837.93	78.5	5844.49	78.88
5857.61	78.39	5870.73	78.79	5887.13	78.52	5929.77	78.9	5939.61	78.61
5965.85	78.8	5992.09	78.23	6015.05	78.53	6051.13	78.61	6077.37	78.43
6093.77	78.82	6106.89	78.37	6169.21	78.71	6182.33	78.58	6270.89	78.86
6290.57	78.52	6306.97	78.72	6320.09	78.51	6359.45	78.87	6375.85	78.5
6392.25	78.95	6421.77	79.08	6434.89	78.75	6451.29	79.26	6470.97	78.88
6480.81	79.34	6500.49	79.16	6513.61	78.72	6552.97	79.17	6575.93	78.87
6592.33	79.66	6605.45	79.47	6621.85	80.26	6654.64	80.47	6667.76	80.3
6687.44	80.5	6697.28	80.17	6723.52	80.12	6739.92	80.33	6753.04	80.04
6815.36	80.13	6903.92	79.89	6930.16	80.33	6943.28	79.94	6959.68	80.14
6982.64	79.86	6999.04	80.38	7005.6	79.9	7028.56	80.07	7044.96	79.72
7107.28	79.76	7143.36	79.95	7182.72	79.75	7218.8	80.13	7231.92	79.73
7251.6	80.07	7264.72	79.83	7300.8	80.01	7320.48	79.82	7340.16	79.97

7343.44	79.69	7366.4	79.92	7392.64	79.79	7438.56	79.84	7448.4	80.19
7454.96	79.77	7527.12	79.66	7553.36	79.24	7589.44	79.6	7628.79	79.79
7648.47	79.53	7681.27	79.54	7723.91	79.77	7815.75	79.71	7851.83	79.39
7874.79	79.37	7904.31	81.97	7927.27	81.27	7946.95	79.11	7963.35	79.12
7983.03	80.16	8009.26	80.29	8012.54	79.7	8038.76	72.43	8048.59	69.06
8071.53	66.1	8081.37	65.74	8117.42	66.71	8127.25	67.32	8137.08	68.66
8143.64	70.38	8150.19	73.16	8160.02	76.12	8166.58	76.86	8176.41	76.11
8189.52	79.38	8196.08	80.42	8219.02	80.58	8232.13	78.55	8238.69	76.45
8255.07	64.26	8261.63	61.74	8270.63	60.74	8275.63	58.08	8283.63	55.64
8303.63	55.04	8313.63	55.64	8333.63	55.24	8363.63	55.24	8373.63	55.04
8403.63	56.04	8433.63	56.04	8453.63	57.34	8458.63	58.08	8464.03	61.16
8530.24	61.71	8536.79	62.32	8540.06	63.68	8546.61	68.32	8553.15	70.44
8562.97	78.33	8579.34	80.67	8598.98	81.4	8628.44	81.15	8661.17	81.37
8667.72	82.39	8677.54	85.42	8684.08	85.09	8697.18	81.95	8720.09	81.33
8736.45	82.05	8749.55	81.92	8769.19	80.41	8782.28	81.97	8792.1	85.16
8798.65	86.41	8808.46	85.43	8815.01	85.59	8824.83	87.01	8834.65	81.77
8837.92	80.79	8844.47	81.89	8854.29	80.45	8864.11	80.24	8926.3	80.09
9014.68	80.13	9027.77	79.97	9080.14	80.03	9086.69	79.88	9135.79	79.89
9148.91	80.07	9171.85	79.8	9221.03	79.73	9266.92	79.83	9289.87	80.1
9322.66	80.09	9362	80.33	9391.5	80.13	9407.89	80.25	9463.62	80.12
9473.46	80.29	9499.69	80.09	9519.36	80.24	9529.19	79.84	9539.03	80.15
9545.58	81	9555.42	84.2	9558.7	84.58	9568.53	83.09	9575.09	84.62
9578.37	84.08	9588.2	79.59	9598.04	79.27	9627.54	79.86	9673.44	79.48
9706.22	79.54	9758.67	79.27	9811.13	79.27	9827.52	79.01	9857.02	79.12
9873.41	78.88	9889.81	79.03	9906.2	78.71	9938.98	78.9	9991.43	78.43
10040.61	78.41	10053.72	78.16	10089.78	78.25	10125.84	78.74	10175.02	80.03
10188.13	80.74	10207.8	82.48	10240.59	82.38	10260.26	81.64	10273.37	80.58
10306.15	80.96	10325.82	80.79	10378.28	80.84	10424.17	80.61	10493.02	80.94
10502.85	81.21	10512.69	80.72	10538.91	81.23	10552.03	82.33	10574.97	82.11
10591.37	81.55	10607.76	81.64	10640.54	80.47	10656.93	80.67	10676.6	80.39
10706.11	80.81	10715.94	80.39	10755.28	80.11	10774.95	80.57	10801.18	80.21
10817.57	80.47	10847.08	80.09	10896.25	80.45	10912.64	80.17	10965.09	80.23
10974.93	80.69	10991.32	80.11	11017.55	80.45	11047.05	80.04	11089.67	79.83
11161.79	80.18	11174.91	80.57	11210.97	80.51	11256.87	81.03	11299.48	80.86
11319.15	81.52	11325.71	81.27	11335.54	82.65	11345.38	81.52	11371.61	80.74
11384.72	81.09	11424.06	81.46	11450.29	81.53	11469.96	81.31	11538.8	81.32
11574.86	81.17	11617.48	81.26	11666.66	81.21	11715.83	80.53	11725.67	80.77
11742.06	80.12	11755.17	80.08	11784.67	77.88	11791.23	77.99	11817.46	80.54

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.168	8219.02	.066	8275.63	.025	8458.63	.066	8579.34	.067

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
8219.02 8579.34 1099.85 1148.64 1145.18 .1 .3
Left Levee Station= 52.25 Elevation= 90.03
Right Levee Station= 8824.83 Elevation= 87.01
Blocked Obstructions num= 1

Sta L	Sta R	Elev
8018.03	8193.8	80.29

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	82.95	Element	0.168	0.048	0.067
Vel Head (ft)	0.05	Wt. n-Val.	1099.85	1148.64	1145.18
W.S. Elev (ft)	82.91	Reach Len. (ft)	26995.69	7785.72	266.87
Crit W.S. (ft)	63.09	Flow Area (sq ft)	26995.69	7785.72	266.87
E.G. Slope (ft/ft)	0.000072	Area (sq ft)	4485.29	15449.80	64.90
Q Total (cfs)	20000.00	Flow (cfs)	8158.37	360.32	182.03
Top Width (ft)	8700.73	Top Width (ft)	0.17	1.98	0.24
Vel Total (ft/s)	0.57	Avg. Vel. (ft/s)	3.31	21.61	1.47
Max Chl Dpth (ft)	27.87	Hydr. Depth (ft)	529931.1	1825372.0	7668.4
Conv. Total (cfs)	2362972.0	Conv. (cfs)	8164.62	372.41	182.64
Length Wtd. (ft)	1143.06	Wetted Per. (ft)	0.01	0.09	0.01
Min Ch El (ft)	55.04	Shear (lb/sq ft)	9.36	Stream Power (lb/ft s)	0.00	0.19	0.00
Alpha							
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	19180.19	14106.18	11967.78
C & E Loss (ft)	0.01	Cum SA (acres)	5778.33	779.44	3822.96

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 129.03

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.83	13.12	84.14	26.24	88.13	32.81	89.57	52.49	90
55.77	89.25	62.33	82.97	65.61	82.22	82.02	81.76	98.42	80.01
111.54	80.95	124.66	81.19	160.75	81.03	213.24	81.07	226.36	81.37
232.92	82.03	242.76	81.13	249.33	81.75	282.13	82.52	308.38	81.8
347.74	81.69	373.99	81.8	413.36	81.74	429.76	81.87	465.85	81.64
475.69	81.79	511.77	81.64	560.98	81.65	580.67	81.85	590.51	81.67
656.12	81.75	679.09	81.62	757.82	81.8	839.84	81.66	928.41	81.91
954.66	81.7	971.06	81.86	1039.95	81.53	1072.76	81.79	1092.44	81.64
1102.29	81.86	1154.77	81.66	1174.46	81.87	1187.58	81.51	1217.11	81.45
1220.39	81.19	1236.79	81.9	1246.63	81.8	1253.19	80.67	1259.75	77.35
1263.03	76.52	1272.88	76.07	1279.44	76.45	1286	78.66	1312.24	77.84
1335.21	78.08	1384.42	78.12	1404.1	77.93	1499.24	78.08	1518.92	78
1545.17	78.18	1614.06	78.01	1643.59	78.23	1673.11	78.09	1682.95	78.23
1745.28	78.15	1787.93	78.42	1827.3	78.99	1846.98	79.97	1856.82	81.08
1876.51	80.76	1886.35	81.19	1915.88	81.49	1935.56	81.32	1951.96	81.56
2020.86	81.36	2043.82	81.42	2109.43	81.35	2155.36	81.48	2168.48	81.28
2224.25	81.31	2234.09	81.22	2283.3	81.31	2289.86	81.53	2316.11	81.25
2345.63	81.18	2355.47	81.36	2401.4	81.5	2430.93	81.13	2444.05	79.66
2457.17	78.87	2463.73	77.75	2470.29	78.29	2476.86	77.89	2483.42	78.33
2493.26	78.02	2571.99	78.24	2621.2	78.16	2650.73	78.34	2690.09	78.36
2755.7	78.15	2814.75	78.31	2857.4	78.23	2890.21	78.4	2932.85	78.19
2988.62	78.24	3018.15	78.55	3031.27	78.4	3044.39	78.68	3087.04	78.3
3100.16	77.29	3116.57	76.45	3159.21	75.71	3198.58	75.54	3267.47	75.74
3283.87	75.51	3365.89	75.58	3395.41	75.53	3428.22	76.93	3438.06	78.18
3454.46	77.63	3470.87	78.18	3490.55	78.26	3503.67	78.69	3539.76	78.2
3585.69	77.88	3595.53	78.03	3628.34	77.89	3644.74	78.08	3710.35	77.82

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 3789.08   78.12 3844.85   77.91 3861.26   78.08 3946.55   77.98 3966.23   78.07
 4035.13   78.04 4041.69   77.86 4074.49   78.09  4090.9   77.91 4120.42   78.14
 4176.19   77.92 4254.93    78.1 4271.33   77.89 4297.58   78.13 4366.47    77.9
 4376.31   78.09 4438.64   77.82 4464.89   78.06 4494.42   77.81 4504.26   78.06
 4537.06   77.79 4563.31   77.75 4573.15   77.95  4615.8   77.79 4655.17   77.99
 4691.25   77.73  4733.9   78.05 4743.74   77.77 4756.87   78.07 4773.27   77.94
 4789.67   78.18 4796.23   78.65 4806.08    75.2 4812.64   77.45 4852.01   77.26
 4888.09   77.26 4911.06   77.49 4963.55   77.53 4999.63   77.43 5078.37   77.82
 5098.05   77.66 5137.42   77.69 5193.19   77.92 5219.44    77.7 5245.68   77.93
 5258.81   77.75 5281.77   77.98 5304.73   77.87 5347.38    78.1 5363.79   77.88
 5426.12   78.08 5442.52   77.94  5531.1   78.04 5577.03   78.23 5586.87   78.11
 5639.36   78.21 5678.73   78.56 5695.13    78.2 5701.69   78.46 5741.06   78.55
 5767.31   79.12 5790.27   78.79 5816.51   78.83 5823.08   78.63 5865.72   78.86
 5878.85   78.74 5905.09   79.28 5911.65   78.91 5931.34   79.17 5944.46    78.9
 5960.86   79.28 5987.11   78.84 5996.95   79.22 6029.76   79.01  6039.6   78.78
 6059.28   79.31 6078.97   78.94 6088.81   79.14 6121.61   78.98 6134.74   79.55
 6144.58   79.01 6190.51   79.42 6213.47   80.41 6220.03   80.27 6233.16   81.19
 6256.12   80.77 6282.37    80.7 6315.17   80.14 6328.29   80.54 6338.14   80.25
 6354.54   80.56 6367.66   80.22 6374.22   80.54 6400.47   80.14 6410.31   80.56
 6423.43   80.32  6446.4   80.82 6469.36   80.08 6489.05   80.53 6512.01    80.2
 6567.78   80.02 6597.31   80.06 6616.99   80.41 6626.83   80.08 6679.32   80.24
 6699.01      80 6741.66   80.07 6748.22   80.29 6764.62   79.85 6797.43   80.08
 6833.51    79.8 6856.48    79.9 6872.88   80.27 6889.28   80.01 6912.25   80.34
 6922.09   79.89  6954.9   80.04 6964.74   79.85 6981.14   80.11 6997.55   79.66
 7027.07   79.95 7043.48   79.88 7053.32   79.53 7092.69    79.5 7099.25   79.73
 7171.42   79.39 7181.26   79.72 7200.95   79.43 7240.31   79.66 7269.84   79.65
 7279.67   79.86 7312.41   79.96 7325.51   79.66 7358.25   79.94  7364.8   79.66
 7417.18   79.62 7446.65   79.23 7456.47   79.41 7479.38    79.1  7502.3   79.57
 7508.85   79.08 7531.77   79.46 7538.31   80.21 7567.78   82.16  7577.6   79.48
  7590.7   77.22 7610.34   77.85 7620.16   74.03 7629.98   68.26 7639.81   66.47
 7646.35   64.68 7662.72   61.92 7669.27   61.71 7671.21   58.78 7678.71   58.28
 7696.42   57.98 7716.42   57.38 7736.42   57.08 7746.42   56.18 7756.42   54.78
 7776.42   55.08 7796.42   56.78 7806.42   56.78 7816.42   58.18 7826.42   61.71
 7832.97   62.86 7842.79   65.91 7849.34    66.6 7862.43   70.61 7868.98   73.87
 7885.35   75.39  7891.9   76.54 7901.72   77.28 7924.64   77.51 7934.46   77.29
 7960.65   77.52 7977.02   78.08 7986.84   79.25 7993.39   82.17 7996.66   82.75
 8003.21   81.72 8006.49   82.76 8013.03   82.29 8026.13   80.31  8029.4   80.97
 8045.77   80.43 8078.52   80.56  8098.2   80.48 8206.47   80.39 8255.67   80.23
 8295.04   80.27 8340.96   80.09 8347.52   80.22 8377.04   79.99 8413.12   80.14
 8426.25   79.99 8511.53   80.21 8544.34   80.03 8573.86   80.23 8593.54   79.97
  8616.5   80.21 8629.62   80.03 8659.15   80.13 8691.95   80.01 8728.03   79.71
 8744.43   79.86 8846.12   79.41 8852.68   79.64 8885.49   79.37 8934.69   79.69
 8944.53   79.52  9033.1   79.12 9059.34   79.33 9069.18   79.16 9118.39   79.28
 9151.19   79.21 9167.59   79.42 9180.71   78.99 9197.11   79.89 9203.67   83.81
 9210.23   84.65 9216.79   83.02 9229.92   84.54 9239.76   80.65 9256.16   79.79
 9272.56   80.04 9311.92   80.06 9325.04   79.84 9344.72   79.94 9403.77   79.72
 9485.78   80.05 9508.74   79.98 9521.86   80.17 9544.82   79.95 9551.38   80.66
 9557.94   80.17 9580.91   79.92 9607.15   80.02 9620.27   79.67 9633.39   79.91
 9656.35   79.52 9676.03   79.59 9692.43   79.33  9715.4   79.31 9751.48   78.91
 9771.16   78.86 9807.24    78.5 9817.09   78.66 9840.05   78.39 9863.01    78.4
 9885.97   78.09 9971.26   77.9110007.34   77.9210069.67   78.7510095.91    79.5
10118.87   79.8610125.43   80.2810158.23   80.76 10197.6   81.6610204.16   80.97
10227.12   84.1310236.96    82.110243.52   83.4910250.08   82.6610273.04   83.17
10282.89   82.3110289.45   82.3110299.29   81.4810318.97   81.8410335.37    81.6
10355.05   82.1710381.29   81.6110417.38   81.4310450.18   81.4510456.74   81.27
10505.94   81.4110525.63    81.210545.31    81.510571.55   81.1910587.95   81.32
10660.12   80.9810669.96   81.35 10679.8    80.910778.21   80.3310788.05   80.45
10817.57   80.1810833.97   80.2810876.62   79.6910899.58   79.7510925.82    79.4
10938.94   79.6310958.62   79.5410965.18   79.8110981.59   79.3110994.71   79.75
11050.47    79.711093.12   80.4411106.24   80.39 11145.6   80.9711188.24    81.2
11234.17   81.3211240.73   81.5311276.81   81.0411293.21   81.1411299.77   81.63
11309.61   83.8411316.17   82.3811326.01   83.1611335.86   81.4111348.98   80.82
11450.67   81.3211493.31   81.2311503.15   80.5511516.27   81.1311552.35    81.2
11572.04   81.08 11627.8   81.2211647.48   81.0611670.44   81.2211709.81   81.07
11742.61   81.1511821.34   80.6111834.46    80.711867.26   79.8811883.66    77.6
11900.06   77.2211913.19   77.5111942.62    79.711958.91   84.3611994.75      84

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .14 7531.77    .066 7662.72    .025 7832.97    .066 8026.13    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7567.78 7996.66          3555.05    2827 2507.63            .1       .3
Left Levee      Station=   52.49      Elevation=     90
Right Levee     Station=11958.91      Elevation=   84.36
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    33.8 6226.78   84.96 6226.78 7564.12   82.15 8004.51 8619.72    82.7
 8619.7311952.68   84.58


CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             82.79    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                 0.136      0.052      0.066
  W.S. Elev (ft)             82.64    Reach Len. (ft)          3555.05    2827.00    2507.63
  Crit W.S. (ft)             65.09    Flow Area (sq ft)         663.58    6435.87       3.69
  E.G. Slope (ft/ft)      0.000324    Area (sq ft)              663.58    6435.87       3.69
  Q Total (cfs)           20000.00    Flow (cfs)                 81.69   19917.42       0.89
  Top Width (ft)           1776.71    Top Width (ft)           1341.00     428.29       7.42
  Vel Total (ft/s)            2.82    Avg. Vel. (ft/s)            0.12       3.09       0.24
  Max Chl Dpth (ft)          27.86    Hydr. Depth (ft)            0.49      15.03       0.50
  Conv. Total (cfs)       1111932.0    Conv. (cfs)               4541.7   1107341.0       49.5
  Length Wtd. (ft)         2831.87    Wetted Per. (ft)         1341.74     437.20      13.11
  Min Ch El (ft)             54.78    Shear (lb/sq ft)            0.01       0.30       0.01
  Alpha                       1.20    Stream Power (lb/ft s)      0.00       0.92       0.00
  Frctn Loss (ft)             0.57    Cum Volume (acre-ft)    18831.01   13918.68   11964.23
  C & E Loss (ft)             0.03    Cum SA (acres)           5658.41     769.05    3820.47


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 128.5

INPUT
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Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.03	16.4	89.07	19.68	86.23	22.96	81.65	26.24	80.54
39.36	80.21	49.2	78.44	55.77	77.9	62.33	78.18	75.45	77.86
85.29	78.62	108.25	79.3	127.93	79.18	137.77	78.76	144.33	79.38
170.58	79.54	209.94	79.34	219.78	79.57	252.59	79.31	268.99	79.49
291.95	79.28	328.03	79.47	347.72	79.18	357.56	79.43	370.68	79.28
455.97	79.3	462.53	79.49	482.21	79.25	508.45	79.43	528.13	79.24
547.82	79.51	564.22	79.26	600.3	79.45	619.98	79.19	626.54	79.55
659.35	79.35	685.59	79.5	698.71	80.3	701.99	79.74	711.83	75.23
718.39	72.87	724.95	71.6	734.79	70.98	744.64	71.01	757.76	71.57
767.6	73.21	784	72.7	790.56	72.08	823.36	71.93	846.33	72.14
859.45	72	888.97	72.21	905.37	72	964.42	72.25	990.66	72
1033.3	72.39	1062.83	72.08	1102.19	72.27	1115.31	72.47	1134.99	72.12
1151.4	72.33	1177.64	72.23	1200.6	72.44	1220.28	73.26	1233.4	73.3
1246.52	74.17	1266.21	74.56	1276.05	75.68	1285.89	75.42	1295.73	75.7
1312.13	75.58	1328.53	75.77	1344.93	75.65	1387.58	75.84	1426.94	75.84
1443.34	75.7	1531.91	75.98	1545.03	75.88	1581.12	76.05	1650	76.08
1672.97	76.24	1689.37	76.11	1741.85	76.34	1771.38	76.21	1814.02	76.46
1866.5	76.57	1896.03	76.45	1935.39	76.63	1941.95	76.54	1991.16	76.61
2040.36	77.12	2069.88	78	2073.17	78.86	2096.13	79.56	2122.37	79.05
2132.21	78.59	2161.74	78.03	2210.94	78.25	2250.31	78.22	2319.19	78.47
2352	78.51	2374.96	78.41	2456.97	78.63	2479.93	78.55	2525.86	78.84
2538.98	78.67	2575.06	78.95	2581.62	78.84	2630.83	79.09	2637.39	78.95
2660.35	79.13	2699.72	79.17	2732.52	79.37	2739.08	79.23	2817.81	79.45
2883.42	79.51	2958.87	79.88	2988.39	79.85	2998.23	80.04	3024.47	79.93
3050.72	80.11	3099.93	80.07	3126.17	80.32	3172.09	80.23	3195.06	80.38
3227.86	80.22	3244.26	80.5	3267.22	80.1	3296.75	80.17	3309.87	80.37
3349.23	80.28	3421.4	79.97	3434.52	80.15	3487.01	79.93	3500.13	80.11
3513.25	79.93	3529.65	80.08	3552.62	79.8	3569.02	80.02	3585.42	79.69
3595.26	79.95	3624.79	79.72	3634.63	79.94	3660.87	79.83	3667.43	80
3693.67	79.77	3700.23	80.03	3726.48	79.78	3742.88	79.97	3785.52	80.01
3798.65	79.75	3811.77	79.91	3831.45	79.76	3854.41	80.05	3870.81	79.74
3887.22	79.93	3897.06	79.74	3926.58	79.83	3939.7	79.64	3956.1	79.89
3972.5	79.63	4011.87	79.59	4031.55	79.8	4044.67	79.5	4061.08	79.82
4074.2	79.64	4110.28	79.93	4136.52	80.72	4175.89	81.11	4192.29	81.42
4202.13	80.15	4218.53	79.93	4225.09	79.58	4248.06	79.67	4261.18	79.92
4290.7	79.8	4297.26	80.23	4316.94	80.1	4323.5	80.34	4346.47	79.88
4359.59	80.23	4369.43	79.78	4392.39	79.98	4425.19	79.76	4435.03	80
4487.52	79.82	4517.04	80.07	4526.88	80.45	4543.28	81.99	4549.84	80.76
4556.41	76.76	4562.97	69.38	4566.25	68.26	4579.37	62	4582.65	55.89
4600.65	55.35	4604.65	55.05	4622.65	55.85	4649.65	56.45	4662.65	57.15
4670.65	57.25	4688.65	57.25	4703.65	57.35	4713.65	57.75	4753.23	61.55
4769.63	61.58	4779.47	63.6	4786.03	65.97	4795.87	66.61	4799.15	67.55
4808.99	72.08	4815.55	74.26	4825.39	76.44	4835.23	77.36	4845.08	77.16
4868.04	77.32	4874.6	77.13	4923.8	77.42	4933.64	79.7	4946.76	79.89
4950.04	80.32	4956.6	79.12	4963.17	80.19	4969.73	79.45	4982.85	78.84
5015.65	79.08	5058.3	78.71	5084.54	78.82	5094.38	78.67	5127.18	78.85
5166.55	78.5	5189.51	78.65	5228.87	78.35	5238.71	78.5	5274.79	78.45
5281.35	78.27	5310.87	78.67	5346.95	78.69	5409.28	78.59	5438.8	78.74
5497.84	78.8	5520.8	78.63	5537.2	78.97	5622.49	78.79	5678.25	78.97
5711.05	78.77	5717.61	79.03	5776.65	79.04	5806.17	78.81	5858.66	78.96
5881.62	78.81	5898.02	79.04	5904.58	78.81	5937.38	79.06	5950.5	78.39
6035.78	78.7	6107.95	78.71	6137.47	78.88	6170.27	78.82	6199.79	79.12
6209.63	79.02	6265.39	79.06	6291.63	79.22	6353.96	78.85	6373.64	79.03
6393.32	78.93	6403.16	79.23	6432.68	78.91	6458.92	79.09	6488.44	78.93
6498.28	79.15	6580.29	78.9	6599.97	79.4	6622.93	79.12	6645.89	79.08
6681.97	79.59	6708.21	79.33	6754.13	79.2	6806.62	79.53	6829.58	80.12
6888.62	80.46	6895.18	81.68	6898.46	83.96	6901.74	84.55	6908.3	81.64
6914.86	83.56	6921.42	81.78	6944.38	81.26	6993.59	81.24	7006.71	81.37
7059.19	81.41	7085.43	81.22	7141.19	81.5	7190.39	81.33	7210.07	81.47
7272.4	81.27	7285.52	81.12	7311.76	81.16	7347.84	80.92	7390.48	80.87
7436.4	80.64	7462.65	80.66	7495.45	80.45	7515.13	80.54	7547.93	80.26
7567.61	80.34	7593.85	80.02	7639.77	79.94	7652.89	79.72	7679.14	79.78
7744.74	79.35	7800.5	79.07	7898.9	78.22	7941.55	78.09	7987.47	77.67
7997.31	77.76	8023.55	77.53	8076.03	77.68	8135.07	77.41	8220.36	77.47
8253.16	77.75	8266.28	77.7	8289.25	78.11	8322.05	78.51	8328.61	78.77
8394.21	80.06	8410.62	80.71	8443.42	81.46	8476.22	81.69	8486.06	81.92
8502.46	81.63	8525.42	81.75	8604.15	81.72	8630.39	81.55	8643.51	81.73
8696	81.21	8712.4	81.13	8738.64	81.26	8755.04	80.38	8761.6	80.65
8787.85	80.89	8837.05	81.01	8846.89	81.18	8856.73	80.71	8860.01	81.12
8892.82	80.56	8909.22	80.54	8919.06	80.24	8942.02	80.58	8958.42	80.45
8964.98	80.94	8971.54	79.62	8981.38	79.32	8987.94	78.23	8994.5	78.42
9001.06	77.02	9010.91	72.47	9020.75	69.76	9037.15	68.21	9046.99	68.28
9063.39	67.63	9092.91	65.78	9099.47	65.15	9119.15	64.68	9132.28	64.82
9142.12	64.25	9151.96	64.4	9174.92	63.88	9188.04	63.94	9197.88	65.08
9211	64.34	9230.68	64.79	9237.24	64.66	9253.65	65.13	9263.49	65.68
9286.45	65.54	9299.57	66.1	9309.41	66.96	9315.97	66.25	9342.21	66.16
9368.46	66.79	9391.42	66.61	9404.54	67.01	9420.94	66.81	9427.5	67.07
9450.46	67.2	9466.86	67.55	9476.7	67.26	9489.83	67.92	9502.95	67.48
9519.35	67.91	9525.91	67.65	9555.43	67.89	9581.67	67.5	9591.51	68.37
9604.63	67.92	9630.88	68	9650.56	67.69	9660.4	67.87	9686.64	67.4
9706.32	67.62	9719.44	67.32	9732.57	67.34	9748.97	66.96	9801.45	66.72
9827.69	66.51	9847.38	66.04	9873.62	65.82	9896.58	65.27	9932.66	64.87
9985.15	63.7510008.11		64.0110047.47		63.8110099.96		64.0110122.92		63.85
10145.88	64.0910155.72		63.6510178.68		64.310201.64		63.7410211.49		63.86
10247.57	66.4310260.69		67.7310267.25		68.0310277.09		69.2810296.77		71.3
10319.73	76.410332.86		77.1310365.66		76.6610401.74		76.77 10424.7		76.53
10437.82	76.1810457.51		76.2110493.59		77.0510503.43		76.9510519.83		77.33
10539.51	76.0510549.35		75.8410605.12		75.39 10641.2		75.8610654.32		75.78
10680.56	76.210733.05		76.5610739.61		76.510775.69		77.1410821.62		77.77
10844.58	77.8610877.38		77.6710887.22		78.0510893.78		77.3110900.34		75.54
10906.9	75.5910913.46		76.66 10923.3		80.2810933.15		82.4810936.43		83.75
10942.96	84.7410962.48		84.7510972.25		82.0410982.01		80.47		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	2096.13	.085	4549.84	.07	4562.97	.025	4799.15	.07
4950.04	.066								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4549.84 4950.04 1964.77 1391 1506.6 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	4549.84	80.76	T
4950.0410982.01		80.32	T

Left Levee Station= 16.4 Elevation= 89.07
Right Levee Station=10962.48 Elevation= 84.75
Blocked Obstructions num= 1

Sta L	Sta R	Elev
8923.611303.13		77.13

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	82.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.075	0.046	0.066
W.S. Elev (ft)	82.14	Reach Len. (ft)	1964.77	1391.00	1506.60
Crit W.S. (ft)	64.68	Flow Area (sq ft)	6204.82	6329.11	9817.09
E.G. Slope (ft/ft)	0.000136	Area (sq ft)	18406.69	6329.11	20070.57
Q Total (cfs)	20000.00	Flow (cfs)	1768.39	14624.91	3606.70
Top Width (ft)	10887.57	Top Width (ft)	4527.23	400.20	5960.14
Vel Total (ft/s)	0.89	Avg. Vel. (ft/s)	0.29	2.31	0.37
Max Chl Dpth (ft)	27.09	Hydr. Depth (ft)	1.37	15.81	1.65
Conv. Total (cfs)	1713963.0	Conv. (cfs)	151548.0	1253328.0	309087.0
Length Wtd. (ft)	1469.46	Wetted Per. (ft)	4530.50	412.84	5962.37
Min Ch El (ft)	55.05	Shear (lb/sq ft)	0.01	0.13	0.01
Alpha	4.92	Stream Power (lb/ft s)	0.00	0.30	0.01
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	18052.82	13504.46	11386.42
C & E Loss (ft)	0.00	Cum SA (acres)	5418.95	742.16	3648.70

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 128.23*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	86.59	13.43	88.56	24.94	88.66	28.6	85.92	32.26	81.46
35.91	80.42	50.54	80.13	61.52	78.89	68.84	78.46	76.16	78.54
90.79	78.04	101.76	78.49	127.36	79.01	146.21	78.91	160.28	77.94
167.6	78.23	189.71	78.54	219.62	78.28	227.78	78.47	241.37	78.23
252.24	78.97	273.99	79.04	284.87	78.85	306.6	79.08	322.93	79.01
344.69	79.21	355.57	79.07	372.44	79.24	399.06	79.08	405.37	79.21
426.25	79.08	439.85	79.33	461.6	79.17	488.78	79.05	522.42	79.22
540.45	79.08	554.04	79.22	581.23	79.12	617.53	79.35	635.82	79.16
676.05	79.38	697.99	79.15	705.31	79.41	733.49	79.29	771.16	79.4
785.79	79.98	789.44	79.62	800.42	76.63	807.73	75.01	815.05	74.19
826.02	73.83	851.63	74.27	862.6	75.36	880.89	75.08	888.21	74.69
931.96	74.53	950.4	74.64	980.91	74.59	997.94	74.72	1016.23	74.64
1035.28	74.8	1059.75	74.71	1070.63	74.84	1111.34	74.7	1171.23	74.91
1190.26	74.66	1231.05	74.84	1252.8	75.47	1272.28	75.19	1301.74	75.23
1345.24	75.08	1353.4	75.54	1369.71	75.53	1382.02	74.97	1394.18	74.79
1418.61	75.1	1429.58	75.78	1440.55	75.61	1488.1	75.71	1506.39	75.6
1553.95	75.83	1592.67	75.88	1616.12	75.72	1649.76	75.85	1676.95	75.84
1698.7	76.02	1729.52	75.89	1823.77	75.9	1846.57	75.85	1864.55	75.99
1890.47	75.88	1940.68	76.03	1992.34	75.9	2011.37	76	2084.77	76.12
2150.03	75.83	2160.91	75.71	2227	75.83	2245.19	76.09	2264.22	76.1
2296.85	76.36	2314.78	77.22	2318.45	77.95	2340.47	78.4313	2364.82	78.09
2384.28	77.61	2417.21	77.21	2451.82	77.46	2481.73	77.39	2517.08	77.43
2530.67	77.67	2544.26	77.56	2590.48	77.82	2631.26	78.18	2647.59	78.04
2693.8	78.22	2699.24	78.35	2772.03	78.46	2823.24	78.72	2878.11	78.9
2892.28	78.86	2930.34	79.13	2947.61	79.11	2982	79.49	3009.19	79.98
3020.07	79.41	3041.82	79.55	3061.01	79.26	3112.51	79.45	3166.88	79.55
3221.96	79.42	3248.45	79.45	3349.98	79.83	3379.25	79.74	3422.46	79.91
3430.61	79.85	3468.68	79.99	3512.19	80.05	3531.22	79.98	3569.47	80.07
3612.79	80.01	3624.33	80.16	3649.94	79.97	3682.87	79.92	3697.5	80.15
3713.39	80.07	3746.01	80.15	3792.24	79.92	3805.83	79.99	3816.71	79.8
3860.21	79.99	3876.52	79.79	3909.65	79.96	3942.57	79.96	3968.19	79.76
3990.72	79.97	4004.76	79.68	4015.73	79.9	4048.66	79.7	4064.13	79.87
4080.45	79.73	4096.21	79.9	4125.47	79.69	4132.79	79.83	4162.06	79.69
4200.08	79.94	4227.89	79.86	4242.53	79.69	4257.17	79.8	4278.94	79.7
4304.71	79.92	4323	79.75	4385.19	79.78	4398.57	79.63	4418.11	79.78
4444.79	79.5	4466.54	79.49	4502.24	79.68	4516.87	79.45	4542.67	79.71
4553.54	79.55	4564.42	79.78	4610.65	80.21	4619.29	80.57	4632.4	80.43
4643.27	80.73	4656.86	81.48	4667.74	81.24	4681.34	81.26	4692.46	80.07
4724.84	79.35	4741.15	79.66	4749.31	79.56	4798.54	79.94	4820.48	79.82
4830.88	80.05	4844.47	79.64	4858.07	79.83	4879.01	79.44	4890.7	79.54
4917.89	79.26	4928.76	79.6	4941.19	79.32	4972.27	79.35	4988.58	79.69
5034.8	79.17	5048.4479	5.70148	5056.55	80.07	5072.87	81.82	5089.4	80.2
5094.7879	7.97818	5099.04	79.48	5108.68	77.16	5119.69	75.51	5126.58	72.9
5136.52	70.03	5151.36	67.45	5169.25	65.77	5174.76	64.59	5180.26	64.32
5189.54	61.51	5195.66	60.84	5200.14	56.76	5229.26	56.02	5250.26	55.79
5262.85	55.44	5271.25	53.64	5284.5	54.4	5301.955	.03925	5304.37	55.13
5305.02	57.91	5313.94	58.37	5339.81	59.09	5351.48	59.99	5357.5760	.83488
5380.6	64.03	5392.68	64.67	5399.92	66.41	5404.75	68.26	5411.99	69.11
5421.64	73.31	5426.47	75.04	5433.71	76.85	5440.96	77.55	5465.1	77.69
5469.93	77.58	5506.14	77.83	5513.38	79.37	5525.45	79.8	5531.05	79.01
5536.66	79.72	5542.25	79.23	5553.45	78.83	5581.44	78.97	5615.4	78.62
5640.22	78.68	5648.61	78.56	5676.6	78.6	5710.19	78.34	5729.78	78.38
5763.37	78.08	5771.76	78.16	5820.28	78.11	5860.26	78.33	5885.24	78.22
5942.49	78.26	5985.19	78.19	5995.18	78.28	6015.17	78.92	6026.46	78.97
6045.15	78.34	6099.23	77.98	6146.81	78.03	6174.79	77.93	6180.39	78.11
6230.77	78.17	6255.96	78.01	6300.75	78.05	6339.93	77.94	6367.91	78.07
6379.11	77.63	6419.92	77.71	6454.9	77.86	6474.88	78.15	6489.88	79.23
6499.88	79.32	6519.86	79.83	6544.85	79.84	6559.84	79.33	6569.83	79.21
6599.81	79.35	6647.79	79.36	6670.18	79.45	6723.37	79.2	6756.95	79.25
6765.35	79.45	6790.54	79.23	6812.92	79.35	6838.11	79.22	6846.51	79.35
6916.49	79.18	6933.28	79.51	6972.46	79.27	7003.25	79.59	7025.63	79.39
7064.82	79.27	7109.6	79.48	7129.2	79.87	7179.57	80.03	7185.17	80.84
7190.77	82.75	7196.36	80.82	7201.96	82.1	7207.56	80.91	7227.15	80.58
7269.14	80.56	7280.33	80.64	7325.11	80.61	7347.5	80.47	7395.08	80.63
7437.06	80.54	7453.85	80.64	7540.62	80.47	7571.41	80.34	7607.79	80.31
7639.19	80.14	7669.37	80.19	7697.36	80.04	7714.15	80.09	7742.14	79.88
7758.93	79.94	7781.32	79.75	7820.5	79.74	7831.7	79.6	7854.09	79.67
7909.03	79.37	7957.65	79.2	8041.61	78.66	8078	78.63	8117.18	78.33
8147.97	78.23	8192.75	78.32	8243.12	78.14	8315.9	78.14	8355.08	78.28
8374.68	78.56	8402.67	78.79	8464.24	79.87	8478.24	80.32	8506.23	80.78
8542.61	81.15	8556.6	80.97	8576.19	81.01	8643.37	80.91	8665.76	80.79
8676.96	80.88	8721.74	80.43	8758.13	80.39	8772.12	79.77	8800.12	80.04
8861.69	80.1	8889.68	79.62	8912.07	79.38	8931.66	79.59	8945.66	79.46
8951.25	79.77	8956.85	78.88	8965.25	78.65	8970.84	77.91	8976.44	78.02
8982.04	77.09	8990.44	74.07	8998.84	72.27	9012.83	71.25	9021.23	71.31
9035.22	70.85	9060.41	69.59	9066.01	69.17	9082.8	68.87	9094	68.96

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  9102.4   68.55  9110.8   68.63 9130.39   68.27 9141.58   68.32 9149.98   69.09
 9161.17   68.59 9183.56   68.77 9205.96   69.43 9225.55   69.35 9245.14   70.23
 9250.74   69.73 9273.13   69.65 9295.53   70.05 9315.12   69.86 9326.31   70.09
 9340.31    69.9 9348.17   70.06 9379.49   70.14 9387.89   69.86 9399.09   70.18
 9410.28   69.78 9424.28   69.97 9429.88   69.76 9455.06   69.76 9477.45   69.36
 9485.85   69.86 9497.04   69.45 9519.44   69.31 9536.23   68.98 9544.63   69.04
 9567.02   68.59 9583.81   68.65  9620.2   67.99 9687.37   67.24 9704.17   66.84
 9726.56   66.57 9746.15   66.07 9776.94   65.59 9821.73    64.6 9841.32   64.67
  9874.9   64.39 9919.69   64.36 9939.28   64.16 9958.87   64.36 9967.27   64.06
 9986.86  64.4710006.45   63.9510014.85   64.0610045.64   65.6510062.43   66.86
10087.62  69.1710107.21   73.2210118.42   74.1610132.69   74.9410147.69   76.22
10162.67  77.1410177.19   77.0910207.97   76.4610224.77   76.4910255.56   77.03
10277.95  77.1910294.74   76.3310303.14   76.1810350.72    75.810387.54   75.98
10415.09   76.310465.48   76.5310532.46   77.5310542.46   77.7410572.44   77.82
10591.43  78.3710597.03   78.0910602.62   77.1410608.22   77.4710613.82   78.67
10622.22  81.4710638.99   84.5310655.65   84.6210668.59   81.1910675.07   80.37

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 3009.19    .085 5099.04     .07 5119.69    .025 5399.92     .07
 5525.45    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      5099.04 5525.45          1964.77    1391  1506.6             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5099.04   79.48       T
 5525.4510675.07    79.8       T
Left Levee      Station=   24.94      Elevation=88.65667
Right Levee     Station=10655.65      Elevation=   84.62
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 8963.8610685.03   77.14

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 127.97*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   84.16   15.45   87.76   18.02   88.06   33.48   88.24   36.43   86.62
   42.34   80.64   45.59   80.31   61.73   80.05   73.83   79.34   95.54    78.7
  106.12   78.21  137.27   78.67  167.26   78.63  176.26   78.06  182.26   77.16
  209.26   77.27  215.26   77.59  224.26   77.22  236.26   77.39  248.25   77.13
  257.25   77.55  266.25   77.03  272.25   77.11  284.25   78.37  299.24   78.35
  308.24   78.68  320.24   78.36  338.24   78.63  362.23   78.67  386.24   79.08
  398.23   78.75  404.23   78.91  437.22   79.06  446.22   78.88  467.22   79.07
  476.22   78.87  491.21   79.38  515.21   79.05  527.21   79.18   545.2    78.8
  582.31   78.94   602.2   78.87   617.2   79.12  647.19   78.87  656.19   79.11
  677.18   79.04  692.18   79.22  707.41   79.05   751.8    79.3  764.17   79.12
  788.17   79.27  815.16   79.19  830.16    79.4  848.16   79.25  872.86   79.66
   876.9    79.5  897.07   77.16  905.14   76.77  917.25   76.68   945.5   76.97
  957.61   77.51  995.13   77.34 1007.13   77.15 1022.13   77.26 1034.13   77.08
 1076.13   77.28 1088.12   77.07 1130.12    77.3 1148.11   77.53 1175.11   77.26
 1187.11   77.48 1211.11   77.32  1244.1   77.51  1253.1   77.31 1289.09    77.4
 1298.09   77.55 1319.08   77.23 1364.08   77.44 1379.08   77.94 1388.08   78.52
 1429.76   77.92 1442.07   78.18 1490.07   77.73 1499.06   78.35 1508.06   77.74
 1517.06    77.8 1544.06   75.55 1556.05   75.37 1583.11   75.88 1601.04   75.84
 1616.05   75.55 1634.05   75.69 1661.04   75.55 1700.03   75.74 1763.03   75.91
 1781.02   75.74 1826.01   75.91 1856.01    75.8    1880    76.1    1898   75.87
    1931   75.97    1943   75.74 1987.99   75.73 1993.99   75.93 2002.99   75.56
 2017.98   75.74 2041.98   75.62 2062.97   75.78 2091.57   75.65 2125.97   75.73
 2140.97   75.55 2146.97   75.75 2173.96   75.56 2194.96   75.68 2203.95   75.54
 2224.95   75.64 2251.94   75.58 2269.94   75.68 2305.93   75.67 2329.94   75.45
 2338.93    75.6 2377.93   75.08 2389.92    74.8 2395.92   75.03 2431.91   74.94
 2449.91   75.19 2461.91   75.04  2482.9    75.4  2503.9   75.24  2524.9   75.39
  2539.9   75.19  2551.9   75.78  2563.9   77.05 2575.89   77.47 2584.8177.42242
 2596.89   77.03 2614.88   76.98 2620.88   76.65 2641.88   76.66 2665.87    76.4
 2683.87   76.44 2710.86   76.74 2743.87   76.53 2770.86   76.72 2782.86   76.63
 2797.86   77.08 2812.85    76.8 2842.85      77 2854.84   77.29 2863.84   77.18
 2890.84   77.68 2908.83   77.85 2926.84   77.63 2938.83   77.81 2977.83   77.94
 2983.83   78.18 3001.82   78.07 3019.82   78.17 3025.82   78.47 3034.81   78.19
 3073.81   78.45  3112.8   78.48  3142.8   78.84 3196.79   78.85 3238.78   79.22
 3257.83   79.28 3295.77   79.85 3325.76   80.79 3337.77   79.63 3361.76   79.79
 3376.76   79.27 3391.76    79.4 3424.75    79.4 3439.75   79.54 3484.74   79.48
 3499.74   79.63 3520.73   79.43 3526.73   79.57 3547.73   79.37 3589.73   79.28
 3604.72   79.48 3613.72   79.34 3649.71   79.44 3676.71   79.67  3721.7   79.52
  3757.7   79.53 3781.69   79.73 3790.69    79.6 3832.68   79.87 3853.69   79.74
 3916.68   79.81 3952.67   79.72 4036.66   79.86 4072.66   79.69 4081.66   79.94
 4102.65   79.81 4138.65   80.04 4165.64   79.84 4180.65   79.95 4189.65   79.75
 4204.64   79.95 4216.64    79.6 4243.63   79.56 4264.63   79.92 4282.63   79.59
 4309.63   79.65 4330.62   79.93 4345.62   79.77 4369.62   79.87 4393.61   79.69
 4408.62      80 4417.62   79.67 4441.61   79.89  4480.6   79.66  4489.6   79.81
 4507.61   79.61  4534.6   79.86 4573.59   79.54 4615.59   79.67 4639.59   79.89
 4648.58    79.7 4726.77   79.65 4735.58    79.9 4807.56   79.61 4816.56   79.83
 4858.56   79.61 4867.56   79.85 4909.55   79.37 4918.55   79.67 4933.54   79.37
 4942.55    79.6 4966.55   79.45 4978.54   79.59 5002.54   79.31 5017.53    79.7
 5029.53   79.44 5041.53   79.81 5062.53   79.94 5077.53   80.23 5092.53   79.94
 5101.53   80.42 5116.52   80.03 5128.52   80.53 5143.52   81.91 5155.52    81.3
 5170.52   81.09 5188.52   79.66 5218.51   79.09 5236.51   79.67 5245.51   79.35
  5266.5   79.44 5287.51   79.82  5320.5   79.49  5335.5   79.81 5350.49   79.25
 5365.49   79.66 5377.49   79.18 5401.49    79.2 5407.49   78.94 5431.48   78.62
 5443.48   79.37 5461.48   78.76 5491.48   78.75 5509.48    79.5 5515.48   79.22
 5530.47   79.16 5560.47   78.34 5584.46   79.53 5602.47   81.65 5611.78   81.12
 5618.77   80.16 5626.5979.74256 5630.41   79.36 5646.71   79.14 5656.01   77.78
    5663   76.32 5672.31   75.32 5681.62   75.79 5693.26   72.95 5711.87   70.52
 5725.84   68.24 5735.15   67.27 5749.12   66.72  5765.4   66.54 5774.72   65.01
 5784.03   65.28 5788.68   64.55 5793.33   62.25 5797.99   61.22 5810.06   59.93
 5817.63   57.63 5838.46   56.95 5852.66   56.92 5859.76   56.24 5866.86   56.43
 5888.16   56.19 5895.26   55.84 5902.36   56.16 5915.9855.74025 5923.66   55.63
 5937.86   52.24 5959.09   53.81 5959.51   59.32 5966.93   59.63 5981.82   60.88
  5989.3   62.23 6007.98   66.51 6015.72   67.77 6023.46   70.56  6028.1    71.6
  6034.3   74.53 6041.36   77.14 6046.68   77.73 6056.22      78 6088.48   78.25
 6093.13   79.04 6100.87   79.29 6124.05   78.83 6147.22   78.85 6175.35    78.5
 6202.85   78.45 6270.06   78.12 6297.87   77.82 6357.41   77.66 6378.09   77.97
 6398.78   77.78 6423.61   77.86 6481.54    77.6 6489.82   77.77 6506.36   79.15
 6514.64   79.04 6531.19   77.75 6539.47   77.54  6576.7   77.16 6638.54   77.09
 6643.17    77.2 6684.89   77.29  6729.8    77.1 6770.64   77.15 6798.45   77.09
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 6841.51   76.85 6870.47   77.01 6887.02    77.6 6899.44   79.75 6907.72   79.94
 6924.27   80.91 6944.95   80.82 6957.37   79.82 6965.64   79.57 6983.85   79.69
 7048.73   79.69 7092.77   79.54 7127.53   79.66 7148.39   79.55 7252.68   79.46
 7266.59   79.62 7299.03   79.46 7324.52   79.58  7375.5   79.35 7412.59   79.43
 7428.81   79.61 7470.52    79.6 7479.79   80.96 7484.43   79.99 7489.06   80.64
  7493.7   80.05 7509.92   79.89 7553.96    79.9 7609.58   79.72 7660.77   79.72
 7697.64   79.81 7750.94   79.72 7813.87   79.78  7851.1    79.6 7871.78   79.73
 7936.34    79.5 8053.85   79.54  8075.4   79.38 8114.79   79.32 8190.38   79.09
 8211.08   79.18 8246.89   78.98 8309.46   78.97 8411.43    78.8 8443.88   78.86
 8483.28   79.08 8534.26   79.68 8550.37   79.99 8599.16   80.38 8666.22    80.1
  8710.4   80.04 8747.49   79.66 8777.61   79.51 8793.83   79.22 8863.36   79.09
 8886.54   78.67 8905.08   78.53 8937.53    78.6 8942.16   78.13 8958.38   77.62
 8969.98   75.66 8976.93   74.78 8988.52    74.3 9007.06   74.08 9032.55   73.19
 9055.73   73.09 9062.68   72.86 9095.12    72.7 9102.08   73.09 9111.35   72.83
 9129.89   72.88 9148.43   73.17 9164.65   73.17 9180.88    73.5 9185.51   73.22
 9204.05   73.14  9222.6   73.31 9248.09   73.16 9292.12   72.73 9317.62   72.07
  9354.7   71.63 9373.24   71.21 9380.19   71.35 9389.46   70.98  9447.4   69.78
  9461.3   69.68 9491.44   69.01 9579.51   67.32 9605.47   66.61  9658.3   65.45
 9692.37   65.04 9717.19   64.94 9762.71   64.41 9795.04   64.64 9808.22   64.17
  9828.9   64.71 9845.45   64.92 9866.14   65.98  9882.7   67.65 9894.69   70.03
 9903.38   71.07 9915.79      73 9928.21   75.77 9940.62   77.57 9957.17   77.32
 9965.44   76.84 9992.04  76.7810036.07  77.0610049.97    76.610096.33    76.2
10191.35  76.5610246.81  77.3510255.09  77.6710279.91    77.910308.39   79.09
10321.13  82.6710335.02  84.3210348.81  84.4910361.68  80.8610368.13   80.27

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .114 5602.47    .066 5810.06    .025 5915.98    .066 6100.87    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5602.47 6100.87          1964.77    1391  1506.6             .1       .3
Left Levee      Station=   33.48      Elevation=88.24333
Right Levee     Station=10348.81      Elevation=   84.49
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  812.39 3304.65   79.01 3318.42 5149.74   80.78 7469.88 7490.53   80.87
 7490.5310333.91   80.92

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 127.7

INPUT
Description: RGV-02. Begin Wall, 8-foot wall applied with 10:1 SS, Bathymetric
             elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.72   19.39   87.11   22.62   87.83   46.62   88.07   47.29   88.07
   47.29   80.07   57.29   79.87  148.29   79.25  151.29   79.55  175.29   79.07
  181.29   78.47  191.29   78.27  197.29   77.67  198.16    77.6  204.72   76.35
  211.28   75.91  234.25   76.17  240.81   76.63  250.65   76.06  263.77   76.34
  276.89   75.98  286.73   76.62  296.57   75.86  303.13   75.99  316.25   77.77
  322.81    78.1  332.65   77.79  342.49   78.31  355.61   77.87  375.29   78.23
  401.53   78.33  427.78   78.95   440.9   78.43  447.46   78.65  483.54   78.97
  493.38   78.68  516.34   78.95  526.18   78.67  542.58   79.43  568.82   78.93
  581.94   79.13  601.62   78.56  608.18   78.68  663.95   78.66  680.35   79.03
  713.15   78.62  722.99   79.02  745.95   78.86  762.35   79.11  768.91   78.89
  831.24   79.25  841.08   79.02  867.32   79.14  896.84   79.08  913.24   79.41
  932.92   79.14  975.56   79.46  988.69   79.27 1024.77   79.75 1047.73   79.63
 1093.65   79.98 1106.77   79.72 1123.17   79.91 1136.29   79.62 1165.82   79.66
 1182.22   79.91 1195.34   79.56 1241.26   79.94 1260.94   80.26 1290.46    79.8
 1303.59   80.12 1329.83    79.9 1365.91   80.22 1375.75   79.89 1415.11   79.93
 1424.95   80.19 1447.91    79.8 1497.12   80.03 1513.52   80.71 1523.36   81.56
 1543.04   81.42 1569.28   80.71  1582.4   81.12 1605.36    80.9 1634.89   80.37
 1644.73   81.16 1654.57   80.09 1664.41   80.06 1670.97   79.46 1693.93   76.31
 1707.05   75.89 1720.17   76.26 1730.01   75.98 1756.25   75.98 1772.66    75.5
 1792.34   75.72 1821.86   75.48 1857.94   75.56  1864.5   75.73 1933.39   75.95
 1953.07   75.73 2002.27   75.97 2018.67   75.84 2028.51   76.13 2035.07   75.77
 2061.31   76.18 2080.99   75.82 2117.08   75.98  2130.2   75.62  2179.4   75.56
 2185.96   75.86  2195.8   75.31  2212.2   75.57 2238.44   75.39  2261.4   75.58
 2267.96   75.39 2330.29   75.48 2346.69   75.18 2353.25   75.47 2382.77    75.2
 2405.73   75.41 2415.57   75.18 2438.53   75.28 2468.05   75.14 2487.73   75.27
 2527.09   75.22 2553.34   74.93 2563.18   75.16 2605.82   74.34 2618.94    73.9
  2625.5   74.24 2664.86   74.13 2684.54   74.48 2697.66   74.26 2720.62   74.71
 2743.58   74.38 2766.55   74.51 2782.95   74.03 2796.07   74.76 2809.19   76.14
 2822.31   76.62 2838.71   76.32 2845.27    75.8 2864.95   75.87 2871.51   75.42
 2894.47   75.74 2920.71   75.53 2940.39   75.62 2969.91   76.03    3006   75.67
 3035.52   75.96 3048.64   75.84 3065.04   76.48 3081.44   76.05 3114.24    76.3
 3127.36   76.72  3137.2   76.54 3166.72   77.27  3186.4   77.52 3206.09   77.23
 3219.21   77.51 3261.85   77.66 3268.41   78.01 3288.09   77.82 3307.77   77.96
 3314.33    78.4 3324.17   77.97 3366.81   78.38 3399.61   78.47 3409.45   78.32
 3442.26    78.9 3465.22   78.76  3501.3   78.84 3547.22   79.31 3553.78   79.18
 3609.54    80.2 3642.34   81.61 3655.47   79.85 3668.59   80.15 3681.71   80.03
 3698.11   79.23 3714.51   79.47 3750.59   79.44 3766.99   79.63 3816.19    79.5
 3832.59   79.72 3855.55   79.41 3862.11   79.61 3885.08   79.31    3931    79.1
  3947.4   79.37 3957.24   79.15  3996.6   79.23 4026.12   79.58 4075.32    79.3
 4104.85   79.42 4114.69   79.27 4140.93   79.54 4150.77   79.36 4196.69   79.74
 4219.66   79.47 4249.18   79.57 4272.14   79.45 4288.54    79.6  4327.9   79.41
 4360.71   79.55 4370.55   79.38 4419.75   79.74 4436.15   79.46 4459.12   79.42
 4468.96   79.74 4491.92   79.54 4531.28   79.93  4560.8   79.68 4577.21   79.87
 4587.05   79.58 4603.45   79.91 4616.57   79.41 4632.97   79.52 4646.09   79.27
 4669.05   79.85 4688.73   79.38  4695.3    79.6 4718.26   79.47 4741.22   79.91
 4757.62   79.65 4783.86   79.83  4810.1   79.58 4826.51   80.03 4836.35    79.6
 4862.59   79.87 4875.71   79.59 4882.27   79.87 4905.23   79.55 4915.07   79.76
 4934.76   79.48 4964.28   79.82 5006.92   79.32 5020.04    79.5 5052.85   79.53
 5079.09   79.84 5088.93   79.55 5174.22   79.59 5184.06   79.93 5203.74   79.64
 5229.98   79.78 5239.82   79.55 5262.78   79.54 5272.62   79.87 5318.55   79.58
 5328.39   79.91 5341.51   79.56 5374.31   79.25 5384.15    79.7 5400.55   79.26
  5410.4    79.6 5436.64    79.3 5449.76   79.54    5476   79.11  5492.4   79.68
 5505.52   79.32 5518.64   79.84 5541.61   79.97 5558.01   80.29 5574.41   79.66
 5584.25   80.28 5600.65   79.62 5613.77   80.33 5630.17   82.34 5643.29   81.35
  5659.7   80.93 5679.38   79.44 5712.18   78.84 5731.86   79.67  5741.7   79.14
 5764.66   79.22 5787.63   79.82 5804.03   79.27 5823.71   79.18 5840.11   79.58
 5856.51   78.85 5872.91    79.5 5886.03   78.68 5912.28   78.87 5918.84   78.46
 5945.08   77.98  5958.2   79.14 5977.88   78.22 6010.69   78.16 6030.37    79.3
 6036.93   78.89 6053.33   78.83 6073.01   77.86 6086.13   77.51 6102.53   78.63
 6112.37   78.98 6132.06   81.48 6145.18   80.85 6155.02   79.53 6161.58   79.46
 6171.42   78.53 6194.37   78.79 6207.48   77.28 6217.32   75.47 6230.43    74.5
 6243.55   76.07 6259.94   73.01 6286.16   71.14 6305.83   68.16 6318.95   67.08
 6338.62   66.87 6361.56   67.31 6374.68   65.42 6387.79   66.23 6394.35   65.34
```

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  6400.9   62.09 6407.46   60.76 6424.46   59.03 6444.46   58.03 6464.46   57.53
 6484.46   57.53 6494.46   56.53 6504.46   56.83 6534.46   56.53 6544.46   56.03
 6554.46   56.53 6564.46   56.03 6584.46   55.83 6604.46   50.83    6614   60.73
 6617.27   60.84 6623.83   62.66 6640.22   71.66 6650.06   77.65 6656.61   78.39
 6676.28   78.77 6705.79   78.85 6735.29   78.38 6745.13    78.5 6777.91   78.06
  6794.3   78.07 6846.76   77.36  6869.7   77.39 6879.54   77.16 6895.93   77.61
 6912.32   77.35 6931.99   77.49 6977.89      77 6984.45   77.27 6997.56   79.37
 7004.12   79.09 7017.23   77.17 7023.79   76.86 7053.29   76.35 7086.07   76.12
 7122.14   76.41 7154.92   76.43 7174.59    76.2 7194.26   76.27  7233.6   76.08
 7243.43   76.23  7263.1      76 7286.05   76.17 7299.16   77.05    7309   80.27
 7315.56   80.55 7328.67   81.99 7345.06    81.8  7354.9   80.31 7361.45   79.92
 7381.12      80 7446.69   79.89 7528.65   79.87 7554.87   79.67 7567.99   79.78
  7610.6   79.71 7689.28   79.41 7738.46   79.35 7764.69   79.15 7813.86   79.25
  7853.2   79.01 7912.21   78.86 7935.16   78.99 7971.22   78.96 8033.51   79.23
 8063.01   79.06  8079.4   79.27 8135.14   79.11 8223.65   79.54 8240.04    79.4
 8331.83   79.54 8348.23   79.72 8371.17   79.64 8476.08   79.59 8525.26    79.4
 8541.65   79.48 8574.43   79.31 8617.05   79.56 8630.16   79.41 8662.95   79.66
 8708.84   79.28 8735.07   79.28 8839.97   78.19 8862.92   78.11 8885.87   77.68
 8905.54   77.67  8941.6   77.21 8971.11   77.38 8990.78   77.18 9013.73   77.28
  9033.4   77.02 9056.34   77.11 9089.13   76.91 9105.52   76.99 9121.91   76.67
 9148.14    76.6  9184.2      76 9203.87   75.37 9223.54   74.41 9269.43   73.06
 9292.38   72.05 9321.89    71.1 9348.11   70.49 9403.85   68.77 9439.91   67.88
 9453.02   67.35 9521.87   65.62 9541.54   65.46  9577.6   64.64 9584.15    64.9
 9603.82   64.81 9613.66   64.33 9630.05   64.59 9643.16   64.04    9653   64.54
 9659.55   64.22 9672.67   65.16 9689.06   68.07 9698.89   71.05 9708.73   75.32
 9718.56   77.99 9731.68   77.63 9738.23   76.97  9757.9   77.07 9826.75   76.79
 9866.09   76.32 9872.65   76.53 9895.59   76.45 9934.93   76.71 9961.16   77.16
 9967.72   77.61 9987.39   77.9810000.35   79.0410009.95   80.8510016.36   83.43
10019.56   83.8510041.98   84.3610048.38   82.8610054.78   80.5310061.19   80.17

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .114 6194.37    .066 6407.46    .025 6617.27    .066 6676.28    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6194.37 6676.28          1186.43    1486 1991.76             .1       .3
Left Levee      Station=   47.29      Elevation=   88.07
Right Levee     Station=10041.98      Elevation=   84.36
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 1664.03 3608.94   80.04 3644.24 5631.98   80.04 7331.1110023.65   81.98

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             81.94    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                 0.114      0.050      0.074
  W.S. Elev (ft)             81.89    Reach Len. (ft)          1186.43    1486.00    1991.76
  Crit W.S. (ft)             63.50    Flow Area (sq ft)       13123.64    8274.87    2987.67
  E.G. Slope (ft/ft)      0.000095    Area (sq ft)            13123.64    8274.87    2987.67
  Q Total (cfs)           20000.00    Flow (cfs)               2780.01   15606.99    1613.01
  Top Width (ft)           7270.93    Top Width (ft)           6137.51     481.91     651.51
  Vel Total (ft/s)            0.82    Avg. Vel. (ft/s)            0.21       1.89       0.54
  Max Chl Dpth (ft)          31.06    Hydr. Depth (ft)            2.14      17.17       4.59
  Conv. Total (cfs)       2051139.0    Conv. (cfs)              285108.8   1600605.0   165425.1
  Length Wtd. (ft)           1419.20    Wetted Per. (ft)         6141.08     493.35     652.49
  Min Ch El (ft)             50.83    Shear (lb/sq ft)            0.01       0.10       0.03
  Alpha                       4.17    Stream Power (lb/ft s)      0.00       0.19       0.01
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)    15856.10   12809.30   10108.71
  C & E Loss (ft)             0.01    Cum SA (acres)           4699.02     698.55    3212.24


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 127.4

INPUT
Description: RGV-02. 8-foot wall applied with 10:1 SS, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     455
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   79.04   12.99   79.88   25.98   80.25   32.47   81.26   58.44   87.78
   82.44   88.02   83.11   88.02   83.11   80.02   93.11   79.82  184.11   79.17
  187.11   79.47  211.11   78.99  217.11   78.39  227.11   78.19  233.11   77.59
  264.76    78.2  281.16   77.99  304.12   78.29  310.68   78.15  350.04   78.21
  359.88   78.43  366.44   78.15  376.28   78.35  402.52    78.2  415.64   78.51
   422.2   78.33  435.33   78.75  484.53    78.8  494.37   79.18  504.21   79.07
  537.01   79.11  543.57   79.29  573.09   79.08  602.61   79.21  664.93   79.04
  678.05   79.33  694.46   79.29   720.7   78.97  746.94   79.11  756.78   78.93
  766.62   79.25  776.46   79.02  783.02   79.39  789.58    79.1  822.38    79.3
  825.66    79.1  842.06   79.25  871.58   79.04   901.1   79.48   933.9   79.11
  953.59   79.67  973.27   79.28  983.11   79.54  992.95   79.39 1009.35   79.54
 1015.91   79.84 1038.87   79.47 1078.23   79.55 1084.79    79.9 1120.87   79.56
 1137.27    79.8 1160.23    79.8 1179.91   79.51 1189.75   79.69 1222.55   79.73
 1232.39   79.44 1242.23   79.78 1252.08   79.57  1265.2   79.96 1271.76   79.77
 1284.88   80.19 1294.72   79.88 1324.24   80.03 1340.64   79.83 1360.32   79.95
 1389.84   79.71 1399.68   79.81  1429.2   79.71 1455.44   80.15    1462   79.96
 1475.12   80.23 1488.24   79.91 1524.32   79.91 1547.28   80.09 1580.08   79.93
 1593.21   80.05 1606.33   79.88 1629.29   79.92 1635.85   80.11 1662.09   80.16
 1704.73      80 1734.25   80.22 1767.05   80.07 1790.01   80.25 1806.41      80
 1829.37   80.14 1875.29   80.25 1904.81   80.75 1924.49   80.73 1937.62   81.17
 1954.02   81.07 1963.86   80.71 1986.82    80.9 1996.66   80.54 2013.06   80.66
  2022.9   80.23 2029.46   80.36 2058.98   79.96 2068.82   79.61  2072.1   80.02
 2081.94   79.34  2088.5   79.49 2098.34   79.11  2104.9   79.62 2108.18   79.05
 2114.74   79.15 2127.86   78.49 2144.26   78.25 2163.94   77.53 2183.63   77.46
 2186.91   78.87 2190.19   78.54 2206.59   78.64 2213.15   78.13 2226.27      78
 2229.55   78.33 2239.39   77.75 2242.67   78.08 2259.07   78.02 2275.47   77.51
 2285.31    77.7 2318.11   77.29 2341.07   77.24 2347.63   77.48 2357.47   77.21
 2370.59   77.26 2396.84   76.69 2406.68   76.86 2423.08   76.55 2449.32   76.84
 2478.84   76.53  2485.4   76.69 2531.32    76.7 2554.28   76.29 2564.12   76.41
 2573.97   76.13 2583.81   76.58 2600.21   76.17 2613.33   76.16 2623.17   76.71
 2629.73    76.2 2636.29   76.41 2646.13   76.07 2655.97   76.33 2669.09   76.18
 2698.61   76.24 2705.17   76.58 2711.73   76.23 2754.37   76.64 2760.93   76.27
 2793.74   76.53 2797.02   76.37  2816.7   76.58  2849.5   76.38 2862.62   76.55
 2888.86   76.58 2905.26   76.42 2928.22    76.9 2954.46   76.62 2983.99    76.8
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3010.23	76.81	3036.47	77	3052.87	76.66	3065.99	76.96	3069.27	76.39		
3095.51	76.35	3102.07	76.57	3144.71	76.3	3177.51	76.69	3203.76	76.72		
3226.72	76.39	3246.4	76.86	3269.36	76.85	3289.04	76.49	3302.16	76.82		
3328.4	76.89	3348.08	76.46	3357.92	76.8	3361.2	76.49	3390.73	76.71		
3410.41	76.38	3443.21	76.68	3459.61	76.45	3472.73	76.59	3492.41	76.41		
3505.53	76.63	3518.65	76.41	3561.29	76.59	3603.94	76.49	3623.62	76.59		
3643.3	76.49	3679.38	76.57	3722.02	76.52	3761.38	76.57	3823.71	76.48		
3830.27	76.61	3882.75	76.52	3908.99	76.67	3974.59	76.52	4010.68	76.57		
4050.04	76.51	4112.36	76.67	4161.56	76.59	4319.01	76.48	4332.13	76.55		
4374.78	76.4	4433.82	76.43	4466.62	76.27	4505.98	76.5	4535.5	76.3		
4558.46	76.44	4568.3	76.25	4587.99	76.4	4617.51	76.31	4630.63	76.14		
4647.03	76.32	4699.51	76.26	4774.96	76.38	4784.8	76.23	4817.6	76.42		
4850.4	77.04	4896.32	76.89	4902.88	76.29	4909.44	76.81	4965.2	76.87		
4978.33	76.75	5001.29	77	5020.97	76.97	5030.81	76.75	5063.61	76.77		
5073.45	76.89	5096.41	76.63	5152.17	76.85	5165.29	76.63	5194.82	76.61		
5198.1	76.43	5217.78	76.68	5221.06	76.51	5244.02	76.63	5286.66	76.34		
5322.74	76.39	5339.14	76.18	5378.45	76.48	5394.79	76.44	5404.59	75.49		
5417.65	78.69	5424.19	80.82	5430.72	81.42	5450.32	81.2	5456.85	79.96		
5460.12	78.36	5466.65	76.32	5473.19	75.38	5482.99	74.87	5492.79	74.76		
5518.92	73.28	5541.79	72.48	5551.59	71.77	5584.25	72.12	5590.79	72		
5603.85	72.66	5607.12	73.28	5613.65	75.75	5623.45	78.66	5626.72	78.96		
5636.52	75.95	5639.79	75.84	5646.32	77.18	5656.12	77.34	5665.92	76.18		
5672.45	73.33	5678.99	71.91	5685.52	69.13	5692.05	66.93	5701.85	66.34		
5708.39	65.33	5718.19	64.92	5724.72	61.49	5731.25	60.66	5800.25	55.8		
5812.25	55.7	5824.25	55.2	5837.25	55.4	5858.25	56.4	5865.25	56.6		
5886.25	56.8	5894.25	56.5	5915.25	56.7	5933.79	56.1	5937.06	60.83		
5943.59	62.85	5959.9	69.33	5963.16	71.3	5966.42	74.66	5969.69	75.54		
5982.74	77.86	5986	79.16	5992.52	83.26	5995.79	84.6	6002.31	85.37		
6018.62	85.07	6054.51	83.52	6067.56	83.64	6077.35	82.93	6083.87	81.55		
6090.4	81.04	6096.92	79.86	6106.71	79.56	6129.55	78.4	6136.07	78.45		
6149.12	77.36	6155.65	77.16	6175.22	75.79	6194.8	75.53	6217.63	75.92		
6233.95	75.7	6240.47	75.91	6260.05	75.95	6273.1	75.76	6279.62	75.96		
6302.46	75.65	6308.98	75.86	6338.35	75.63	6344.87	75.89	6364.45	75.57		
6387.28	75.74	6400.33	75.45	6423.17	75.37	6442.75	75.74	6459.11	75.44		
6491.91	75.38	6531.27	75.47	6541.1	75.28	6557.5	75.42	6567.34	75.26		
6619.82	75.5	6665.74	75.19	6688.7	75.32	6705.09	75.19	6734.61	75.35		
6741.17	75.2	6764.13	75.31	6777.25	75.14	6783.81	75.34	6836.29	75.4		
6852.68	75.65	6872.36	75.53	6908.44	75.95	6954.36	76.18	6983.88	76.21		
7000.27	75.99	7006.83	76.79	7019.95	75.79	7023.23	76.32	7033.07	76.71		
7042.91	76.31	7059.31	76.53	7111.79	76.49	7121.63	76.26	7134.75	76.46		
7187.22	76.48	7203.62	75.86	7210.18	77.2	7216.74	76.68	7256.1	76.98		
7272.5	77.24	7302.02	77.44	7308.57	77.64	7344.65	78.12	7351.21	78.01		
7387.29	78.45	7416.81	78.48	7436.49	78.92	7456.17	78.84	7485.68	79.16		
7492.24	79.07	7498.8	80.15	7502.08	78.78	7505.36	79.77	7511.92	79.28		
7518.48	79.66	7538.16	79.65	7603.76	79.11	7610.31	79.25	7656.23	79.4		
7666.07	79.24	7711.99	79.22	7728.39	79.03	7744.79	79.11	7777.58	78.88		
7790.7	79.04	7823.5	78.85	7846.46	79.02	7879.26	78.64	7892.38	78.77		
7912.06	78.64	7918.61	78.83	7931.73	78.55	7957.97	78.61	7984.21	78.36		
8000.61	78.48	8020.29	78.31	8030.13	78.51	8049.81	78.3	8056.37	78.47		
8082.6	78.27	8112.12	78.42	8144.92	78.19	8177.72	78.22	8203.96	78		
8243.31	78.34	8253.15	78.07	8262.99	78.23	8299.07	78.1	8318.75	78.32		
8335.15	78.22	8358.11	78.31	8364.67	78.17	8440.11	78.43	8466.35	78.34		
8472.91	78.55	8489.31	78.45	8545.06	78.72	8571.3	78.61	8597.54	78.76		
8604.1	78.52	8610.66	79.46	8613.94	78.6	8620.5	79.64	8623.78	78.8		
8653.3	78.88	8682.82	79.1	8712.34	78.83	8722.18	79.11	8741.86	79.12		
8754.98	79.35	8768.1	80.06	8781.21	82.51	8791.05	83.81	8814.01	83.98		
8823.85	82.48	8830.41	80.64	8836.97	79.71	8846.81	79.23	8856.65	79.43		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	5665.92	.07	5724.72	.025	5937.06	.07	6002.31	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5665.92 6002.31 1737.71 1757.01 769.76 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	5665.92	76.18	T
6002.31	8856.65	85.37	T

Left Levee Station= 83.11 Elevation= 88.02
Right Levee Station= 8814.01 Elevation= 83.98

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	81.84	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.03	Wt. n-Val.	0.066	0.044		
W.S. Elev (ft)	81.82	Reach Len. (ft)	1737.71	1757.01	769.76	
Crit W.S. (ft)	63.58	Flow Area (sq ft)	22818.43	6630.63		
E.G. Slope (ft/ft)	0.000046	Area (sq ft)	23268.82	6630.63	11620.95	
Q Total (cfs)	20000.00	Flow (cfs)	8862.94	11137.06		
Top Width (ft)	8601.99	Top Width (ft)	5582.81	324.30	2694.88	
Vel Total (ft/s)	0.68	Avg. Vel. (ft/s)	0.39	1.68		
Max Chl Dpth (ft)	26.62	Hydr. Depth (ft)	4.09	20.45		
Conv. Total (cfs)	2961279.0	Conv. (cfs)	1312282.0	1648997.0		
Length Wtd. (ft)	1750.78	Wetted Per. (ft)	5589.22	334.54		
Min Ch El (ft)	55.20	Shear (lb/sq ft)	0.01	0.06		
Alpha	3.55	Stream Power (lb/ft s)	0.00	0.09		
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	15360.49	12555.05	9774.72	
C & E Loss (ft)	0.01	Cum SA (acres)	4539.41	684.80	3135.73	

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 127.05*

INPUT
Description: RGV-02
Station Elevation Data num= 458

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.35	17.4	82.72	39.14	87.27	63.14	87.51	63.81	87.51
63.81	77.51	73.81	77.31	164.81	75.59	167.81	76.34	191.81	75.86
197.81	74.36	207.81	74.16	213.81	72.66	216.6	72.69	230.81	72.59
250.7	72.74	256.38	72.67	290.48	72.7	299	72.81	335.94	72.69
352.99	72.76	375.44	73.2	406.99	73.11	421.98	73.41	429.74	73.26
460.77	73.52	491.78	73.38	499.54	73.71	518.93	73.92	526.69	73.68

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  534.44   73.81   542.2   73.63  553.84   73.69  573.23   74.26  588.73   76.27
  592.61   76.97  608.12   78.97  634.32   79.05  643.03   79.22   659.9   79.09
  665.58   79.39   681.8    78.8  705.07   78.78  720.59   78.98  732.22   78.81
  751.61   78.87  767.88   78.63  778.75   78.31  786.51   78.49  796.29   78.34
  813.35   78.62   830.4   78.42  838.92   78.54  861.66   78.55  867.34   78.68
  887.23   78.57  921.33   78.54     930   78.77  958.27   78.56  972.48   78.73
  992.37   78.76 1009.42   78.59 1046.36   78.71 1054.88   78.58 1065.73   78.78
 1083.31   78.89 1088.99   78.79 1100.35      79 1134.45   78.96 1148.66   78.83
 1165.71   78.91 1191.28    78.8 1225.38   78.78 1248.11   79.07 1265.16   79.09
 1276.53   78.93 1327.68   79.05 1341.07   78.96 1367.47   79.06 1378.83   78.96
 1427.14   79.18 1464.08   79.06 1489.66   79.19 1518.07   79.16 1537.96   79.22
 1552.17    79.1 1611.84   79.33 1635.78   79.56 1647.42   79.46 1665.84   79.98
 1678.45   79.94 1682.32   79.46 1693.96   77.23 1701.72   76.42 1716.99   75.67
 1739.72   75.19 1752.12   75.21 1759.88   74.52 1782.34   74.53 1790.87   74.22
 1805.08   74.18 1810.76   74.46 1830.65   73.92 1844.86   73.81 1861.91   73.42
 1878.96   73.35 1881.81   74.06 1884.65    73.9 1898.86   73.98 1904.54   73.74
 1918.75   73.87 1927.27   73.59 1930.11   73.75 1944.32   73.71 1958.53   73.45
 1973.17   73.58 1988.69    73.4 2040.93   73.42 2063.67   73.19  2072.2    73.3
 2086.41   73.16 2109.14   73.31 2134.71   73.16  2140.4   73.26 2180.18    73.4
 2217.13   73.13 2225.65   73.34 2239.86   73.11 2251.22   73.11 2259.75   73.44
 2265.43    73.2 2279.64   73.15 2288.16    73.3 2299.53   73.24 2336.47   73.39
  2372.6    73.7 2379.09   73.51 2427.41   73.73 2455.82   73.76 2489.92   73.96
 2504.13   73.94 2523.84   74.28 2546.75   74.15 2582.02   74.33 2632.01   74.81
 2643.38   75.15 2646.22   74.91 2668.95   75.01 2674.63   75.13 2702.24   75.19
 2729.37   75.66 2741.01   76.09 2764.28   76.49 2782.62   76.21 2799.67   76.45
 2819.56   76.51 2836.61   76.34 2853.47   76.69 2870.71   76.71 2887.76    76.5
 2899.12   76.51 2924.71   76.74 2934.92    76.6 2969.81   77.42 2984.38   77.32
 2995.74   77.46 3012.79   77.34 3024.16   77.46 3051.26   77.28 3109.41   77.35
 3126.46   77.42 3175.35   77.35 3210.25    77.4 3225.77   77.35 3373.69    77.4
  3450.7   77.34  3485.6   77.42 3516.63   77.39 3549.87   77.49 3594.19    77.4
  3679.5   77.51 3698.89   77.47 3714.41   77.55 3780.33   77.59 3788.08   77.52
 3830.75   77.62 3856.78    77.5 3869.52   77.65 3961.92   77.68 3998.86   77.53
  4032.4   77.68 4059.55   77.63 4071.19   77.69 4109.96   77.67  4121.6   77.84
 4132.42   77.71 4160.84   77.72 4189.25   78.04 4229.04   78.02 4234.72   77.72
 4241.82   77.92  4280.6   78.03 4300.08   77.91 4319.97   78.09 4345.55   77.96
 4382.49   78.04 4402.38   77.87 4450.69   78.01 4487.63   77.83 4490.48   77.73
 4530.26   77.86 4552.07   77.75 4559.83   77.57 4598.45   77.71 4641.12   77.52
 4660.87   77.59 4669.36   77.14 4680.68   78.73 4686.34   79.79    4692   80.08
 4708.98   79.95 4714.64   79.32 4723.13    77.5 4728.79   77.03 4745.77   76.72
 4768.41   75.99 4788.22    75.6 4796.71   75.25 4825.01   75.33 4830.82   75.25
 4844.82   76.12 4858.97   79.05  4861.8   79.31 4868.36   77.77 4874.92   78.35
 4888.05   77.43 4892.42      76  4896.8   75.17 4905.54    71.5  4912.1   69.84
 4923.04   66.19 4927.42   63.36 4939.38   60.35 4945.84   59.86 4954.56   57.15
 4958.21 56.5882 4974.31   54.11 4994.05   53.07 5002.06   53.42 5011.38   53.47
 5026.07   53.83 5034.07   54.48 5041.5654.73495 5050.08   54.67 5058.08   56.35
 5074.09   58.66 5076.71   58.74 5081.95   59.98 5089.81   61.11 5100.29   61.48
 5108.15   60.57 5113.39    60.8 5118.63   61.89 5126.49   62.68 5136.97    64.4
 5140.01   66.84  5152.7   67.78 5168.42   70.57 5173.66   71.29 5179.14   73.04
 5183.48    75.1 5205.23   77.39 5209.57   78.25 5218.26   80.58 5222.62   81.23
  5231.3   81.73  5244.3   81.57 5252.09   81.15 5262.49   81.18 5301.84   80.73
 5319.47   80.96  5332.7   80.68 5341.51   80.01 5350.84   79.85 5359.14   79.31
 5369.04   79.32 5376.83   79.09 5403.23   78.72 5412.04   78.75 5429.68   78.33
  5439.2    78.4 5459.99   77.65 5496.37   77.44 5522.25   77.84  5544.3    77.8
 5566.54   77.99 5592.57   77.85 5602.98   77.99  5618.6   77.91 5636.81   77.66
 5660.25   77.75 5673.25    77.6 5694.17   77.79 5720.63   77.47 5751.48   77.51
 5769.11   77.34    5806   77.31 5816.41   77.46  5899.7   77.02 5954.36   77.13
 5959.32   77.05 6016.82   76.79 6024.63   76.96 6065.69   76.93 6110.53   76.65
 6158.76   76.61 6220.79   76.49 6229.66   76.38 6251.08   76.45 6278.41   76.25
 6287.27   76.33 6326.56   76.37 6339.57   76.28 6380.33   76.35 6406.92   76.26
 6428.06   76.42 6443.68    76.4 6467.11   76.54 6477.52   76.45 6519.16   76.54
 6529.57   76.48 6557.61   76.58 6579.75    76.4 6588.62   76.84 6606.35   76.29
 6610.78   76.54 6624.07   76.69 6637.37   76.45 6659.71   76.49 6685.74   76.32
 6730.44   75.94 6743.74   75.74 6761.46   75.74 6823.68   75.43 6841.91   75.23
 6854.52   74.88 6863.39   75.53 6872.25   75.24 6914.79   75.15  6930.4   75.22
 6969.44   75.21 6987.48   75.15 7045.08   75.35 7053.95    75.2 7091.77   75.23
 7104.79   75.35 7133.42   75.21 7169.18   75.59 7193.28   75.52 7235.64   75.84
 7244.51   75.81 7253.37   76.37  7257.8    75.7 7262.23   76.21  7271.1   75.98
 7279.96    76.2 7323.42   76.33 7354.65   76.55 7365.07   76.52 7383.28   76.68
 7430.13   76.81 7453.56   77.01  7484.8   76.99  7492.6   76.79 7500.41   76.16
 7516.03    75.6 7531.64   74.71 7542.05   74.39 7552.47   74.33 7565.48   74.02
  7583.7   74.13 7617.54   73.57 7627.95    73.6 7640.96   73.94 7646.17   73.53
 7659.18   73.16  7682.6   73.22 7693.02   73.11 7739.87   73.47 7747.67   73.42
 7789.32   73.93 7810.14   74.32 7830.96   76.33 7841.38   76.21 7849.19    77.4
    7870    78.1 7880.42      78 7896.03   77.52 7916.86   77.52 7929.87   77.72
 7932.47   77.33 7948.09   78.27 7961.11    79.4 7971.31   79.48 7976.72   79.02
 7992.34   78.62 8010.55   79.02 8018.36   78.89 8093.84    78.9 8132.89   78.65
 8158.91   78.75 8206.19   78.47 8259.36   78.57 8272.65    78.4 8285.95   78.54
 8325.49   78.35 8335.91   78.46 8361.29   78.47 8390.56   78.33 8398.37   78.41
 8421.79   78.23 8445.22   78.33 8484.27   78.32 8497.27   78.19 8507.69   78.27
 8549.33   78.16 8560.73   78.06 8585.77   78.13 8596.19   78.01 8635.22   78.06
 8682.07   77.98 8702.54   77.86 8737.99   77.91 8746.86   77.78 8755.72   78.21
 8760.15   77.76 8769.02   78.23 8773.45    77.8 8807.01   77.87 8817.42   77.76
 8830.43   77.87 8853.22   77.87 8893.11   77.69 8911.12   77.91 8929.34   77.95
 8937.14   78.16 8947.56   79.08 8957.97   79.11 8968.46   79.46 8986.17   80.79
 8999.46   81.48 9030.49   81.72 9043.78   81.15 9052.65   80.15 9064.68   79.81
  9075.1   80.35 9080.29   81.23 9088.11   81.68

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .11  4861.8    .066 4958.21    .025 5041.56    .066  5231.3    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4861.8  5231.3          1737.71 1757.01  769.76             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  5231.3 9088.11   81.73       T
Left Levee      Station=   63.81      Elevation=   87.51
Right Levee     Station= 9030.49      Elevation=   81.72
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
   40.16  4853.7   79.25

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 126.7

INPUT
Description: RGV-02. Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     461
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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.35	17.4	82.72	39.14	86.97	63.14	87.21	63.81	87.21
63.81	77.21	73.81	77.01	164.81	70.12	167.81	70.87	191.81	70.39
197.81	68.89	207.81	68.69	213.81	67.19	286.38	67.19	302.77	67.63
335.57	67.38	342.13	67.72	348.69	67.45	374.93	67.77	401.16	67.64
407.72	68.25	424.12	68.66	430.68	68.21	437.24	68.48	443.8	68.16
453.64	68.32	460.2	68.93	470.04	69.23	483.15	73.24	486.43	74.7
499.55	78.93	522.51	79	529.07	79.5	538.91	78.93	548.75	79.42
561.86	78.43	581.54	78.44	594.66	78.74	604.5	78.49	620.9	78.53
643.85	77.28	650.41	77.75	666.81	77.41	676.65	77.65	693.05	77.5
699.61	77.65	722.56	77.5	735.68	77.67	768.48	77.51	771.76	77.67
794.72	77.56	817.67	77.74	847.19	77.64	883.27	77.73	886.55	77.84
919.34	77.8	925.9	78	955.42	77.82	978.37	77.9	1027.57	77.84
1047.25	78.05	1057.08	77.92	1099.72	78.1	1119.4	77.91	1135.79	78.1
1152.19	78.03	1188.27	78.22	1234.18	78.08	1260.42	78.29	1280.1	78.19
1306.33	78.21	1342.41	78.41	1368.64	78.4	1378.48	78.18	1398.16	78.95
1404.72	78.79	1408	77.94	1417.84	73.7	1424.4	72	1434.24	70.99
1447.35	70.14	1467.03	70.17	1473.59	68.91	1486.71	69.26	1493.27	69.01
1519.51	69.34	1545.74	69.37	1575.26	69.24	1611.33	69.43	1647.41	69.38
1653.97	69.54	1667.09	69.42	1690.04	69.65	1703.16	69.54	1742.52	69.76
1791.71	69.8	1821.23	70.06	1847.46	70.19	1886.82	70.03	1896.66	70.18
1926.17	70.28	1991.77	70.77	2011.44	70.71	2044.24	70.93	2060.64	71.14
2080.31	71.21	2119.67	71.66	2152.47	71.7	2168.87	71.85	2178.7	72.14
2195.1	72.33	2227.9	73.62	2247.58	73.69	2270.54	74.01	2277.09	74.5
2293.49	74.78	2303.33	75.49	2323.01	76.29	2342.69	75.97	2368.93	76.17
2378.76	76.07	2398.44	76.54	2437.8	76.54	2460.76	76.79	2467.32	76.69
2477.15	77.29	2496.83	78.17	2503.39	78.08	2516.51	78.34	2536.19	78.26
2555.87	78.36	2565.71	78.07	2585.38	78.01	2618.18	78.24	2664.1	78.25
2670.65	78.14	2700.17	78.28	2713.29	78.15	2788.72	78.28	2795.28	78.17
2818.24	78.24	2844.48	78.09	2867.43	78.21	2903.51	78.12	2933.03	78.31
2959.27	78.21	2975.66	78.34	3024.86	78.21	3097.01	78.51	3113.41	78.43
3126.53	78.61	3152.77	78.55	3182.28	78.77	3188.84	78.63	3224.92	78.82
3251.16	78.71	3257.71	78.94	3274.11	78.81	3300.35	79.03	3306.91	78.85
3326.59	78.96	3379.06	78.92	3395.46	79.07	3418.42	78.99	3428.26	79.09
3461.05	78.98	3470.89	79.31	3493.85	79	3539.77	79.06	3566	79.17
3572.56	79.03	3605.36	79.21	3621.76	79.07	3641.44	79.19	3667.67	79.16
3674.23	79.29	3713.59	79.08	3729.99	79.18	3769.34	79.17	3782.46	79.02
3821.82	79.11	3834.94	79.05	3841.5	78.74	3861.14	79.02	3887.33	79.04
3910.25	78.61	3933.17	78.8	3975.73	78.67	4047.77	78.73	4070.68	78.5
4077.23	78.86	4090.33	79.09	4096.88	79.65	4103.42	79.55	4106.7	78.69
4113.25	78.66	4116.52	78.12	4123.07	72.75	4129.62	65.58	4136.17	60.83
4139.44	60.53	4143.86	56.04	4153.86	52.04	4163.86	50.94	4173.86	51.54
4193.86	51.54	4203.86	51.74	4213.86	52.74	4223.86	53.04	4233.86	52.74
4243.86	56.04	4253.86	58.54	4263.86	60.53	4267.13	60.68	4273.68	63.3
4283.5	65.71	4290.05	65.79	4296.6	66.37	4306.42	64.5	4312.97	64.92
4319.52	67.17	4329.34	68.94	4335.89	71.09	4342.43	72.63	4348.98	73.3
4362.08	72.8	4381.72	73.72	4388.27	73.59	4398.09	75.29	4404.64	75.95
4411.19	75.99	4424.29	76.66	4440.66	77.91	4457.03	77.82	4460.3	78.08
4470.12	77.76	4476.67	77.94	4486.49	77.21	4499.59	77.58	4512.69	77.58
4529.06	77.88	4548.7	77.94	4578.17	78.39	4604.36	78.5	4610.91	78.73
4627.28	78.77	4633.83	79	4643.65	78.79	4660.02	79.03	4692.76	79.06
4709.13	79.27	4722.23	79.67	4748.42	79.25	4768.07	79.46	4784.44	79.46
4794.26	79.28	4810.63	79.65	4846.64	79.91	4869.56	79.86	4882.67	80.05
4899.07	79.87	4915.47	79.89	4928.58	80.08	4941.7	79.82	4948.26	79.99
4971.21	79.67	5000.73	79.72	5017.12	79.49	5046.64	79.71	5053.2	79.47
5085.99	79.32	5141.74	79.23	5161.41	79.3	5184.37	79.17	5197.49	79.33
5213.88	79.06	5230.28	79.14	5279.47	78.9	5302.42	78.65	5325.38	78.84
5335.22	78.68	5354.89	78.68	5371.29	78.91	5400.8	78.53	5443.43	78.4
5449.99	78.24	5459.83	78.55	5541.81	78.25	5568.05	78.03	5600.84	78.04
5627.07	77.9	5653.31	77.93	5718.89	77.56	5745.13	77.62	5751.69	77.46
5791.04	77.31	5840.23	77.36	5856.62	77.17	5866.46	77.28	5899.26	77.07
5945.17	76.99	5968.12	77.13	5987.8	76.95	6017.31	77.08	6030.43	76.87
6050.1	76.99	6056.66	76.88	6082.9	76.9	6096.01	76.77	6138.64	76.98
6155.04	76.75	6168.16	76.91	6259.98	76.45	6266.54	76.28	6292.77	76.13
6322.29	75.69	6358.36	75.29	6420.66	74.72	6466.57	74.39	6476.41	74.2
6489.53	74.25	6499.37	73.94	6564.95	73.6	6581.35	73.39	6601.03	73.4
6617.42	73.2	6650.21	73.07	6689.57	72.71	6722.36	72.56	6745.31	72.58
6755.15	72.4	6804.34	72.11	6820.74	72.24	6837.13	72	6856.81	71.94
6883.04	72.29	6932.23	72.19	6938.79	72.33	7033.89	72.7	7096.2	73.11
7135.55	73.74	7148.67	73.75	7171.62	74.17	7230.65	74.31	7260.16	74.65
7279.84	74.52	7299.52	74.74	7309.35	74.34	7319.19	73.08	7329.03	72.37
7338.87	71.98	7345.43	71.17	7351.98	70.97	7358.54	70.2	7371.66	69.56
7384.78	69.54	7401.17	69.01	7404.45	69.35	7411.01	68.93	7424.13	69.16
7443.8	68.61	7466.76	68.2	7479.88	68.31	7496.27	68.9	7502.83	68.03
7519.23	67.32	7532.35	67.31	7548.74	67.55	7561.86	67.37	7601.21	67.7
7620.89	68.07	7630.72	68.04	7660.24	68.8	7683.19	69.12	7693.03	69.57
7709.43	70	7735.66	73.99	7748.78	73.86	7758.62	76.24	7768.46	76.91
7778.29	77.08	7784.85	77.59	7797.97	77.44	7817.64	76.59	7843.88	76.63
7860.28	76.96	7863.55	76.18	7870.11	77.12	7883.23	78.17	7899.63	80.45
7912.74	80.44	7919.3	79.58	7925.86	79.2	7938.98	78.9	7945.54	79.25
7961.93	79.59	7971.77	79.37	7984.89	79.55	8060.31	79.32	8066.87	79.45
8076.71	79.07	8083.27	79.27	8096.38	79.16	8109.5	79.31	8116.06	79.11
8148.85	79.28	8168.53	79.05	8198.04	78.94	8257.07	78.89	8296.42	78.71
8302.98	78.86	8339.05	78.78	8358.73	78.58	8371.85	78.81	8381.68	78.7
8424.31	78.55	8440.71	78.42	8450.55	78.55	8480.06	78.27	8486.62	78.45
8503.02	78.28	8509.58	78.43	8542.37	78.26	8558.77	78.31	8575.16	78.02
8588.28	78.15	8604.68	77.99	8640.75	77.96	8647.31	77.81	8676.82	77.66
8686.66	77.78	8699.78	77.55	8716.17	77.59	8742.41	77.41	8748.96	77.51
8768.64	77.36	8807.99	77.29	8814.55	77.12	8886.7	77.06	8919.49	76.81
8952.28	76.74	8965.4	76.87	8978.52	76.62	8994.91	76.76	9027.71	76.63
9090.01	76.53	9096.57	76.7	9119.53	76.79	9129.36	77.15	9142.48	78.85
9155.6	78.57	9162.16	78.88	9178.55	78.83	9185.11	79.05	9237.58	79.27
9263.81	79.82	9270.37	79.54	9290.05	80.03	9303.17	81.47	9309.72	83.14
9319.56	83.94								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	4116.52	.066	4129.62	.025	4273.68	.066	4460.3	.074

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4116.52	4460.3	587.49	1806.25 1797.03	.1	.3

Left Levee Station= 63.81 Elevation= 87.21
Right Levee Station= 9319.56 Elevation= 83.94
Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
23.66	4116.52	78.12	4461	4600.13	78.08	4721.94	4883.85	80.02
4929.12	7902.81	80.1	7914.4	9551.37	80.46			

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	81.33	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.07	Wt. n-Val.	0.110	0.051	0.074	

W.S. Elev (ft)	81.26	Reach Len. (ft)	587.49	1806.25	1797.03	
Crit W.S. (ft)	63.03	Flow Area (sq ft)	11712.58	5639.97	5542.05	
E.G. Slope (ft/ft)	0.000183	Area (sq ft)	11712.58	5639.97	5542.05	
Q Total (cfs)	20000.00	Flow (cfs)	4336.47	14017.55	1645.98	
Top Width (ft)	9237.46	Top Width (ft)	4052.71	343.78	4840.97	
Vel Total (ft/s)	0.87	Avg. Vel. (ft/s)	0.37	2.49	0.30	
Max Chl Dpth (ft)	30.32	Hydr. Depth (ft)	2.89	16.41	1.14	
Conv. Total (cfs)	1479634.0	Conv. (cfs)	320819.6	1037042.0	121772.1	
Length Wtd. (ft)	1641.64	Wetted Per. (ft)	4056.44	356.63	4841.73	
Min Ch El (ft)	50.94	Shear (lb/sq ft)	0.03	0.18	0.01	
Alpha	5.72	Stream Power (lb/ft s)	0.01	0.45	0.00	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	14214.26	12053.89	9319.03	
C & E Loss (ft)	0.01	Cum SA (acres)	4155.82	656.51	3002.47	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 126.35*

INPUT
Description: RGV-02
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.16	48.05	83.84	86.73	84.57	94.9	84.9	105.1	86.97
129.1	87.21	129.77	87.21	129.77	77.21	139.77	77.01	230.77	71.98
233.77	72.73	257.77	72.25	263.77	70.75	273.77	70.55	279.77	69.05
314.84	69.07	360.77	68.98	379.06	69.01	396.27	69.34	430.7	69.15
437.59	69.41	444.48	69.21	472.03	69.46	499.56	69.39	506.45	69.84
523.67	70.15	530.55	69.84	537.44	70.02	544.33	69.76	554.66	69.89
561.55	70.36	571.88	70.6	585.64	73.61	589.08	74.7	602.86	77.87
626.96	77.93	633.85	78.31	644.18	77.9	654.51	78.27	668.27	77.54
688.93	77.58	702.71	77.78	713.04	77.6	730.26	77.6	754.35	76.71
761.24	77.06	778.45	76.81	788.79	76.98	806	76.86	812.89	76.97
836.98	76.89	850.76	77	885.19	76.91	888.64	77.03	912.74	76.95
936.83	77.09	967.83	77.04	1005.7	77.08	1009.15	77.17	1043.57	77.17
1050.46	77.32	1081.45	77.15	1109.98	77.28	1115.72	77.19	1173.13	77.29
1187.49	77.22	1196.1	77.36	1227.67	77.48	1253.5	77.29	1273.6	77.4
1305.17	77.38	1310.91	77.55	1374.07	77.4	1391.3	77.63	1422.87	77.5
1428.61	77.71	1445.84	77.57	1465.93	77.72	1503.24	77.66	1515.27	77.73
1525.6	77.54	1546.26	78.17	1553.15	78.04	1556.59	77.4	1566.92	74.21
1573.81	72.92	1584.14	72.22	1597.9	71.55	1618.56	71.57	1625.45	70.73
1639.22	70.92	1646.11	70.71	1663.99	70.99	1669.74	70.92	1704.18	71.03
1724.28	70.9	1744.37	71.06	1807.93	71.03	1821.88	71.19	1830.49	71.02
1852.69	71.24	1882.16	71.23	1953.93	71.41	1965.4	71.36	1990.42	71.55
2031.43	71.72	2059.28	71.53	2069.61	71.65	2103.2	71.74	2180.7	72.26
2192.18	72.07	2278.29	72.6	2304.13	72.92	2315.62	72.77	2327.09	72.91
2355.39	73.02	2382.92	73.42	2413.22	74.19	2417.36	74.45	2436.18	74.39
2462.12	74.69	2469	75.05	2486.22	75.22	2496.55	75.86	2517.21	76.38
2537.87	76.16	2575.74	76.22	2596.4	76.56	2614.16	76.63	2637.72	76.57
2661.82	76.82	2668.71	76.72	2699.69	77.86	2706.58	77.77	2728.98	78.06
2743.33	77.94	2761.68	77.99	2789.26	77.73	2843.8	77.97	2852.41	77.88
2875.3	77.99	2892.6	77.86	2913.17	78.01	2950.01	77.87	2967.23	78.04
2981.59	77.96	3006.13	78.05	3013.02	77.88	3050.48	77.92	3067.7	77.79
3096.41	78.01	3105.02	77.89	3136.6	77.91	3157.64	78.04	3185.18	77.96
3208.36	78.14	3239.94	77.98	3245.68	78.12	3260.03	78.01	3329.79	78.26
3357.63	78.24	3369.11	78.42	3380.6	78.24	3397.82	78.3	3415.04	78.52
3435.14	78.37	3463.84	78.54	3481.07	78.46	3498.5	78.67	3515.72	78.5
3543.26	78.75	3561.44	78.57	3615.97	78.62	3633.2	78.74	3667.22	78.72
3690.6	78.8	3711.97	78.68	3722.3	78.9	3746.41	78.7	3762.37	78.79
3799.68	78.75	3819.77	78.9	3831.26	78.73	3859.96	78.96	3877.19	78.81
3901.36	78.93	3914.5	78.86	3935.78	78.99	3977.65	78.84	4023.57	78.96
4066.63	78.79	4086.73	78.9	4104.5	78.78	4111.39	78.54	4135.52	78.86
4159.5	78.85	4183.56	78.52	4224.5	78.67	4230.25	78.58	4270.43	78.52
4299.13	78.64	4333.58	78.56	4351.99	78.59	4368.01	79.16	4373.76	79.16
4379.5	79.79	4382.78	79.68	4389.28	78.51	4394.19	76.98	4404	75.3
4408.89	73.64	4415.59	69.82	4418.69	68.51	4428.49	63.01	4430.4762.24098	
4438.3	59.2	4443.19	59.02	4449.8	55.76	4464.77	52.73	4479.73	51.61
4487.98	52.1	4512.71	52.35	4520.95	53.07	4529.19	53.27	4537.44	53.02
4547.1455.87728		4553.92	57.49	4562.17	60.43	4564.86	60.59	4570.26	62.65
4578.36	64.86	4589.16	65.91	4597.25	64.81	4602.65	65.33	4608.05	67.22
4616.15	68.86	4626.94	72.15	4632.34	72.91	4643.13	72.85	4659.32	73.76
4664.72	73.67	4672.82	74.94	4678.22	75.44	4694.42	76.03	4707.91	77.02
4721.4	77.01	4724.1	77.22	4733.57	76.8	4739.89	76.9	4749.36	76.35
4762	76.66	4774.64	76.65	4790.43	77.01	4815.44	77.42	4837.8	78.57
4851.98	78.58	4863.06	78.33	4885.17	78.4	4891.49	78.58	4900.96	78.45
4916.75	78.67	4946.98	78.7	4964.12	78.86	4976.76	79.17	5002.02	78.85
5020.97	79.01	5046.24	78.87	5062.03	79.15	5096.76	79.39	5118.87	79.37
5131.52	79.52	5163.15	79.39	5175.8	79.53	5188.46	79.32	5194.78	79.46
5219.23	79.21	5245.4	79.31	5261.21	79.14	5289.68	79.31	5296.01	79.13
5315.04	79.02	5337.15	79.05	5381.41	78.97	5400.39	79.03	5422.53	78.94
5435.19	79.06	5451	78.85	5466.82	78.91	5514.27	78.71	5536.4	78.54
5558.55	78.67	5587.02	78.56	5602.84	78.75	5631.3	78.48	5672.42	78.38
5678.75	78.26	5688.24	78.51	5727.76	78.47	5767.32	78.32	5792.63	78.16
5824.26	78.18	5849.56	78.1	5874.87	78.14	5938.13	77.9	5963.44	77.97
5969.77	77.85	6007.72	77.78	6055.17	77.83	6070.98	77.69	6080.47	77.78
6112.11	77.63	6156.4	77.61	6178.54	77.74	6197.52	77.61	6225.98	77.68
6238.64	77.52	6257.61	77.63	6301.9	77.42	6343.02	77.58	6358.84	77.41
6371.49	77.52	6435.28	77.18	6460.06	77.11	6472.12	76.89	6491.69	76.82
6542.13	76.27	6608.47	75.8	6681.48	75.41	6690.98	75.18	6754.23	74.91
6770.05	74.76	6789.04	74.78	6804.85	74.63	6836.94	74.55	6874.44	74.26
6906.07	74.12	6928.21	74.15	6937.7	74.02	6985.15	73.77	7000.97	73.86
7016.78	73.65	7035.76	73.56	7061.06	73.75	7108.51	73.49	7120.68	73.63
7187.01	73.6	7266.67	73.8	7304.63	74.19	7317.29	74.16	7339.42	74.38
7396.36	74.35	7424.83	74.52	7443.81	74.37	7462.8	74.48	7472.28	74.16
7481.77	73.2	7500.75	72.34	7507.08	71.72	7513.4	71.55	7519.73	70.96
7532.38	70.46	7545.04	70.42	7560.85	69.99	7564.01	70.24	7570.34	69.91
7582.99	70.06	7601.97	69.62	7624.11	69.28	7636.77	69.35	7652.58	69.78
7658.91	69.13	7674.73	68.58	7703.19	68.71	7715.85	68.55	7753.8	68.75
7772.79	69.02	7782.27	69	7810.74	69.55	7832.88	69.77	7858.19	70.4
7883.49	73.38	7896.15	73.28	7905.64	75.05	7915.13	75.54	7924.61	75.66
7930.94	76.03	7943.6	75.9	7962.57	75.25	7987.88	75.27	8003.7	75.51
8006.86	74.92	8013.18	75.62	8025.84	76.39	8041.66	78.08	8054.3	78.06
8066.96	77.12	8079.62	76.9	8085.94	77.16	8101.75	77.4	8111.24	77.22
8123.9	77.35	8196.65	77.11	8202.98	77.21	8212.47	76.91	8244.1	77.09
8250.43	76.94	8282.05	77.05	8301.04	76.86	8340.42	76.77	8386.44	76.74
8424.4	76.55	8430.73	76.68	8465.72	76.6	8484.5	76.48	8497.16	76.67
8539.42	76.61	8557.84	76.86	8579.96	78.11	8601.54	77.94	8607.87	78.07

8623.68	77.95	8677.46	78.14	8693.27	77.95	8705.93	78.07	8721.75	77.97
8756.54	77.95	8791.33	77.77	8800.82	77.88	8813.48	77.72	8829.29	77.77
8854.6	77.63	8860.92	77.72	8893.19	77.56	8917.86	77.55	8924.19	77.43
8993.78	77.39	9022.16	77.19	9057.04	77.19	9069.7	77.28	9082.35	77.08
9098.16	77.18	9125.34	77.08	9189.89	76.98	9196.22	77.1	9218.37	77.12
9227.85	77.38	9240.5	78.63	9253.16	78.41	9259.49	78.64	9275.3	78.6
9281.63	78.76	9328.02	78.81	9335.39	78.96	9342.77	79.47	9350.14	80.35
9357.51	80.71	9363.87	80.5	9395.51	80.92	9401.82	81.94	9411.31	82.46

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	4379.5	.066	4430.47	.025	4547.14	.066	4724.1	.074

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4379.5	4724.1	587.49	1806.25	1797.03	.1	.3

Left Levee Station= 129.77 Elevation= 87.21
Right Levee Station= 9411.31 Elevation= 82.46
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
109.01	4377.51	79.77	4721.74	9391.85	77.34

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 126.00*

INPUT
Description: RGV-02
Station Elevation Data num= 458

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.67	39.02	81.18	83.51	81.83	120.59	82.16	150.74	82.36
164.93	82.94	173.79	84.38	182.66	86.96	206.66	87.2	207.33	87.2
207.33	77.2	217.33	77	308.33	73.8	311.33	74.55	335.33	74.07
341.33	72.57	351.33	72.37	357.33	70.87	404.47	70.94	452.58	70.77
471.74	70.84	503.7	71.1	525.84	70.93	569.12	71.16	597.97	71.13
605.18	71.43	623.22	71.63	644.86	71.37	655.68	71.46	673.71	71.98
688.13	73.99	691.74	74.71	706.17	76.81	731.41	76.85	738.63	77.12
749.45	76.87	760.27	77.12	774.69	76.65	810.76	76.81	834.45	76.74
864.85	76.13	872.06	76.37	890.1	76.21	900.92	76.32	978.77	76.27
1005.51	76.39	1030.76	76.34	1062.97	76.47	1088.46	76.44	1167.8	76.54
1175.02	76.64	1204.29	76.48	1237.36	76.66	1243.37	76.48	1279.46	76.58
1288.48	76.68	1303.51	76.58	1309.53	76.78	1318.55	76.51	1327.57	76.78
1342.6	76.68	1360.64	76.87	1366.66	76.68	1402.74	76.61	1408.75	76.71
1441.82	76.64	1447.84	76.96	1456.86	76.83	1483.93	76.74	1489.93	76.88
1513.99	76.73	1532.04	77.05	1550.07	76.84	1565.11	76.81	1571.12	77.22
1589.17	76.93	1607.2	76.89	1610.21	77.15	1628.25	76.94	1634.27	77.07
1649.3	76.92	1652.3	77.09	1672.72	76.9	1694.36	77.4	1701.57	77.3
1705.18	76.86	1716	74.72	1723.21	73.85	1748.45	72.95	1770.09	72.97
1777.31	72.54	1791.74	72.58	1798.95	72.41	1817.68	72.75	1823.7	72.56
1859.78	72.7	1880.83	72.53	1901.88	72.81	1922.92	72.64	1943.97	72.71
1965.02	72.65	1983.06	72.89	1992.08	72.61	2022.15	72.83	2031.17	73.03
2046.21	72.84	2091.31	72.88	2097.32	73.06	2106.34	72.89	2121.38	73.03
2133.4	72.88	2166.48	73.07	2196.55	73.07	2202.56	73.29	2211.58	73.08
2231.73	73.03	2271.72	73.28	2277.74	73.18	2313.82	73.45	2352.9	73.51
2358.92	73.77	2370.95	73.43	2404.02	73.64	2419.06	73.65	2425.07	73.89
2437.1	73.66	2452.13	73.94	2461.15	73.82	2473.18	74.03	2479.19	73.92
2488.22	74.17	2500.25	73.86	2512.27	74.13	2541.9	74.19	2560.37	74.31
2602.48	74.91	2605.49	75.27	2626.53	75.1	2653.71	75.37	2660.91	75.61
2683.66	75.77	2689.67	76.22	2711.41	76.47	2734.77	76.34	2761.9	76.33
2812.96	76.71	2830.99	76.6	2849.04	76.66	2855.05	76.86	2870.1	76.75
2894.14	77.42	2915.19	77.47	2933.23	77.82	2948.26	77.61	2978.33	77.6
2996.37	77.44	3014.41	77.62	3023.44	77.48	3053.5	77.69	3062.52	77.51
3098.6	77.79	3104.62	77.53	3137.7	77.86	3164.76	77.55	3182.8	77.86
3197.84	77.67	3223.54	77.83	3230.76	77.6	3260.97	77.56	3270	77.68
3288.04	77.48	3318.1	77.83	3327.13	77.62	3342.16	77.79	3360.21	77.65
3382.24	77.77	3426.35	77.73	3435.37	77.95	3450.41	77.74	3468.45	77.72
3474.47	78	3489.5	77.79	3510.55	77.81	3528.59	77.94	3579.71	78.03
3591.73	77.91	3603.76	78.24	3615.79	77.9	3618.8	78.12	3633.83	77.98
3639.84	78.21	3660.89	78.3	3672.92	78.07	3703.23	78.26	3721.03	78.17
3739.29	78.39	3757.32	78.18	3786.18	78.48	3805.22	78.22	3826.26	78.37
3838.29	78.25	3844.3	78.47	3856.32	78.51	3862.34	78.32	3880.38	78.5
3889.4	78.34	3901.42	78.5	3916.02	78.44	3940.51	78.56	3962.9	78.38
3982.6	78.56	4009.67	78.36	4015.69	78.56	4054.77	78.43	4075.81	78.64
4087.84	78.43	4117.91	78.73	4135.95	78.51	4169.03	78.66	4175.04	78.54
4187.07	78.75	4220.14	78.56	4277.27	78.62	4289.29	78.76	4301.32	78.54
4322.36	78.69	4334.39	78.52	4355.45	78.7	4381.28	78.35	4406.55	78.71
4421.59	78.55	4436.63	78.66	4442.64	78.49	4499.76	78.58	4505.78	78.42
4541.86	78.52	4547.87	78.36	4562.91	78.55	4577.94	78.57	4595.97	78.43
4614.02	78.45	4633.3	78.69	4650.09	79.32	4656.1	79.13	4662.12	79.93
4666.49	79.75	4675.15	77.46	4681.69	75.26	4694.94	71.88	4710.365	.16335
4714.31	64.27	4727.37	60.43	4740.42	57.57	4746.94	57.51	4755.75	55.48
4765.58	54.64	4775.68	53.42	4795.61	52.28	4802.1	52.66	4820.615	2.95513
4828.04	53.41	4841.02	53.3	4853.99	56.43	4859.97	60.15	4862.6	60.5
4873.22	64.01	4881.71	65.44	4888.08	65.12	4892.33	65.74	4896.58	67.27
4902.95	68.78	4911.44	71.67	4915.69	72.53	4924.19	72.9	4931.16	73.59
4941.18	73.74	4947.55	74.6	4964.54	75.41	4975.16	76.14	4987.9	76.35
4994.94	75.91	5003.11	75.85	5012.24	75.49	5024.41	75.74	5040.69	75.77
5075.88	76.8	5097	78.74	5111.09	78.71	5121.76	78.17	5139.24	78
5192.04	78.4	5203.9	78.35	5231.28	78.66	5255.62	78.46	5273.88	78.56
5298.21	78.47	5313.42	78.65	5346.88	78.87	5380.36	78.99	5410.84	78.9
5423.02	78.98	5464.86	78.74	5490.06	78.9	5505.29	78.8	5532.72	78.9
5557.15	78.67	5578.44	78.8	5621.09	78.7	5660.7	78.71	5672.89	78.78
5688.12	78.64	5703.36	78.68	5731.09	78.52	5770.39	78.44	5819.14	78.45
5834.38	78.59	5861.8	78.42	5901.41	78.36	5916.65	78.47	5954.72	78.53
6017.21	78.29	6096.43	78.35	6157.37	78.23	6270.12	78.3	6338.08	78.19
6367.62	78.24	6388.95	78.36	6407.24	78.27	6434.66	78.28	6446.85	78.18
6465.12	78.27	6507.78	78.06	6547.4	78.18	6574.82	78.13	6604.31	77.92
6636.27	77.79	6660.14	77.78	6671.76	77.53	6690.61	77.51	6721.46	77.32
6739.2	77.11	6803.1	76.83	6824.41	76.8	6882.58	76.43	6920.24	76.34
6958.76	76.13	6977.04	76.15	7016.08	75.98	7023.18	76.03	7048.04	75.85
7079.98	75.79	7090.63	75.67	7111.11	75.72	7147.42	75.47	7181.19	75.48
7214.71	75.19	7239.08	75.22	7284.79	74.79	7296.51	74.9	7310.72	74.78
7360.41	74.59	7388.81	74.61	7437.15	74.5	7473.71	74.64	7485.9	74.56
7530.8	74.55	7562.08	74.38	7589.5	74.4	7607.79	74.22	7626.07	74.23
7635.21	73.99	7644.35	73.32	7662.64	72.69	7668.73	72.26	7693.1	71.36
7705.29	71.3	7720.52	70.97	7741.86	70.96	7781.47	70.35	7793.66	70.39
7808.89	70.67	7814.99	70.22	7830.22	69.83	7857.64	69.86	7869.83	69.74
7906.4	69.8	7933.82	69.97	7961.25	70.29	7982.57	70.41	8006.96	70.81
8031.33	72.77	8043.52	72.69	8052.66	73.87	8077.04	74.47	8089.23	74.36
8107.5	73.91	8131.88	73.91	8147.12	74.06	8150.16	73.66	8156.26	74.12
8168.45	74.61	8183.69	75.71	8195.87	75.68	8201.7	75.25	8220.25	74.9

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 8241.58    75.2 8332.99   74.91 8348.23   74.75  8378.7   74.87 8384.79   74.77
 8415.26   74.83 8439.54   74.64 8535.38   74.54 8549.59   74.39 8560.23    74.5
 8610.28   74.38 8622.47   74.54 8663.17   74.63 8680.93   75.25 8702.23   77.74
 8723.02    77.6 8729.11    77.7 8755.48   77.64 8796.15   77.98 8811.38   77.88
 8823.57   77.98 8851.32   77.98 8878.42   77.89 8942.41   77.95 8961.36   77.84
 8975.56   77.93 9003.96   77.79 9033.82   77.75  9078.5   77.78  9128.2   77.55
 9131.75   77.62 9173.99   77.69 9186.18   77.55 9201.41   77.59  9227.6    77.5
  9248.9   77.52 9273.74    77.4 9295.87    77.5 9317.21   77.44 9326.34    77.6
 9338.53   78.42 9350.72   78.25 9356.82    78.4 9383.79   78.48 9422.84   78.38
 9429.94   78.59 9437.04   79.45 9444.14   81.03 9451.24    81.6 9457.36   81.47
 9475.48   81.56 9485.83   80.43 9503.07   80.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 4662.12     .07  4710.3    .025 4820.61     .07  4987.9    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4662.12  4987.9           587.49 1806.25 1797.03             .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 4662.12   79.93       T
Left Levee      Station=  207.33      Elevation=    87.2
Right Levee     Station= 9451.24      Elevation=    81.6
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  183.59 2931.73   77.81  2943.2 3247.27      77 6540.45 9357.43   78.29

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 125.65*

INPUT
Description: RGV-02
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   79.17   32.84   79.41   55.58   79.44   68.21    79.7   78.32   79.55
   88.42   79.81   93.48   79.66  131.37   79.88  156.63    79.9   171.8   80.04
  214.74   80.14   229.9   80.53  234.96   80.99  247.59   83.12  260.22   86.31
   267.8   86.96   291.8    87.2  292.47    87.2  292.47    77.2  302.47      77
  393.47   75.64  396.47   76.39  420.47   75.91  426.47   74.41  436.47   74.21
  442.47   72.71  443.82    72.7  468.96    72.8  478.39   72.69  494.11   72.82
   544.4   72.56  597.83   72.88  607.26   72.72  636.05   72.73  666.22   72.85
  696.37   72.88  703.91   73.02  737.85   73.11   756.7   73.03  775.55   73.35
  809.47   75.75  830.41   75.75  843.41   75.94  866.03   75.97  874.43   75.77
     909   75.89  943.57   75.86     975   75.56  982.89   75.68 1031.91   75.58
 1080.91   75.67 1094.44    75.6 1122.39   75.74 1148.78   75.73 1182.45   75.84
 1239.03   75.87 1254.34   75.82 1299.58   75.96 1330.17    75.8 1355.32   75.89
 1364.75   76.04 1371.03   75.78 1408.76   75.95 1418.18    76.1  1433.9   75.87
 1440.18   76.16 1449.62   75.81 1459.05   76.19 1474.76   76.02 1493.62   76.27
  1499.9   75.98 1522.01   76.04 1537.62   75.88 1543.91   76.03 1578.48    75.9
 1584.76   76.37  1594.2   76.16 1622.49   76.03 1628.77   76.24 1653.92   76.05
 1666.49   76.17 1672.78   76.47 1691.63   76.14 1707.35   76.11 1713.64   76.73
  1732.5    76.3 1751.35    76.2  1754.5   76.57 1773.36   76.22 1779.64    76.4
 1795.35   76.18  1798.5   76.43 1819.83   76.26 1839.36   76.61    1850   76.55
 1865.08   75.22 1872.62   74.77    1899   74.36 1930.51   74.45 1951.79   74.11
 1971.37   74.51 1977.66   74.19 1993.38   74.17 2015.37   74.38 2037.38   74.16
 2059.38   74.57 2081.38   74.25 2103.39   74.36 2125.38   74.28 2144.24    74.6
 2153.68   74.19  2185.1   74.44 2194.53   74.77 2210.25   74.45  2257.4   74.43
 2263.69    74.7 2273.12   74.44 2288.84   74.64  2301.4   74.39 2335.98   74.55
 2354.83   74.44 2361.12   74.77 2367.41   74.53  2373.7   74.87 2383.13   74.57
 2404.19   74.52 2445.99   74.78 2452.28   74.63 2489.99    74.9 2530.85   74.89
 2537.14   75.29 2549.71   74.78 2584.28   74.99    2600   74.93 2606.29   75.27
 2618.86    74.9 2634.57   75.27    2644   75.04 2656.58    75.3 2662.87    75.1
  2672.3   75.43 2684.87   74.95 2697.44   75.36 2747.73   75.36 2754.01   75.63
 2791.74   75.64 2794.88   76.12 2816.88   75.81 2852.82   76.16  2876.6   76.12
 2882.89   76.59 2901.75   76.49  2920.6   76.68 2930.03   76.51 2961.47   76.38
 2970.89   76.56 2986.61   76.53 3011.76    76.8 3030.61   76.63 3049.47   76.66
 3055.76   76.94  3071.5   76.78 3096.62   77.21 3118.62   77.12 3137.49   77.58
  3153.2   77.28 3178.35    77.2 3184.63   77.37 3203.49   77.15 3222.35   77.38
 3231.78   77.14 3263.21   77.42 3272.64   77.15 3310.35   77.61 3316.64    77.2
  3335.5   77.37 3351.22   77.71  3379.5   77.23 3398.36   77.68 3414.08   77.39
 3442.37   77.61  3448.5   77.31 3480.08   77.24 3489.51   77.43 3508.37   77.16
  3539.8   77.64 3549.23   77.34 3564.95   77.61 3583.81   77.38 3621.53   77.54
 3652.96   77.44 3662.39   77.76  3678.1   77.47 3696.97   77.46 3703.25   77.89
 3718.96   77.57 3740.97   77.56 3759.83   77.72 3781.83   77.57 3784.97    77.7
 3813.26   77.82 3825.83   77.58  3838.4   78.07 3850.98   77.57 3854.12    77.9
 3869.84   77.66 3876.12   77.99 3888.69   78.09 3894.98   77.81 3898.12    78.1
  3910.7   77.77 3916.99   77.91 3942.38   77.99 3960.99   77.87 3973.55   78.15
 3998.93   77.87 4030.13   78.21 4048.99   77.88 4070.99   78.07 4083.56    77.9
 4089.85   78.23 4102.42   78.29  4108.7   78.01 4127.57   78.25    4137   77.99
 4149.56   78.24 4177.86   78.15 4190.42   78.31    4225   78.06 4234.42   78.24
 4262.72   78.04    4269   78.34 4309.86    78.1 4331.86   78.37 4344.43   78.12
 4375.86   78.49 4394.72   78.22  4407.3   78.38 4429.29   78.39 4435.58   78.22
 4448.15   78.54 4454.43   78.36 4476.44   78.38 4482.73   78.26 4504.72   78.37
 4523.58   78.29 4536.16    78.5 4542.45   78.35 4555.01   78.55 4567.59   78.23
 4589.58   78.52 4602.16   78.25 4624.16   78.49 4630.45    78.3 4651.16   78.15
 4677.59   78.55  4693.3    78.3 4709.02   78.52 4715.31   78.31 4743.59   78.46
 4759.31   78.34 4775.02    78.5 4781.31   78.26 4797.03   78.41 4803.31   78.29
 4819.02   78.44 4825.31   78.19 4841.03   78.48 4856.74    78.5 4875.59   78.29
 4894.45   78.33 4903.87   78.64 4922.74   78.99 4932.16   79.47 4938.45   79.11
 4944.73   80.07 4950.19   79.81 4952.93    79.1 4969.18   73.55 4985.73   68.49
 4990.1465.90205 5004.77   60.55 5009.93   60.03 5026.24   57.86 5042.55   55.94
 5050.69       56 5061.69  55.21 5073.97   54.93 5086.59   54.11 5100.65   53.59
 5111.48   52.95 5116.21   53.22 5135.13   53.74 5144.59   53.58 5154.05   55.38
 5158.41   60.12 5163.63   61.39 5168.07   63.16 5174.27   64.98 5182.01   66.15
 5189.63   68.65 5195.95   71.19 5199.97   72.36 5210.1373.71008 5217.63   73.82
 5222.27   74.25 5242.41   75.25  5251.7   75.49 5258.47   74.95 5275.11   74.63
 5286.82   74.82 5302.48   74.82 5336.33   76.19  5346.5   77.44 5353.26   78.73
 5356.65   78.92 5370.19   78.83 5383.74   77.76 5397.28   77.62 5448.06   78.08
 5458.22   77.99 5485.81   78.16 5509.22   78.06 5550.19   78.06 5587.56   78.31
 5629.21   78.47 5681.97   78.33 5703.65   78.41 5710.48   78.28 5734.73   78.49
 5775.76    78.5 5799.26   78.31 5819.74   78.54 5867.55   78.43 5910.59   78.51
  5939.9   78.45 5966.57   78.28 6000.71   78.35 6033.69   78.28 6065.93   78.43
 6130.41   78.35 6181.68    78.6 6195.34   78.49 6263.63   78.41  6304.6   78.56
  6352.4   78.53 6485.06   78.78 6550.44   78.77 6598.24   78.97 6655.06   78.83
 6680.19   78.91 6713.67   78.71 6751.77   78.79  6799.7   78.63 6806.52   78.51
 6837.26   78.39 6861.16   78.44  6871.4   78.18 6919.21   78.15 6936.27   77.94
 6997.74   77.85 7018.23   77.89 7053.67   77.72 7110.41   77.64 7147.46   77.49
 7165.05   77.53  7202.6   77.42 7209.43   77.51 7233.34   77.36 7264.07   77.38
 7274.31   77.23    7294   77.29 7328.94    77.1 7359.67   77.11 7376.07   76.94
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7417.1	76.68	7462.1	76.08	7472.35	76.17	7486.01	75.97	7509.9	75.83
7533.81	75.57	7561.12	75.53	7607.62	75.19	7642.79	75.09	7680.63	74.74
7697.7	74.71	7711.35	74.51	7754.17	74.27	7789.35	73.97	7853.83	72.26
7889	71.87	7900.72	71.86	7938.82	71.43	7965.2	71.55	7985.72	71.09
8023.82	70.92	8063.05	70.85	8111.75	71.04	8132.27	71.06	8155.72	71.21
8179.16	72.15	8190.89	72.11	8199.68	72.68	8223.13	72.91	8252.43	72.57
8290.54	72.61	8293.47	72.4	8311.06	72.83	8325.72	73.35	8360.89	72.9
8381.4	73.01	8469.33	72.7	8483.99	72.6	8513.29	72.65	8548.46	72.6
8571.82	72.45	8588.89	72.54	8602.55	72.44	8664.01	72.41	8677.67	72.22
8687.91	72.32	8718.46	72.24	8786.93	72.66	8797.18	73.05	8804.01	73.64
8814.25	75.63	8817.67	75.88	8824.5	77.37	8875.72	77.26	8906.45	77.76
8967.91	77.98	8981.56	77.92	9039.61	78.06	9046.44	78.15	9073.75	78.04
9087.41	78.15	9114.74	78.02	9165.96	78.13	9186.44	78.12	9234.24	77.91
9237.66	78.02	9278.28	78.09	9329.85	77.93	9350.34	77.98	9374.24	77.83
9395.52	77.9	9424.83	77.83	9436.55	78.2	9448.28	78.09	9480.09	78.19
9517.65	77.94	9524.48	78.21	9531.31	79.42	9538.14	81.72	9544.97	82.49
9568.28	82.33	9578.24	80.03	9584.88	79.47	9594.83	79.5		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	4952.93	.07	4990.14	.025	5210.13	.07	5251.7	.066

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4952.93	5251.7		587.49	1806.25 1797.03	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	4952.93	79.1	T
5251.7	9594.83	75.49	T

Left Levee Station= 292.47 Elevation= 87.2
Right Levee Station= 9544.97 Elevation= 82.49

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 125.3

INPUT
Description: RGV-02. 9-foot wall applied, Bathymetric elevations translated
from IBWC 2008 Cross-sections
Station Elevation Data num= 458

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.67	29.51	77.67	42.63	77.79	72.15	77.69	88.54	77.97
101.66	77.7	114.78	77.99	121.34	77.76	170.53	77.85	203.32	77.79
223	77.92	259.07	77.84	278.75	77.92	298.43	78.42	304.99	79.03
321.38	81.86	337.78	86.1	347.62	86.96	371.62	87.2	372.29	87.2
372.29	78.2	382.29	78	473.29	77.53	476.29	78.28	500.29	77.8
506.29	76.3	516.29	76.1	522.29	74.6	531.27	74.54	557.5	74.67
567.34	74.52	583.74	74.69	636.21	74.35	649.33	74.48	678.84	74.48
691.96	74.66	701.8	74.47	741.15	74.49	796.9	74.63	819.86	74.57
829.69	74.72	849.37	74.55	885.44	74.78	908.4	74.65	928.08	74.83
934.63	74.67	967.43	74.86	980.55	74.74	990.38	74.93	1016.62	75
1026.46	74.88	1052.69	74.97	1059.25	74.8	1085.49	74.98	1115	75.01
1151.08	74.92	1183.87	75.06	1210.1	74.93	1233.06	75.1	1292.09	75.13
1301.93	75.22	1360.96	75.26	1374.08	75.13	1419.99	75.3	1456.06	75.12
1482.3	75.22	1492.13	75.42	1498.69	75.08	1538.05	75.32	1547.88	75.51
1564.28	75.16	1570.84	75.53	1580.68	75.1	1590.52	75.6	1606.91	75.36
1626.59	75.67	1633.15	75.27	1656.1	75.42	1672.5	75.15	1679.06	75.34
1715.13	75.16	1721.69	75.78	1731.53	75.48	1761.05	75.32	1767.6	75.61
1793.84	75.37	1806.96	75.51	1813.52	75.89	1833.19	75.43	1849.59	75.42
1856.15	76.24	1875.83	75.66	1895.5	75.51	1898.78	76	1918.46	75.5
1925.02	75.73	1941.41	75.44	1944.69	75.77	1967.65	75.62	1987.33	75.86
2026.68	75.67	2033.24	75.9	2052.91	75.74	2075.87	75.78	2082.43	76.28
2102.11	75.75	2125.06	76.27	2131.62	75.82	2148.02	75.78	2170.97	76.05
2193.93	75.79	2207.05	75.95	2216.89	76.32	2239.84	75.87	2262.8	76.01
2285.75	75.91	2305.43	76.31	2315.27	75.78	2348.06	76.06	2357.9	76.51
2374.3	76.06	2397.26	75.95	2423.49	75.98	2430.05	76.34	2439.89	75.99
2456.29	76.26	2469.4	75.9	2505.48	76.04	2525.15	75.86	2531.71	76.3
2538.27	75.98	2544.83	76.45	2554.67	76.06	2584.18	76.01	2620.26	76.29
2626.82	76.07	2666.17	76.35	2708.8	76.27	2715.36	76.81	2728.48	76.13
2764.55	76.35	2780.95	76.21	2787.51	76.64	2800.63	76.14	2817.02	76.6
2826.86	76.26	2839.98	76.56	2846.54	76.27	2856.38	76.68	2869.5	76.04
2882.61	76.58	2915.41	76.53	2935.08	76.4	2941.64	76.74	2981	76.36
2984.28	76.97	3007.23	76.52	3030.19	76.74	3056.42	76.7	3069.54	76.46
3076.1	76.96	3095.78	76.6	3115.45	76.88	3125.29	76.69	3158.09	76.46
3167.92	76.72	3184.32	76.57	3204	76.68	3210.56	76.89	3230.23	76.66
3249.91	76.66	3256.47	77.01	3276.15	76.77	3299.1	77.01	3322.06	76.77
3341.74	77.34	3358.13	76.95	3384.37	76.85	3390.93	77.14	3410.6	76.86
3430.28	77.14	3440.12	76.8	3472.91	77.14	3482.75	76.78	3522.1	77.42
3528.66	76.87	3548.34	77.07	3564.74	77.55	3594.25	76.91	3613.93	77.5
3630.33	77.11	3659.84	77.39	3666.4	77.02	3699.19	76.91	3709.03	77.19
3728.71	76.85	3748.39	77.09	3761.5	77.46	3771.34	77.06	3787.74	77.44
3807.42	77.11	3846.77	77.3	3879.56	77.14	3889.4	77.57	3905.8	77.2
3925.48	77.2	3932.04	77.77	3948.43	77.35	3971.39	77.31	3991.07	77.5
4014.02	77.27	4017.3	77.44	4046.82	77.62	4059.93	77.25	4073.05	77.89
4079.61	77.83	4086.17	77.24	4089.45	77.68	4105.85	77.34	4112.4	77.77
4125.52	77.87	4132.08	77.5	4135.36	77.91	4148.48	77.47	4155.04	77.65
4181.27	77.71	4200.95	77.58	4214.06	77.95	4240.3	77.55	4273.09	77.94
4286.21	77.86	4292.77	77.53	4315.72	77.78	4328.84	77.55	4335.4	78
4348.51	78.08	4355.07	77.71	4374.75	78.01	4384.59	77.63	4397.7	77.97
4427.22	77.84	4440.33	78.07	4476.41	77.65	4486.24	77.92	4515.76	77.71
4522.32	78.11	4541.99	78.04	4564.95	77.77	4587.9	78.11	4601.02	77.81
4633.81	78.26	4653.49	77.93	4666.61	78.13	4689.56	78.13	4696.12	77.9
4709.24	78.33	4715.79	78.08	4738.75	78.11	4745.31	77.95	4768.26	78.13
4787.94	78	4801.06	78.27	4807.62	78.07	4820.73	78.34	4833.85	77.91
4856.8	78.35	4869.92	77.98	4892.88	78.29	4899.44	78.03	4919.11	77.93
4945.35	78.22	4948.62	78.39	4965.02	78.06	4981.42	78.37	4987.98	78.13
5017.49	78.38	5033.89	78.19	5050.28	78.41	5056.84	78.1	5073.24	78.32
5079.8	78.16	5096.19	78.36	5102.75	78.03	5119.15	78.41	5128.98	78.21
5135.54	78.43	5155.21	78.14	5174.89	78.22	5184.72	78.66	5204.4	79.03
5214.23	79.62	5220.79	79.08	5227.35	80.21	5233.9	79.88	5237.18	78.94
5253.58	72.92	5269.97	67.19	5276.53	65.11	5283.09	60.95	5286.36	60.1
5299.36	55.92	5322.36	55.42	5346.36	54.22	5373.36	55.12	5382.36	55.22
5414.36	54.32	5427.36	53.62	5438.36	54.22	5449.36	53.82	5456.86	60.1
5460.14	60.72	5466.7	64.46	5476.48	68.57	5482.98	72.07	5489.49	73.88
5499.24	73.91	5515.5	74.62	5522	73.99	5531.75	73.7	5548.01	73.9
5564.27	73.87	5596.78	75.57	5606.54	77.18	5613.04	78.86	5616.29	79.1
5629.3	78.96	5642.31	77.47	5655.31	77.24	5704.08	77.76	5713.84	77.64
5769.2	77.67	5824.94	77.64	5838.06	77.8	5887.25	77.97	5929.88	77.83
5949.55	77.96	5956.11	77.81	5982.34	78.11	6034.81	78.09	6041.37	77.96
6061.04	78.29	6106.95	78.16	6126.63	78.25	6175.82	78.22	6202.05	78.04
6234.84	78.24	6261.08	78.13	6306.99	78.31	6366.01	78.33	6408.64	78.66

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 6421.76   78.54 6487.34   78.54 6526.69   78.77  6572.6    78.8 6661.14   79.19
 6762.79   79.34  6808.7   79.58 6828.38    79.6 6857.89   79.46  6887.4   79.59
 6913.64   79.35 6969.38    79.4 7002.18   79.24 7008.73   79.09 7038.25      79
  7061.2   79.11 7071.04   78.82 7116.95   78.99 7133.34   78.78 7146.46   78.86
 7192.37   78.87 7212.05   78.99 7241.56   78.89 7300.58   78.95 7326.82   78.84
 7359.61   78.92 7389.12   78.86 7395.68   78.99 7418.64   78.87 7448.15   78.97
 7457.99   78.78 7484.22   78.89 7510.45   78.72 7539.97   78.74 7585.87   78.31
 7638.34   77.37 7648.18   77.44  7661.3   77.15 7684.25   76.94 7707.21   76.55
 7733.44   76.45 7762.95   76.04 7815.42   75.51 7848.21   74.93 7864.61   74.87
 7877.72   74.59  7897.4   74.42 7949.87   73.74 8051.52   72.82 8097.43    72.5
 8130.22   72.41 8215.48   71.87 8235.16    71.9 8320.42   71.55 8343.38   71.52
 8386.01   71.25 8431.92   71.17 8484.38   70.89  8497.5   70.91 8622.12   70.43
  8671.3   70.43  8704.1   70.26 8720.49    70.4 8733.61   70.27 8792.64   70.28
 8805.76   70.05 8815.59   70.14 8845.11   70.06 8871.34   70.25 8910.69   70.68
 8920.53   71.22 8927.09   72.03 8936.93   74.68 8940.21   74.99 8946.77      77
  8956.6   76.91 8986.12   76.98 8995.96   76.88 9025.47   77.59  9084.5   77.98
 9097.61    77.9 9153.36   78.22 9159.92   78.35 9186.15   78.23 9199.27   78.37
 9225.51   78.25  9274.7   78.47 9294.37   78.47 9340.28   78.27 9343.56   78.43
 9373.07   78.53  9432.1   78.36 9451.78   78.44 9474.73   78.25 9491.13   78.35
 9507.53   78.14 9546.88   77.92 9576.39   77.89 9612.46    77.5 9619.02   77.84
 9625.58    79.4 9632.14   82.41  9638.7   83.38 9648.35   83.41 9661.09    83.1
 9670.65   79.63 9677.03   78.36 9686.58   78.02

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 5237.18     .07 5269.97    .025 5476.48     .07  5515.5    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5237.18  5515.5           2076.9    1775 1633.38             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5237.18   78.94       T
  5515.5 9686.58   74.62       T
Left Levee      Station=  372.29      Elevation=    87.2
Right Levee     Station= 9641.98      Elevation=   83.38

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             80.39    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                 0.066      0.039     0.066
  W.S. Elev (ft)             80.34    Reach Len. (ft)          2076.90    1775.00    1633.38
  Crit W.S. (ft)             62.68    Flow Area (sq ft)        6775.21    5409.53   12712.12
  E.G. Slope (ft/ft)      0.000079    Area (sq ft)            18569.02    5409.53   16008.45
  Q Total (cfs)           20000.00    Flow (cfs)               1691.49   12906.52    5401.99
  Top Width (ft)           9255.33    Top Width (ft)           4864.89     278.32    4112.12
  Vel Total (ft/s)            0.80    Avg. Vel. (ft/s)            0.25       2.39       0.42
  Max Chl Dpth (ft)          26.72    Hydr. Depth (ft)            1.39      19.44       3.09
  Conv. Total (cfs)       2247963.0    Conv. (cfs)            190119.9   1450670.0   607173.9
  Length Wtd. (ft)         1760.46    Wetted Per. (ft)         4869.03     288.07    4113.89
  Min Ch El (ft)             53.62    Shear (lb/sq ft)            0.01       0.09       0.02
  Alpha                       5.78    Stream Power (lb/ft s)      0.00       0.22       0.01
  Frctn Loss (ft)             0.21    Cum Volume (acre-ft)    13511.49   11155.94    7104.68
  C & E Loss (ft)             0.00    Cum SA (acres)           3915.43     603.42    2264.59


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 125

INPUT
Description: RGV-02. Bathymetric elevations translated from IBWC 2008
             Cross-sections
Station Elevation Data    num=     461
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   76.18    9.76   75.74   29.28   76.73    42.3   76.85   61.82   77.49
   81.34   81.18   87.84   82.78  100.86   85.14  113.87   86.67  137.87   86.91
  138.54   86.91  138.54   76.91  148.54   76.71  239.54   74.39  242.54   75.14
  266.54   74.66  272.54   73.16  282.54   72.96  288.54   71.46  299.53   71.46
  332.32   71.57   335.6   71.86  348.72   74.44     352   74.67   368.4   73.96
  381.51   72.94  401.19   71.83  407.75   72.11  456.94   72.39  493.01    72.3
  522.53   72.47  568.44   72.35  588.11   72.51   653.7   72.66  666.82   72.49
  689.78   72.67  742.25   72.51   748.8   72.65  804.55   72.92  817.67   72.73
  879.98   72.93  912.77   72.89  952.12   73.11  968.52   72.96  975.08   73.19
   988.2   72.97 1043.95   73.18  1066.9   73.13 1073.46   73.38 1086.58   73.18
 1139.05    73.4 1155.45   73.33 1162.01   73.54 1171.84   73.32  1178.4   73.57
 1188.24   73.31 1201.36   73.68 1207.92   73.35 1221.03   73.72 1227.59   73.46
 1240.71   73.73 1250.55   73.46 1260.39   73.81 1266.95   73.55  1273.5   73.83
 1296.46   73.63 1325.97    73.9 1335.81   73.75 1345.65   74.02 1368.61    73.8
 1378.44   74.03 1388.28   73.79 1394.84   74.13 1404.68    73.9 1414.52    74.3
 1421.08   73.97 1434.19   74.22 1440.75   73.98 1476.83   74.05 1503.06   74.27
 1516.18   74.17 1539.13    74.4 1565.37   74.24 1575.21   74.52 1585.05   74.34
 1621.12    74.6 1637.52   74.46 1676.87   74.73  1719.5   74.62 1749.02   74.91
 1794.93   75.04 1821.16   74.91 1840.84   75.15 1850.68   75.03 1893.31   75.26
 1919.54   75.14  1926.1   75.36 1939.22   75.16 1952.34   75.33 1998.25   75.23
 2047.44   75.52 2080.23   75.48 2096.63   75.64 2106.47   75.29 2129.42    75.6
 2142.54   75.57  2165.5    75.9 2198.29    75.8 2211.41   75.91 2247.48    75.8
 2257.32   75.92 2306.51   75.95 2329.46   75.77 2395.05   75.98 2418.01      76
 2454.08   76.21 2483.59   76.13 2496.71   76.32 2536.06   76.11 2559.02   76.44
 2585.25    76.3 2624.61   76.45 2677.08   76.51 2683.63    76.4 2713.15   76.62
  2768.9   76.52 2824.65   76.81 2844.32   76.63 2906.63   76.85 2916.47   76.69
 2988.61   76.92 3047.64   76.96  3054.2   77.13 3129.63   77.01 3162.42   77.14
  3182.1   77.07 3211.61   77.19 3218.17   77.09  3277.2   77.17 3287.04   77.04
 3326.39   77.27 3352.62   77.15 3359.18   77.25 3414.93   77.25 3431.33   77.56
 3441.17   77.28 3480.52   77.33 3493.64   77.62 3503.47   77.36 3513.31   77.63
 3519.87   77.43  3578.9   77.47 3592.02   77.61 3621.53   77.49 3631.37   77.68
 3641.21   77.47 3654.32   77.78 3664.16   77.45 3703.51   77.63 3710.07   77.84
 3723.19   77.64 3736.31   77.72 3755.98   77.53  3785.5   77.78 3795.34   77.58
 3854.36   77.71 3870.76   77.91  3880.6   77.73 3942.91   77.68 3956.02    77.9
  3975.7   77.71 4011.77    77.8 4028.17   77.95 4100.32   77.82 4110.15   77.96
 4139.67   77.89 4185.58   78.15 4211.82   78.05 4231.49   78.22 4267.57   78.24
 4274.13   77.99 4297.08   78.65 4306.92   79.73 4313.48   79.46 4316.76   78.39
 4323.32   74.15 4329.88   68.36 4336.43   60.84 4339.71   59.85 4341.71   55.24
 4351.71   51.24 4361.71   50.64 4371.71   50.64 4381.71   50.24 4391.71   50.64
 4401.71   50.64 4411.71   51.24 4421.71   50.94 4431.71   51.24 4441.71   51.94
 4451.71   51.24 4461.71   51.24 4471.71   51.64 4491.71   53.74 4493.85   59.85
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4497.13	60.38	4506.96	66.81	4510.24	67.62	4516.8	67.08	4526.64	63.58		
4533.2	62.86	4539.76	62.98	4546.32	64.13	4556.16	68.29	4562.72	72.5		
4566	72.98	4579.12	72.48	4588.96	72.76	4608.64	72.66	4625.03	73.66		
4634.87	74.85	4647.99	75.82	4657.83	76.12	4667.67	75.81	4684.07	75.99		
4693.91	75.77	4716.87	75.72	4733.26	75.97	4749.66	75.81	4756.22	76.03		
4792.3	75.83	4805.42	76.01	4848.05	76.09	4854.61	76.38	4874.29	76.67		
4887.41	76.25	4907.09	76.2	4926.77	76.54	4936.6	76.23	4975.96	76.37		
4998.92	76.36	5008.76	76.15	5028.44	76.35	5035	76.15	5054.67	76.25		
5067.79	76.09	5103.87	76.23	5126.83	76.09	5133.39	76.27	5153.06	76.14		
5189.14	76.17	5195.7	76.82	5205.54	76.37	5228.5	76.26	5241.62	75.98		
5261.29	75.95	5271.13	76.23	5294.09	75.96	5303.93	76.05	5336.73	75.89		
5372.8	76.01	5402.32	75.87	5441.68	76.36	5458.08	76.03	5487.59	75.92		
5526.95	76.36	5540.07	77.14	5549.91	78.22	5563.03	78.99	5572.87	78.72		
5579.43	78.9	5592.54	77.38	5599.1	77.16	5641.74	76.91	5654.86	77.26		
5671.26	77.26	5677.82	77.68	5684.38	77.35	5694.21	77.72	5717.17	77.75		
5730.29	78.26	5736.85	79.22	5746.69	79.25	5753.25	79.72	5772.93	80.05		
5782.77	79.06	5809	78.69	5818.84	78.91	5825.4	78.62	5848.36	78.9		
5877.88	78.25	5884.44	77.68	5894.28	77.58	5904.11	78.21	5923.79	78.69		
5936.91	79.74	5950.03	79.93	5972.99	79.08	5986.11	79.22	5992.67	78.89		
6018.9	79.13	6041.86	79.13	6058.26	78.62	6068.1	79.12	6077.94	78.24		
6087.78	79.43	6094.34	79.07	6107.46	79.42	6127.13	79.2	6136.97	78.44		
6150.09	78.72	6156.65	79.46	6169.77	79.1	6179.61	79.91	6205.85	79.82		
6215.69	79.4	6248.48	79.56	6264.88	79.14	6271.44	79.35	6307.52	79.11		
6337.03	79.2	6435.43	78.59	6455.1	79.12	6464.94	78.68	6504.3	78.48		
6510.86	78.28	6540.38	78.27	6553.49	78.1	6579.73	78.19	6605.97	78.08		
6632.21	77.8	6661.72	77.83	6668.28	78.12	6684.68	78.24	6694.52	77.84		
6704.36	78.05	6710.92	77.76	6724.04	78	6737.16	77.89	6743.72	78.25		
6763.4	77.38	6802.75	77.28	6822.43	77.74	6848.67	77.27	6865.07	77.85		
6888.02	77.63	6894.58	77.26	6917.54	77.15	6927.38	77.5	6937.22	77.09		
6973.3	77.03	6986.41	77.4	6999.53	77.35	7012.65	76.92	7022.49	77.22		
7029.05	77.01	7042.17	77.47	7055.29	77.16	7065.13	77.68	7081.53	77.51		
7094.64	77.75	7101.2	77.4	7117.6	77.61	7124.16	77.32	7140.56	77.46		
7147.12	77.24	7156.96	77.49	7173.36	77.23	7202.87	76.49	7215.99	76.38		
7245.51	76.62	7288.15	76.08	7311.1	76.41	7327.5	76.24	7347.18	76.43		
7363.58	76.25	7373.42	76.46	7396.38	76.22	7435.73	76.36	7458.69	76.14		
7478.37	76.17	7517.72	76.56	7530.84	76.45	7563.64	76.77	7583.32	76.3		
7603	76.7	7609.56	76.29	7622.67	76.19	7635.79	76.61	7645.63	76.21		
7675.15	76.03	7688.27	76.25	7694.83	76.91	7704.67	76.19	7717.79	76.29		
7740.74	77.84	7747.3	79.21	7757.14	79.33	7776.82	79.12	7786.66	78.6		
7796.5	78.8	7806.34	78.59	7812.9	77.92	7826.02	77.88	7835.85	77.14		
7848.97	76.77	7878.49	75.5	7891.61	75.56	7914.57	76.24	7937.53	75.91		
7947.36	76.02	7960.48	76.54	7973.6	76.78	7993.28	78.13	8019.52	78.06		
8039.2	78.23	8049.04	77.77	8055.59	77.88	8068.71	77.31	8075.27	77.65		
8091.67	77.34	8098.23	77.52	8131.03	77.46	8140.87	77.66	8180.22	77.62		
8206.46	77.88	8222.86	77.42	8249.09	77.71	8275.32	77.51	8288.44	77.54		
8317.96	77.2	8334.35	77.28	8390.1	76.75	8436.01	76.43	8475.36	75.74		
8495.04	75.19	8521.27	74.88	8531.11	75.21	8544.23	74.82	8557.34	74.17		
8570.46	73.16	8590.14	73.06	8603.25	73.25	8609.81	73.06	8626.21	73.19		
8639.33	73.01	8649.16	73.79	8659	74.11	8668.84	74.79	8675.4	75.82		
8681.96	76.26	8691.79	78.31	8698.35	81.54	8701.63	82.53	8727.87	82.48		
8734.43	81.38	8740.98	78.98	8744.26	78.49	8773.78	78.04	8793.45	78.27		
8842.64	78.46										

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.108	4306.92	.066	4341.71	.025	4493.85	.066	4634.87	.074

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4306.92	4634.87	941.35	1489.33	1466.35	.1 .3

Left Levee Station= 138.54 Elevation= 86.91
Right Levee Station= 8701.63 Elevation= 82.53
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
123.94	4306.92	79.81	5560.56	8721.13	80.43

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	80.18	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.11	Wt. n-Val.	0.108	0.050	0.074	
W.S. Elev (ft)	80.08	Reach Len. (ft)	941.35	1489.33	1466.35	
Crit W.S. (ft)	59.59	Flow Area (sq ft)	1107.19	6194.11	3626.42	
E.G. Slope (ft/ft)	0.000191	Area (sq ft)	1107.19	6194.11	3626.42	
Q Total (cfs)	20000.00	Flow (cfs)	86.95	17415.96	2497.09	
Top Width (ft)	5422.02	Top Width (ft)	4168.38	327.95	925.69	
Vel Total (ft/s)	1.83	Avg. Vel. (ft/s)	0.08	2.81	0.69	
Max Chl Dpth (ft)	29.84	Hydr. Depth (ft)	0.27	18.89	3.92	
Conv. Total (cfs)	1447820.0	Conv. (cfs)	6294.3	1260759.0	180766.8	
Length Wtd. (ft)	1474.48	Wetted Per. (ft)	4168.65	348.63	927.17	
Min Ch El (ft)	50.24	Shear (lb/sq ft)	0.00	0.21	0.05	
Alpha	2.07	Stream Power (lb/ft s)	0.00	0.60	0.03	
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	13042.42	10919.53	6736.55	
C & E Loss (ft)	0.02	Cum SA (acres)	3700.08	591.07	2170.14	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 124.80*

INPUT
Description: RGV-02
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.52	13.91	76.29	41.73	77.24	60.28	77.24	88.1	77.52
115.91	79.77	131.46	81.72	137.62	82.68	152	85.56	162.27	86.54
186.27	86.78	186.94	86.78	186.94	76.78	196.94	76.58	287.94	75.31
290.94	76.06	314.94	75.58	320.94	74.08	330.94	73.88	336.94	72.38
370.88	72.4	407.72	72.48	411.41	72.66	426.15	74.37	429.84	74.53
448.26	74.09	463	73.36	485.11	72.64	492.48	72.84	547.75	73.1
588.28	73.03	624.59	73.18	673.03	73.09	713.29	73.34	750.92	73.45
761.67	74.21	783.57	74.21	809.37	74.38	858.44	74.23	909.51	74.55
931.01	74.53	960.58	74.66	979.39	74.46	1023.09	74.71	1041.22	74.73
1062.72	74.55	1104.14	74.69	1122.57	74.57	1129.94	74.75	1144.68	74.65
1233.11	74.79	1240.48	74.96	1255.22	74.84	1296.57	74.93	1351.02	74.9
1358.4	75.07	1369.45	74.91	1384.19	75.21	1391.56	75	1406.3	75.24
1413.67	75.06	1428.41	75.24	1439.46	75.04	1450.52	75.25	1457.89	75.07
1465.25	75.3	1490.1	75.13	1524.21	75.45	1535.26	75.32	1546.32	75.48
1572.12	75.35	1583.16	75.51	1594.22	75.35	1601.59	75.57	1612.65	75.42

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  1623.7   75.72 1631.07   75.52 1645.81   75.71 1659.44   75.46 1705.13   75.55
 1723.19    75.7 1737.93   75.66 1763.72   75.84  1793.2   75.63 1804.26   75.83
 1815.31   75.73 1852.97   76.04 1904.05   75.95 1925.55   76.09 1966.38   76.02
 1999.55   76.23 2008.87   76.11 2016.94   74.74 2038.44   73.62 2051.88   73.55
 2080.61   73.06 2129.84   73.08  2137.9   73.44 2151.33   73.47 2167.47   73.14
 2202.41   73.33 2223.91   73.16 2229.29   73.48 2253.48   73.28 2277.68   73.33
  2293.8   73.16 2299.17   73.38 2326.05   73.29 2344.87   73.47 2363.69   73.27
 2390.13   73.49 2404.01   73.19 2414.76   73.37 2430.88   73.25 2447.01   73.86
 2468.51      76 2476.58   76.48 2490.02   76.74 2500.78   76.46  2516.9   76.64
 2527.65   76.58 2541.09   75.24 2559.63   75.18 2602.91   75.43 2610.98    75.6
 2621.73   76.96 2637.86   76.35 2651.75    76.3 2748.06   76.79 2772.26   76.84
 2815.27   76.53 2839.67   76.65 2883.89   76.59 2909.68   76.93 2939.16   76.75
 2983.38   76.73 3041.05    76.6  3049.7   76.52    3076   76.68 3145.51   76.63
 3208.15   76.97 3248.02   76.75 3300.27    76.9 3311.32   76.79 3371.67    76.9
 3392.38      77 3411.99   76.91 3458.71   76.99 3468.44    77.1 3514.13   76.99
  3543.7   76.99 3567.88   77.17 3609.79   77.11 3650.32   77.14 3702.28   77.39
 3731.85   77.38 3750.67   77.59 3771.92   77.67 3796.35   77.61 3823.24   77.39
  3871.4   77.38 3889.83   77.53 3900.88   77.31 3930.75   77.19 3952.25   77.46
 3971.07   77.98 3987.19   76.53  4008.7   76.17 4043.64   76.31 4054.39   76.16
 4070.38   76.38 4102.77   76.28 4126.97   76.69 4153.84   76.56 4167.28   77.13
 4180.72   77.07 4195.65   77.26 4215.66   77.71  4229.1   77.74 4255.98   76.97
 4272.11    77.2 4287.78   76.93  4296.3   76.58 4341.99   76.91 4355.43   76.86
 4383.58   77.25 4417.25   77.17 4422.63    77.3 4444.13   77.17 4479.38   77.39
 4501.49   77.12 4524.76   77.16 4562.33   76.82 4586.48   76.39  4599.9   76.29
 4607.95   76.45 4629.43   76.38 4652.56    76.5 4682.3876.38584 4707.26   76.78
 4712.63   77.08 4731.41    77.5 4760.94   77.34 4774.36   77.07 4790.45   77.39
 4811.93   76.99 4829.44   77.78 4844.13   78.03 4852.19   77.78  4862.6   78.12
 4873.66   78.89 4881.89   78.16 4901.66      75  4906.6   73.27 4910.74 71.0069
 4931.99   62.43 4938.47   61.91 4942.42   59.08 4947.77   58.67 4954.36   56.85
 4967.53   54.05 4969.18   52.32 4985.28   51.23 4995.84   51.29 5021.49   50.26
 5040.81   50.88 5048.63   51.46 5056.46   51.53 5072.9352.75007 5079.93   52.58
 5095.58   53.42 5111.23   55.39 5112.91   59.52 5115.47   59.97 5123.16   64.47
 5125.73   65.04 5130.86   64.75 5138.56   62.52  5143.7   62.19 5148.83   62.62
 5153.96    63.9 5161.66   67.47  5166.8   70.81 5171.64   71.56 5179.63   71.64
 5202.8673.19576 5215.55   74.47 5223.25    75.5 5235.27   75.94  5253.3   75.74
 5268.32   75.89 5298.37   74.98 5315.44   75.08 5327.46   75.85 5351.51      76
 5418.54   76.06 5442.57   76.48 5454.59    76.2 5472.62   76.15 5490.65   76.41
 5507.83   76.19 5531.93   76.35 5556.74   76.29 5565.75   76.15 5583.78   76.23
 5589.79   76.09 5620.27   76.16 5632.32   77.24 5648.39   77.36 5656.42   77.13
 5664.45   76.41 5680.52   75.57  5700.6   75.09 5730.99   75.19    5737   75.59
 5746.01   75.24 5767.05   75.15 5779.07   74.93 5797.08   74.85  5806.1   75.01
 5827.13   74.77 5866.19   74.77 5899.23   74.89 5926.27    74.8 5962.33   75.07
 5977.35   74.87 6004.39   74.79 6040.44   75.02 6052.46   75.52 6061.47   76.24
 6073.49   76.75 6088.52   76.68 6100.52   75.65 6106.53    75.5 6145.59   75.28
 6157.61   75.53 6172.64   75.54 6178.65   75.82 6184.65   75.61 6193.66   75.86
 6214.69    75.9 6226.71   76.25 6232.72   76.87 6265.77   77.39 6274.78   76.73
 6294.95   76.71 6307.83   77.48 6313.84    77.6 6327.08   78.41 6335.11   78.58
 6347.14   77.69 6361.91   77.77 6367.92   77.39 6376.93   77.31 6385.94   77.73
 6403.97   78.06 6415.98   78.77    6428    78.9 6449.04   78.28 6461.05   78.38
 6467.06   78.16 6491.09   78.32 6512.12    78.3 6527.15   77.92 6536.16   78.24
 6545.17   77.65 6554.19   78.45  6560.2   78.21 6572.22   78.45 6590.23   78.29
 6599.25   77.76 6611.27   77.92 6617.28    78.4 6629.29   78.16 6638.31    78.7
 6662.35   78.65 6671.36   78.37  6701.4   78.47 6716.42   78.19 6722.43   78.33
 6755.48    78.1 6782.51   78.15 6872.65   77.68 6890.67   78.02 6899.69   77.74
 6935.74   77.58 6941.75   77.45 6968.79   77.43  6980.8   77.31 7028.88   77.32
 7052.91   77.15 7079.95   77.13 7100.98    77.4 7109.99   77.13 7125.01   77.06
 7137.03   77.26 7149.05   77.17 7155.06    77.4 7173.09   76.81 7209.14   76.72
 7227.16   76.99  7251.2   76.68 7266.22   77.07 7287.25   76.93 7293.26   76.69
 7314.29   76.67  7323.3   76.93 7332.32   76.65 7365.37   76.56 7377.38    76.8
 7401.41   76.48 7416.44   76.56 7428.46   76.84 7440.47   76.64 7449.49   76.99
 7464.51   76.86 7476.52      77 7482.53   76.76 7497.55    76.9 7503.56   76.71
 7533.61   76.75 7555.91   76.47 7575.66   76.01 7614.72   76.05 7668.34   75.61
 7696.45   75.95 7728.57   75.19 7740.62   74.15 7752.93   73.68 7788.98   73.57
 7810.01   73.41 7853.04   73.52 7869.11   73.63 7885.17   74.42 7897.22   74.59
 7905.25    74.4 7913.27   73.61 7924.17    73.2  7942.2   73.44 7960.22   73.02
 7972.24    73.3 7981.25   73.04  8008.3   72.93 8020.31   73.08 8026.32   73.51
 8035.34   73.02 8047.36   73.16 8057.83   73.98 8068.38    75.2 8074.39   76.51
 8093.97   78.18 8110.44   77.49 8128.47   77.48 8134.48   77.15  8146.5   77.13
  8155.5   76.63 8167.52   76.37 8194.56    75.5 8206.58   75.53 8227.62   75.97
 8248.65   75.73 8281.69   76.24 8299.72   77.09 8323.75   77.04 8341.78   77.15
  8356.8   76.92 8368.82   76.54 8375.04   76.76 8389.85    76.5  8425.9   76.59
 8434.92   76.73 8470.96    76.6    8495    76.8 8510.02   76.42 8534.05   76.64
 8597.14   76.28 8612.15   76.33 8668.17   75.92 8684.23   75.97 8705.28   75.83
 8741.33   75.32 8759.35   74.98 8783.38   74.82  8792.4   75.08 8816.42    74.5
 8828.79   73.67 8840.83   73.87 8858.48   73.91 8891.53   73.63 8908.99   74.53
 8918.56   75.42 8930.58   77.05 8939.59   79.21  8948.6   82.72  8969.5   82.71
 8974.73   81.98 8982.56   80.04 9027.89   78.23 9034.51    78.1 9060.94   78.16

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .108 4873.66    .066 4947.77    .025 5072.93    .066 5223.25    .074

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4873.66 5223.25           941.35 1489.33 1466.35            .1       .3
Left Levee      Station=  186.94      Elevation=   86.78
Right Levee     Station=  8948.6      Elevation=82.72334
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   200.8 4870.91   78.96 5215.15 8961.56   75.57


CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 124.60*

INPUT
Description: RGV-02
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   76.86   18.06   76.83   54.17   77.76   78.26   77.62  114.37   77.55
  138.67   77.91     152   78.43  170.67   79.86  178.67      81  197.33   85.29
  202.67   86.04  210.67   86.42  234.67   86.66  235.34   86.66  235.34   76.66
  245.34   76.46  336.34   76.19  339.34   76.94  363.34   76.46  369.34   74.96
  379.34   74.76  385.34   73.26  416.54   73.28  487.22   73.47  503.58   74.29
  517.98    74.4  544.84   73.77  569.03   73.45  577.21   73.56  638.56   73.82
  708.94   73.74  723.86   73.89  738.77    73.8  762.64   73.89  783.53   73.83
  822.32   74.13  864.09   74.27  876.02   75.78  928.97   76.09  947.63   76.14
  983.43   75.92 1040.12    76.3 1063.98   76.16 1084.87   76.51 1096.81   76.57
 1117.69   76.11 1153.49   76.43 1186.32   76.56 1210.18   76.19 1225.11   76.35
 1272.84   76.17  1284.8    76.3 1329.54   76.44 1377.27   76.31 1407.51   76.54
 1469.77   76.52 1487.66   76.42 1517.95   76.57 1550.66   76.51 1567.03   76.75
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 1575.21   76.64 1591.56   76.76 1616.11   76.75 1648.83   76.58 1660.71   76.79
 1684.58   76.63 1693.54   76.81 1720.39   76.99 1762.16   76.85 1787.89      77
 1820.61   76.93 1832.89   77.13 1854.65   77.22 1872.55   76.94 1923.28   76.97
 1943.32   77.14 1985.94   77.29 2012.79   77.01 2033.31   77.15 2057.54   77.17
 2087.38    77.5 2111.25   77.49 2144.07   77.27 2167.94   77.46 2213.27   77.42
 2257.45   77.56 2260.43   77.28 2269.38   74.52 2278.34   73.82 2293.26   72.22
 2308.17   72.06    2341   71.19 2367.84   71.01 2382.77   71.28  2394.7   71.06
 2403.66   71.74 2409.61   71.47 2418.57   71.72 2424.54   71.23 2436.47   71.05
 2460.34   71.27 2466.31   71.04 2475.26   71.36 2481.23   71.16 2499.13   71.04
  2505.1   71.62 2531.95   71.28 2558.81   71.43 2567.75   71.07  2576.7   71.02
 2582.67   71.43 2591.62   71.23 2612.51    71.1 2618.47   71.45  2633.4   71.42
 2654.28   71.06 2672.18   71.43 2693.07   71.26 2699.04   71.05 2710.98   71.28
 2728.87   70.92 2746.78   72.07 2758.71    73.9 2770.64   76.11 2779.59   77.09
 2794.52   77.65 2806.45    77.1 2824.35   77.39 2836.29   77.28 2851.21   74.64
 2872.09   74.57 2901.93    74.7 2919.83   74.93 2928.78   75.27 2934.75   77.14
 2940.72   77.98 2958.62   76.84 2974.03   76.82 3045.15    77.3 3080.95   77.59
  3107.8   77.57 3155.54    76.9 3182.63   76.97  3218.2   76.94    3254   77.42
 3293.06    77.2 3424.08   76.62 3444.96   76.78 3480.76    76.7 3495.68   76.83
 3516.57   76.74 3564.31   76.88 3591.65   77.13 3615.03   77.17 3635.91   76.82
 3659.79   76.92 3706.17   76.89 3773.16   76.93 3797.03   77.08 3817.91   76.89
 3844.77   77.02 3880.57   77.07  3931.3   76.93 3946.21    77.1 3964.11   76.97
 3990.96   77.28 4037.48   77.15 4082.46    77.2 4125.22   77.43 4140.15   77.62
 4172.96    77.7 4193.85   78.02 4244.57   78.06 4274.41   77.52 4348.33    77.5
 4393.75   77.06 4417.61   77.46 4435.52   78.65  4438.5    78.6 4447.46   76.86
  4456.4   75.57 4480.27   74.91  4492.2   75.06 4519.06   75.16    4531   74.84
 4545.91   75.16 4569.78   74.97 4584.69   75.07  4602.6   75.45 4611.55   75.88
 4629.45    75.5 4641.39   75.66 4656.31   76.75 4671.22   76.56 4680.17   76.66
 4701.06   77.31    4710   77.74 4724.93   77.77 4745.82   76.62 4754.76   76.39
 4772.66   76.74 4781.62   76.52 4799.51   75.53 4817.42   75.94 4829.36    75.8
 4850.24   76.15 4865.16   76.03 4877.08   76.48 4889.02   76.61 4903.94   76.49
 4933.78   76.62 4939.74   76.89 4963.61   76.64 4969.58   76.88 5005.38   76.87
 5011.35   76.68 5041.19   76.43 5053.11   76.56 5070.98   76.39 5076.94   76.07
 5088.86   76.15 5094.81    75.7 5112.69   75.35 5121.63   74.88 5136.52    74.7
 5145.46   75.02 5169.29   74.91 5208.02   75.03 5225.89   74.81 5255.69   75.57
 5261.65   76.14 5273.56   76.27  5282.5   76.89 5306.33   76.51 5315.27   76.61
 5330.17   76.04 5348.04   76.56 5371.87   75.75 5377.83   76.06 5386.77   76.99
 5398.69   77.77 5407.62   77.88 5416.56   77.18 5440.39   78.04 5447.78      77
  5452.7   76.75 5462.54   74.88 5472.38   74.41 5479.7874.51952 5482.23    74.4
 5489.61   72.63 5494.53   70.29 5501.91   68.28  5508.2   67.06 5527.55   64.02
 5537.23   63.96 5543.14   62.93 5551.12   63.17 5560.97   60.87 5573.27   58.84
 5580.65   57.02 5583.12   53.61    559252.97071 5607.16   51.81 5622.94   51.95
 5631.21   51.48 5661.27   50.28  5668.6   50.28  5691.2   52.12  5702.5   53.59
 5708.15   53.93 5719.45    55.2 5730.75   57.04 5731.96    59.2 5739.37   62.12
 5744.93   62.42 5753.09   61.39  5757.9   62.26 5761.61   63.67 5770.87   69.13
 5774.37   70.26 5785.02   71.46 5800.99   74.66 5811.64   76.15 5822.55   76.06
 5833.48   75.71 5855.32   75.79 5869.88      75 5880.81   74.19 5888.09   73.95
 5895.38    74.2  5906.3   75.88 5917.22   75.71 5928.14   76.08 5942.63   75.97
  5979.1   75.99 6010.86   76.28    6041   76.11 6054.53   76.27 6070.14   76.13
 6092.03   76.34 6102.96   76.14 6114.56   76.22 6150.38      76 6172.27   76.23
 6183.22   78.33 6186.86   78.59 6197.81   78.52  6205.1   78.06  6212.4   76.66
 6226.99   74.88 6245.23   74.05  6278.3   74.35 6286.49    74.1 6305.59   74.05
 6358.31   73.59 6425.66   73.77 6450.23   73.73 6471.39   73.84 6521.18   73.65
 6553.93   73.68 6583.95   74.51  6597.6   74.46 6613.97   73.84 6649.45   73.66
 6712.21   74.05 6728.59   74.52 6736.78   74.46 6758.61   74.73  6766.8   74.41
 6777.82   74.36 6785.11   74.66  6814.3   78.03 6821.59   78.27 6832.53   76.77
 6845.94   77.29 6859.59   77.03 6884.14   77.44 6895.06    77.8 6905.98   77.87
 6925.08   77.49 6941.46   77.43 6971.15   77.52 6996.03   77.23 7004.22   77.35
 7012.41   77.07  7020.6   77.47 7053.34   77.38 7061.53   77.08  7077.9   77.35
 7088.82   77.22 7097.01    77.5 7127.03   77.35 7154.31   77.38 7203.44   77.09
    7228   77.11 7277.57   76.95 7309.88   76.77 7326.24   76.93 7372.64   76.62
 7408.11   76.53 7451.78   76.55 7498.17   76.44 7517.27   76.55 7540.22   76.37
 7543.87   76.51  7566.4   76.54 7582.78   76.24 7615.52   76.16  7631.9   76.24
 7653.73   76.08 7667.38   76.29 7691.93   76.12 7727.41   76.22 7755.43   76.09
 7768.34    76.2 7790.18   76.05 7798.37    76.2 7825.66   76.12 7833.85   76.31
 7863.86   76.13 7896.61   76.14 7915.92   75.92 7930.52   75.92 7948.46   75.53
 7963.34   75.61 7988.87   75.41 8021.69   75.33 8032.64   74.92 8058.18   75.58
 8072.77   74.64 8080.05   74.59 8087.35   73.99 8098.29   71.95 8109.24   71.15
 8116.53   70.97 8161.33   70.69 8200.42   70.61 8207.71   70.36 8215.01   70.74
  8222.3   71.73  8229.6    72.3 8240.54    72.5 8247.84   72.05 8258.77   70.29
 8273.37   70.01 8281.41   70.17 8297.77   69.85 8341.44   69.84 8357.82   70.11
    8366   69.84 8379.14   70.12 8386.43   70.91 8396.02   72.56 8401.48   73.81
 8408.32   74.84 8415.62    76.7 8419.27   77.15 8434.23   76.38 8444.79   76.17
  8450.6   76.38 8466.98   76.37 8510.64   75.51 8540.66   75.69 8559.77   75.54
 8589.78   75.71 8606.16   76.06 8644.37   76.08 8668.92   75.76 8674.58   75.88
 8700.11   75.62 8728.96   75.79 8758.47   75.57 8784.01   75.71 8798.59   75.41
 8824.12   75.56 8849.66    75.4 8889.96   75.38 8940.84   75.13 8955.43   75.34
 8974.55   75.23 9023.67   74.77 9045.49   74.77  9064.6   74.94 9083.09   74.68
 9086.74   74.18 9097.67   74.66 9113.71   74.58 9143.73   74.25 9159.59   74.98
 9166.79   75.82 9181.18   78.24 9195.57   82.92 9211.14   82.94 9220.87   81.59
 9234.94   80.51 9254.63   78.16 9259.55   77.87 9279.24   77.86

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  210.67    .066 4435.52    .085 5440.39     .07 5551.12    .025
 5744.93     .07 5811.64    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      5440.39 5811.64           941.35 1489.33 1466.35             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5440.39   78.04       T
 5811.64 9279.24   76.15       T
Left Levee      Station=  235.34      Elevation=   86.66
Right Levee     Station= 9195.57      Elevation=82.91666

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 124.4

INPUT
Description: RGV-02. End Wall, 9-foot wall applied, Bathymetric elevations
             translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    77.2   13.12   77.17   59.03   78.22   65.59   78.28  137.73   77.65
  170.53   76.88  186.92   76.95  200.04   77.39  209.88      78  219.72   79.32
  242.67   85.03  249.23   85.98  259.07   86.29  283.07   86.53  283.74   86.53
  283.74   77.53  293.74   77.33  384.74   77.09  387.74   77.84  411.74   77.36
  417.74   75.86  427.74   75.66  433.74   74.16  442.71   74.13  485.34   74.19
  537.81   74.35  583.73   74.21  596.84   74.45  626.36    74.2  708.34    74.4
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   731.3   74.54  764.09   74.55  806.72    74.4  823.12    74.6  839.51   74.48
  865.75   74.65  888.71   74.55  931.34   74.92  944.45   74.88  977.25    75.1
  990.36   77.34 1013.32   77.64 1069.07    77.9 1108.42   77.61 1170.73   78.05
 1196.96    77.8 1219.92   78.38 1233.04   78.48 1255.99   77.76 1295.34   78.19
 1331.42   78.38 1357.65   77.84 1374.05   78.04 1426.52   77.76 1456.03   77.99
 1488.83   78.13  1508.5   77.95  1541.3   77.88 1557.69   78.09  1603.6   78.18
 1642.96   78.11 1662.63   77.93 1695.43   78.08 1724.94   78.05 1751.17   78.29
 1806.92   78.26 1839.72    78.1 1852.83   78.29 1879.07   78.13 1888.91   78.37
 1918.42   78.55 1964.33   78.32 1984.01   78.49 2026.64   78.43 2065.99   78.74
 2085.67   78.41 2118.46   78.48 2141.42   78.39 2157.82   78.55 2210.29   78.74
 2229.96   78.63  2239.8   78.38 2288.99   78.55 2321.79   78.96 2331.63   78.84
 2348.02      79  2384.1   78.58 2410.33   78.84 2469.36   78.81 2508.71   78.87
 2511.99   78.46 2518.55    75.3 2521.83    74.3 2531.67   73.25 2548.07   70.83
 2564.46   70.57 2584.14      70 2600.54   69.33 2613.66   69.04 2620.21   69.23
 2630.05   68.95 2646.45   69.39 2649.73      69 2659.57   69.03 2669.41   70.03
 2675.96   69.62  2685.8   69.98 2692.36   69.23 2705.48   68.95 2731.71   69.33
 2738.27   68.94 2748.11   69.39 2754.67   69.12 2774.35   68.92 2780.91   69.77
 2810.42   69.28 2839.94   69.53 2849.77   68.97 2859.61   68.88 2866.17   69.48
 2876.01   69.16 2898.96   68.92 2905.52   69.42 2912.08   69.13 2921.92   69.38
 2944.88   68.84 2951.44   69.22 2964.55   69.37 2971.11   69.17 2987.51    69.2
 2994.07   68.92 3007.19    69.2 3013.74   68.81 3026.86   68.58 3033.42   69.37
 3046.54   70.29 3059.66   72.96 3072.77   76.22 3082.61    77.7 3099.01   78.55
 3112.13   77.75 3121.96   77.76  3131.8   78.14 3144.92   77.98 3158.04   74.55
 3161.32   74.03 3184.27   73.95 3217.07   74.08 3236.74   74.43 3246.58   74.93
 3253.14   77.74  3259.7   78.99 3272.82   77.65 3279.38   77.33 3292.49   77.32
 3374.48   77.98 3413.83   78.38 3443.35    78.3 3495.82   77.27 3564.69   77.33
 3604.04   77.95 3771.29   76.79 3790.97   76.71 3813.92   76.88 3827.04   76.74
 3853.27   76.76 3869.67   76.97 3892.63   76.85  3945.1   76.97 3991.01   77.46
 4000.85   77.43  4023.8   76.88 4050.04      77 4174.65   76.97 4200.89   77.16
 4223.84   76.87 4253.36   77.06 4292.71   77.04 4348.46   76.86 4364.85   77.13
 4384.53   76.94 4414.04   77.38 4456.67    77.2 4502.58   77.17 4561.61   77.57
 4578.01   77.85 4614.08   78.02 4637.04   78.45 4692.78    78.5 4725.58   77.66
 4781.32   77.66 4837.07   77.24 4856.75   76.94 4873.14   77.42 4882.98   77.45
 4892.82   78.06 4902.66   79.27 4905.94   79.22 4915.78   76.51 4925.61   74.61
 4951.85   73.64 4964.96   73.86 4994.48   74.01  5007.6   73.53 5017.43   73.53
 5023.99   73.95 5050.23   73.68 5056.79   73.98 5066.62   73.86  5086.3   74.38
 5096.14   75.07 5115.81    74.4 5128.93   74.76 5145.33   76.37 5161.72   76.06
 5171.56   76.19 5194.52   77.07 5204.35   77.78 5220.75   77.81 5237.15   76.78
 5243.71   76.14 5253.54   75.82 5273.22   76.28 5283.06   75.92 5302.73   74.48
 5322.41    75.1 5335.53   74.89 5351.92   75.05 5358.48   75.39 5374.88    75.2
 5387.99   75.86 5401.11      76 5417.51   75.84 5424.07    76.1  5433.9   75.93
  5450.3   76.07 5456.86   76.48 5483.09   76.12 5489.65   76.47 5506.05   76.53
    5529   76.36 5535.56   76.11 5568.36   75.77 5581.46   75.96  5601.1   75.69
 5607.65   75.19 5620.75   75.27  5627.3   74.58  5640.4   74.01 5646.95   74.06
 5656.77   73.36 5673.14    73.1 5682.96    73.6 5709.16   73.45 5715.71   73.56
 5751.73   73.57 5771.37   73.27 5791.02   74.03 5804.12   74.35 5810.67   75.19
 5823.76   75.37 5833.59   76.27 5859.78   75.71 5869.61   75.88 5885.98      75
  5895.8   75.16 5905.62   75.73 5931.82   74.51 5938.37   74.98 5948.19   76.36
 5961.29   77.65 5971.11   77.73 5980.94   76.58 5997.31   77.18 6007.13    77.2
 6016.96   75.69  6023.5   75.35  6036.6   72.74  6049.7   72.74 6056.25   73.62
  6062.8    73.8 6072.62   71.98 6079.17   69.21 6088.99    67.3 6095.54   66.48
 6118.46   65.56 6131.56    65.7 6141.38    66.4 6147.93   67.39 6154.48   67.68
 6157.75    67.3 6167.58    64.9 6183.95   62.64 6193.77   59.99 6197.05    54.9
 6207.05    54.2 6218.05    53.2 6229.05    52.4 6242.05    52.4 6250.05    52.6
 6261.05    51.9 6301.05    50.3 6312.05    50.3 6323.05      52 6354.19   59.65
 6364.01   60.54 6367.28   62.05  6377.1   68.95 6383.65   70.83 6393.47   75.43
 6400.02    76.8 6419.66   75.56  6439.3   75.72 6452.39   74.63 6462.21   73.41
 6468.76   72.99 6475.31   73.33 6485.13   75.91 6494.95   75.57 6504.77   76.16
 6524.41   75.98 6550.59   75.95 6583.33   76.11 6606.24   76.04 6625.88    76.2
 6632.44   76.06 6652.12   76.33 6661.95   76.02 6675.07   76.18 6704.59   75.91
 6724.27    76.3 6727.55   76.97 6734.11   79.42 6737.39    79.8 6747.23   79.67
 6753.79   78.99 6760.35   76.92 6773.47   74.19 6789.87      73 6809.55   73.35
 6825.94   72.97 6845.62   72.94 6891.54   72.39  6947.3   72.64 6993.21   72.67
 7003.05   72.49 7026.01   72.59 7075.21   72.29 7101.45   72.27 7153.92   72.03
 7219.52   72.23 7235.92   72.02 7268.72   72.11 7275.28   72.62 7301.52   77.64
 7308.08   77.96 7317.91   75.86 7331.03    76.9 7337.59   76.75 7383.51   76.85
 7399.91   76.69 7442.55   76.71 7472.06   76.47 7508.14   76.53 7540.94   76.27
  7580.3   76.32  7629.5   76.27 7649.17   76.09 7718.05   76.01 7757.41   75.81
 7777.09    75.9 7793.48    75.8 7859.08   75.71 7891.88   75.87 7908.28   75.76
  7954.2   75.67 7957.48   75.83 7980.43   75.67 8013.23   75.68 8039.47   75.46
 8098.51   75.56 8111.63   75.78 8134.58   75.79  8147.7   75.62 8173.94   75.56
 8187.06    75.7 8206.74   75.53  8213.3   75.65 8239.53   75.49  8275.6   75.48
    8292   75.19 8305.12   75.36 8321.52   75.05 8334.63    75.2 8357.59   74.85
  8387.1   74.93 8396.94   74.22 8406.78   74.47  8419.9   75.22 8433.02   73.77
 8439.57   73.74 8446.13    72.8 8455.97   69.74 8465.81   68.61 8472.37   68.33
 8495.32   67.99 8521.56   67.95 8547.79   67.69 8554.35   67.28 8560.91   67.86
 8567.47   69.37 8574.03   70.17 8583.87   70.41 8590.43   69.69 8596.98   67.65
 8600.26   67.19 8613.38   66.77 8623.22   66.96 8636.34   66.66 8682.25   66.76
 8698.65   66.66 8708.48   66.95 8715.04   67.83 8734.72   72.61 8741.28   75.43
 8744.56   76.12 8751.12   75.56 8767.51   74.88 8777.35   75.62 8793.75   75.62
 8888.85    75.3 8908.53   75.02 8974.11   74.99 8997.07   74.68 9020.03   74.89
 9049.54   74.55  9072.5   74.63 9085.61   74.39 9108.57   74.51 9131.53   74.33
 9147.92   74.47 9213.51   74.34 9226.63   74.72 9275.82   74.47 9308.61   74.72
 9341.41   75.28 9344.69   74.69 9354.52   75.44 9397.16   74.85 9410.19   75.42
 9416.66    76.4  9429.6   78.98 9436.07   81.35 9442.54   83.11 9458.72   83.21
 9468.42    81.7 9481.36   78.09  9484.6   77.64 9497.54   77.56

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  259.07    .066 5771.37    .085 6007.13     .07 6167.58    .025
  6377.1     .07 6400.02    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       6007.13 6400.02         1288.43 1489.08  953.22             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 6007.13    77.2       T
 6400.02 9497.54    76.8       T
Left Levee      Station=  283.74      Elevation=   86.53
Right Levee     Station= 9442.54      Elevation=   83.11

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             79.70    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                0.067      0.049      0.066
  W.S. Elev (ft)             79.66    Reach Len. (ft)         1288.43    1489.08     953.22
  Crit W.S. (ft)             60.86    Flow Area (sq ft)       11836.94    6874.68    8559.65
  E.G. Slope (ft/ft)      0.000082    Area (sq ft)            20215.14    6874.68   16070.82
  Q Total (cfs)           20000.00    Flow (cfs)               3872.82   12633.87    3493.30
  Top Width (ft)           9136.60    Top Width (ft)           5723.39     392.89    3020.32
  Vel Total (ft/s)            0.73    Avg. Vel. (ft/s)            0.33       1.84       0.41
  Max Chl Dpth (ft)          29.36    Hydr. Depth (ft)            2.07      17.50       2.83
```

Conv. Total (cfs)	2206689.0	Conv. (cfs)	427305.8	1393951.0	385431.6
Length Wtd. (ft)	1334.21	Wetted Per. (ft)	5731.68	403.21	3026.21
Min Ch El (ft)	50.30	Shear (lb/sq ft)	0.01	0.09	0.01
Alpha	4.06	Stream Power (lb/ft s)	0.00	0.16	0.01
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	12280.79	10243.26	5474.05
C & E Loss (ft)	0.00	Cum SA (acres)	3379.43	554.10	1864.98

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 124.20*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	79.81	9.47	79.92	42.59	80.95	57.52	81.04	99.38	80.91
123.04	80.45	134.87	80.52	151.43	81.23	158.53	82.11	175.09	85.89
182.4786	59436	191.54	86.37	200.77	84.82	207.77	82.97	216.92	80.06
228.62	76.81	249.22	75.03	256.14	73.76	267.68	74.11	286.14	74.42
316.13	74.37	383.04	74.61	415.35	74.5	424.57	74.68	445.34	74.54
519.17	74.87	542.24	74.89	572.24	74.81	583.77	74.95	595.31	74.88
613.77	75	629.92	74.93	645.58	75.02	687.27	74.83	692.22	74.94
701.44	76.58	728.97	77.26	756.82	77.44	784.5	77.11	828.34	77.29
846.8	77.09	862.95	77.44	872.18	77.49	888.33	76.99	916.01	77.26
941.4	77.37	959.85	77	971.39	77.14	1008.31	76.97	1052.15	77.22
1089.06	77.04	1100.6	77.18	1132.9	77.24	1160.59	77.21	1174.43	77.09
1197.51	77.2	1218.27	77.19	1236.72	77.35	1270.94	77.35	1299.02	77.24
1308.25	77.36	1326.71	77.26	1333.63	77.42	1354.39	77.54	1386.69	77.39
1400.54	77.5	1430.53	77.46	1458.22	77.67	1472.07	77.45	1511.29	77.43
1522.83	77.54	1559.74	77.67	1580.51	77.43	1615.12	77.54	1638.19	77.81
1656.65	77.83	1682.03	77.55	1700.49	77.74	1769.7	77.78	1772.01	77.51
1778.93	74.73	1785.86	74.03	1797.4	72.42	1808.93	72.24	1834.31	71.41
1855.07	71.15	1866.61	71.44	1875.84	71.2	1882.77	71.87	1887.38	71.59
1894.3	71.83	1898.91	71.33	1908.14	71.15	1926.6	71.4	1931.21	71.15
1938.14	71.45	1956.6	71.14	1961.21	71.7	1981.98	71.38	2002.75	71.55
2016.59	71.12	2021.2	71.52	2028.12	71.31	2044.27	71.15	2048.89	71.48
2060.43	71.46	2076.58	71.1	2090.42	71.46	2106.57	71.35	2111.19	71.16
2120.42	71.35	2134.26	70.94	2148.1	72.08	2157.33	73.86	2166.56	76.04
2173.48	77.02	2185.02	77.59	2194.25	77.06	2208.09	77.32	2217.32	77.21
2228.86	74.58	2245.01	74.53	2268.08	74.61	2281.92	74.85	2288.85	75.18
2293.46	77.05	2298.08	77.89	2307.31	76.99	2321.15	76.77	2378.83	77.22
2406.52	77.48	2427.29	77.43	2464.2	76.74	2512.66	76.78	2540.34	77.21
2658.02	76.47	2671.86	76.41	2688.01	76.53	2715.69	76.45	2727.23	76.59
2743.39	76.51	2780.3	76.59	2812.6	76.91	2835.67	76.51	2854.14	76.59
2941.81	76.59	2960.27	76.73	2976.42	76.54	2997.19	76.67	3024.87	76.65
3064.09	76.52	3075.63	76.7	3089.47	76.57	3110.23	76.87	3140.23	76.75
3172.53	76.73	3214.06	77	3225.6	77.19	3250.98	77.31	3267.13	77.59
3306.35	77.6	3329.42	77.04	3368.64	77.04	3407.87	76.77	3421.71	76.58
3440.17	76.92	3456.32	78.1	3463.24	76.3	3470.16	75.03	3488.62	74.39
3518.61	74.64	3527.84	74.32	3539.38	74.61	3557.84	74.43	3569.37	74.55
3583.22	74.9	3590.14	75.36	3603.98	74.91	3613.21	75.15	3624.75	76.22
3636.28	76.01	3643.2	76.1	3659.36	76.68	3666.27	77.15	3677.81	77.17
3693.96	76.05	3700.88	75.84	3714.73	76.14	3721.65	75.9	3735.49	74.94
3749.34	75.35	3758.57	75.2	3774.71	75.53	3786.25	75.4	3795.48	75.84
3816.24	75.82	3839.31	75.98	3842.7476	.18046	3862.39	76.02	3867	76.26
3894.69	76.2	3899.3	76.03	3922.38	75.82	3931.59	75.95	3945.41	75.77
3950.02	75.44	3959.24	75.5	3963.85	75.04	3977.67	74.7	3984.58	74.23
3996.1	74.05	4003.01	74.38	4021.44	74.26	4047.1374	.32922	4065.21	74.16
4088.25	74.92	4092.86	75.49	4102.07	75.62	4108.99	76.23	4127.41	75.89
4134.33	76.02	4145.85	75.45	4159.66	75.96	4178.1	75.17	4198.83	77.3
4205.74	77.37	4212.66	76.62	4224.17	77.06	4231.08	77.1	4244.02	75
4254.38	72.14	4264.74	71.16	4275.09	71.36	4282.85	69.84	4288.03	67.84
4295.79	66.34	4300.97	65.64	4329.45	63.93	4335.77	64.01	4337.21	63.35
4342.39	63.56	4350.15	62.82	4357.92	60.6	4370.86	58.87	4378.62	56.97
4381.22	53.57	4406.51	51.8	4423.11	51.86	4431.81	51.33	4458.63	50.2882
4470.76	50.11	4488.35	51.61	4494.21	52.53	4511.8	54.46	4523.52	56.6
4525.96	58.51	4533.66	60.97	4539.42	61.21	4545.19	62.4	4550.96	61.96
4556.12	62.86	4571.3	67.07	4574.03	67.45	4581.42	69.35	4585.57	71
4591.34	72.29	4596.6	74.33	4606.72	76.16	4623.93	75.26	4643.28	75.35
4660	75.28	4677.75	74.49	4691.07	73.62	4699.95	73.43	4708.83	73.7
4722.15	75.53	4735.47	75.44	4746.5	75.78	4774.46	75.76	4836.82	75.88
4864.77	75.97	4886.4	75.95	4913.04	76.1	4921.94	76.04	4948.63	76.26
4961.96	76.08	4979.75	76.22	5019.79	76.15	5046.48	76.44	5050.93	76.88
5059.82	78.54	5064.27	78.79	5077.62	78.7	5086.52	78.27	5095.41	76.92
5113.21	75.11	5135.45	74.36	5162.14	74.65	5184.37	74.45	5228.21	74.45
5279.81	74.22	5340.03	74.54	5352.93	74.75	5359.38	75.33	5365.84	75.43
5370.14	75.13	5380.89	75	5411.22	74.98	5424.57	74.88	5460.45	74.96
5494.86	74.87	5522.43	74.72	5546.47	74.73	5632.49	74.45	5647.54	74.52
5651.84	74.76	5669.05	74.36	5701.31	74.29	5718.15	74.34	5740.39	74.22
5784.88	74.2	5793.77	74.55	5829.36	77.83	5838.26	78	5851.59	76.58
5869.38	77.2	5878.28	77.07	5931.4	77.11	5952.91	76.91	5991.61	76.8
6023.87	76.79	6060.43	76.58	6109.89	76.63	6154.07	76.41	6243.22	76.48
6274.18	76.44	6316.33	76.26	6359.34	76.25	6363.64	76.17	6400.2	76.21
6445.36	76.05	6458.26	76.14	6501.27	76.07	6535.68	76.09	6559.33	75.99
6585.54	76.01	6630.02	76.17	6714.54	76.01	6718.99	76.12	6750.12	76.02
6778.69	76.06	6830.19	75.82	6896.96	75.95	6928.05	76.07	6959.18	76.04
6976.97	75.9	7012.56	75.9	7030.35	75.98	7057.05	75.86	7075.46	75.96
7096.97	75.86	7109.87	76	7122.77	75.85	7144.28	75.99	7161.49	76.56
7174.39	76.45	7187.29	76.57	7195.89	76.29	7204.49	75.66	7219.54	75.34
7245.36	75.38	7258.26	75.16	7273.31	75.61	7288.36	75.27	7301.65	75.47
7315	74.98	7322.78	75.03	7346.14	75.59	7363.93	74.56	7372.82	74.51
7381.71	73.86	7395.06	71.79	7408.4	70.96	7417.3	70.75	7449.65	70.41
7469.01	70.37	7496.97	70.19	7519.59	69.92	7528.48	69.59	7537.38	69.94
7546.28	71.01	7555.17	71.48	7568.52	71.61	7577.42	71.05	7586.3	69.69
7590.75	69.36	7608.54	68.91	7621.7	69.07	7636.76	70.56	7649.66	70
7658.26	70.31	7681.91	70.4	7705.57	70.38	7724.19	70.24	7737.52	70.47
7746.42	71.08	7773.11	74.25	7782	76.04	7786.45	76.53	7795.35	76.18
7817.4	75.68	7830.92	76.17	7856.11	76.18	7944.29	75.87	7961.49	75.87
7993.74	75.71	8008.83	75.56	8034.61	75.68	8062.56	75.46	8092.67	75.53
8112.03	75.5	8133.53	75.2	8160.05	75.46	8176.54	75.21	8200.2	75.17
8217.4	75.04	8226	75.25	8262.57	74.87	8269.02	74.99	8311.27	74.8
8320.63	75.02	8335.68	75.07	8352.89	74.53	8367.94	74.75	8406.65	74.69
8417.41	74.42	8426.01	74.49	8434.61	74.91	8449.66	75.35	8466.86	75.46
8496.98	75.43	8503.43	75.6	8533.53	75.56	8563.64	75.64	8580.85	74.91
8595.92	74.89	8600.36	74.48	8613.69	75.06	8671.52	74.46	8684.07	74.71

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 8696.97   75.88 8709.88   77.71 8718.34    80.2  8724.3   81.37 8733.07   82.62
 8747.63   81.54 8756.37    80.1 8768.01   77.41 8770.93   77.06 8782.58   76.65

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  182.47    .066 3456.32    .085 4231.08     .07 4350.15    .025
 4533.66     .07 4606.72    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4231.08 4606.72          1288.43 1489.08  953.22             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 4231.08    77.1       T
 4606.72 8782.58   76.16       T
Left Levee      Station=  182.47      Elevation=   86.59
Right Levee     Station= 8733.07      Elevation=82.62334

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 124.00*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.42   26.15   83.68   35.32   83.93   61.02   84.18   75.55   84.03
   82.82    84.1   92.99   84.47   97.35   84.89  105.8886.45006  110.42   87.06
  114.78   87.14   122.8    85.4  126.85   84.08  138.91   77.11  154.84   74.22
  172.19   74.56  189.55   74.61  223.35   74.86  247.47    74.8  307.05    75.2
  337.75   75.22  361.79   75.35   380.2    75.3  404.32    74.6  407.18   74.78
  412.52   75.82  428.45   76.81  440.51   77.04  464.64   76.56  485.95   76.53
  496.63   76.37  511.32    76.5  520.67   76.23  551.38   76.37  562.06   76.17
  568.73   76.24   590.1   76.18  615.47   76.32  636.83    76.2  662.19   76.31
  686.23   76.25  722.27   76.41  774.35   76.39  790.37   76.53  809.06   76.45
  834.43   76.49  850.45   76.59  858.46   76.48  881.16   76.48   909.2    76.6
  921.21   76.48  965.27   76.65  979.96   76.52  990.64   76.63  1030.7   76.69
 1036.04   75.16 1046.72      74 1068.08   73.49 1092.12   73.38 1096.12   73.71
  1102.8   73.69 1110.81   73.35 1128.17    73.5 1138.85   73.35 1141.52   73.64
 1153.53   73.48 1165.55   73.57 1173.56   73.36 1176.23   73.56 1189.58   73.38
 1192.25   73.55 1208.28   73.36 1216.29   73.55 1241.66    73.3 1249.67   73.87
 1260.35   75.85 1264.35   76.35 1271.03   76.64 1276.37   76.37 1289.72   76.45
  1296.4   75.13  1319.1   75.15 1331.11   75.43 1336.45   76.79  1341.8   76.34
  1349.8   76.23 1399.21   76.58 1411.22   76.56 1432.59   76.22 1460.63   76.24
 1476.65   76.47 1502.05   76.38 1544.74   76.14 1578.12   76.14 1615.51   76.22
  1638.2   76.34 1647.55   76.13 1658.23   76.18 1728.99    76.2 1741.01   76.28
 1779.73   76.18 1806.43   76.36 1842.48    76.3 1887.87   76.59 1897.22   76.74
 1919.91    76.7 1933.27   76.41 1955.96   76.43 1986.67   76.21 1997.35   76.39
  2006.7   76.99 2014.71   75.46 2025.39   75.14 2042.75   75.28 2065.45   75.18
 2080.13   75.43 2084.14   75.65 2092.15   75.42 2097.49   75.54 2104.17   76.07
 2114.84      76 2128.19   76.52 2134.87   76.53 2148.22   75.85 2156.23      76
 2168.25   75.39 2176.26   75.59 2197.62   75.61  2208.3   75.87 2221.65   75.83
  2229.775.95183 2260.37   76.03  2276.4   75.86 2289.73   75.86 2319.06      75
 2323.05   75.16 2358.6875.05278 2372.38   75.49 2384.38    76.2 2399.05   76.15
 2405.71    75.9 2413.71   76.18 2424.38   75.84 2436.37   76.95 2444.37   76.65
 2455.04      77 2460.17   76.12 2464.55   74.66 2472.16   71.53 2479.77   69.59
 2487.38   68.92 2493.09   67.71 2496.89   66.48 2503.28  65.278 2511.46   64.28
 2521.72   63.38 2527.33   62.17 2531.98   60.52 2536.84   59.73 2542.55   58.34
 2547.62   56.42 2557.77    55.1 2563.48   53.95 2565.38   52.24 2583.98   51.21
 2596.18   51.12  2601.450.82592 2610.17   50.42 2625.81   49.93 2637.41   50.26
 2645.34   50.92 2653.27   51.12  2661.2   52.03 2677.06   52.66 2684.99    53.1
 2692.92   54.68 2700.85   55.52 2704.16   58.94 2706.76    59.5 2711.97   61.86
 2714.57   62.64 2722.37   62.57 2730.18    64.6 2732.78   64.44 2737.98   63.39
 2740.58   63.33 2756.19   64.78 2763.99   64.99  2769.2   65.45  2779.6   67.99
  2784.8   69.92 2792.5270.74342 2799.73   73.23 2803.02   74.05 2813.43   75.52
    2827   75.15 2835.15   74.52 2840.58   74.99 2851.44    74.9 2859.58   75.09
 2867.73   74.86 2880.69   74.83 2900.31   74.44 2919.92   73.83 2942.36   74.06
 2959.17   75.15 2989.92    75.5 2995.35   75.42 3026.44   75.55 3036.08   75.68
 3052.37   75.63 3079.52   75.76 3103.96   75.71 3139.26   75.86 3171.85   75.86
 3177.28   75.94  3253.3   76.12 3284.44   76.27 3310.32   76.23 3345.63    76.4
 3368.69   76.58 3374.31   76.78 3385.54   77.65 3391.16   77.77 3408.01   77.74
 3419.24   77.56 3430.48   76.92 3451.52   76.07 3481.03   75.72 3514.73   75.94
 3542.79   75.92    3590      76 3598.15   76.11 3663.31   76.04 3674.18   76.18
 3709.48   76.27 3739.35   76.47 3744.78   76.72 3755.64   76.87 3763.78   78.02
 3769.21   77.54 3771.93   78.21 3777.36   77.61 3790.93   77.35 3812.66   77.27
 3846.09   77.27  3891.4   77.35 3934.85   77.32 3940.28   77.24 3972.86   77.15
 4000.01   77.19 4067.89   76.99 4089.61   77.01 4108.62   76.87 4127.62   76.98
 4133.06   77.44 4138.49   76.75 4143.92   77.09 4154.79   76.59 4171.08   76.62
 4195.51    76.4 4233.53   76.48  4282.4   76.27 4301.04    76.3 4312.27   76.48
  4357.2   78.02 4368.44   78.04 4385.27   77.29 4410.02   77.51  4423.6   77.37
 4453.46    77.4 4472.47   77.33 4486.05   77.39  4513.2   77.07  4548.5   77.04
 4562.07   76.91 4586.51   76.88 4594.65   76.76  4602.8   76.89 4624.53   76.84
 4648.97   76.69 4676.12   76.77 4692.41   76.68 4711.42   76.73 4722.28   76.64
 4746.71   76.64 4757.57   76.56 4879.76   76.66 4885.19    76.6 4918.85   76.61
 4972.08   76.44 5026.38   76.46 5031.81    76.3 5077.98   76.44    5135   76.27
 5151.29   76.44  5170.3   76.32 5183.87   76.41 5205.59   76.35 5249.04   76.43
 5262.61   76.27 5300.63   76.27 5363.08   76.49 5379.38   76.39 5409.24   76.46
 5441.83   76.43 5474.89   76.34 5493.42   76.47 5515.14   76.36 5555.88   76.45
 5574.88    76.3 5623.76   76.18 5705.22   76.35 5713.37   76.29 5744.48   76.37
 5794.83    76.2 5830.13   76.26 5879.01   76.24 5889.87   76.29 5907.35   76.18
 5927.88   76.21  5930.6   76.32 5957.76    76.2 5974.05    76.5 5990.34   76.22
 6017.49   76.49 6039.22   77.79 6055.51    77.7  6071.8   77.82 6082.67   77.29
  6088.1   76.45 6093.53   76.15 6112.53   75.58 6123.39   75.45 6128.82   75.64
 6145.12   75.73 6161.41   75.44 6169.56   76.08 6180.42   76.34 6196.71    75.9
 6199.43   75.63 6210.29   76.07 6242.88   75.69 6253.74   75.85 6272.38   75.95
 6294.84   75.36 6306.06   75.29 6317.29   74.93 6334.14   73.84 6350.99    73.3
 6384.08   73.05 6403.08   72.84 6427.52   72.78 6462.82   72.53 6473.69    72.3
 6491.38   72.14 6502.62    71.9 6513.85   72.02 6525.27   72.65 6536.32   72.78
 6553.17    72.8  6564.4    72.4 6575.62   71.73 6595.88   71.15 6606.74   71.04
 6620.31   71.18 6628.46   72.27 6639.33    74.4 6642.04   74.45 6647.47   73.84
 6655.62   73.32 6666.48   73.93 6696.35   74.08 6715.35   73.92 6726.21   74.01
 6750.66   73.82 6766.56   73.98 6791.39   74.88 6811.49   75.88 6828.34   76.94
 6872.85   76.45 6886.43   76.74    6900   76.65 6916.29   76.75 6927.15    76.6
 6948.88   76.65 6981.47   76.42  6986.9    76.5 7027.63   76.35 7049.35   76.38
 7071.08   76.24 7090.08   76.25 7095.51   76.12 7119.95    76.1 7141.68   76.36
 7155.25   76.11 7174.26   76.03 7176.98   75.92 7195.98   75.89 7214.99   76.06
 7220.42    75.9 7239.43   76.14 7255.72   76.02 7266.59   75.69 7280.16   75.69
 7299.17   76.04 7312.74   75.91 7320.89   75.67 7329.04   75.85 7334.47   75.71
 7350.76    75.8 7372.49   75.48 7383.35   75.89 7424.08   75.46 7429.51    75.3
 7437.66   75.52 7443.09   75.39 7464.81    75.4 7494.68   75.26 7502.82   75.64
 7521.83   75.68 7529.98   75.04 7543.56   74.63 7562.56   75.07 7611.44   75.01
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7625.02	74.5	7635.88	74.56	7646.74	75.21	7665.75	76.02	7679.33	76.07
7687.47	76.31	7709.19	76.41	7725.49	76.35	7733.64	76.71	7771.65	76.51
7798.8	76.56	7809.66	76.41	7831.39	74.72	7836.82	74.53	7850.42	74.5
7856.04	74.28	7863.98	74.59	7877.55	74.68	7888.41	74.52	7912.85	74.42
7940.01	74.09	7961.73	74.17	7978.02	75.46	7983.45	76.18	7991.6	76.82
7994.31	77.27	8002.34	80.09	8005	80.65	8015.63	81.63	8023.6	82.14
8027.27	81.78	8038.27	79.4	8049.27	77.48	8054.67	76.72	8067.61	75.74

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	114.78	.089	2358.68	.066	2503.28	.025	2792.52	.066
2813.43	.07								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2455.04	2813.43	1288.43	1489.08	953.22	.1	.3

Left Levee Station= 114.78 Elevation= 87.14
Right Levee Station= 8023.6 Elevation=82.13667
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
97.53	2449.8	76.94	2811.24	3069.42	75.59	6276.53	6856	75.91

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 123.8

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 458

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	85.03	3.28	85.62	13.12	86.82	22.96	87.46	32.8	87.73
42.64	87.57	45.92	85.19	49.2	77.4	52.48	74.7	55.76	74.61
72.16	75.14	78.72	75.09	91.84	75.49	111.53	75.72	114.81	75.58
121.37	74.38	127.93	76.36	131.21	76.64	137.77	76	150.89	75.49
164.01	75.33	177.13	75.43	186.97	75.34	213.21	75.51	265.69	75.53
275.53	75.47	288.65	75.61	311.62	75.54	357.54	75.68	410.02	75.69
419.86	75.81	452.66	75.84	459.22	75.76	485.46	75.89	495.3	75.84
528.11	75.88	534.67	75.78	577.31	75.95	616.67	75.78	639.63	75.99
649.47	75.84	675.71	76.66	678.99	76.9	682.27	76.26	692.11	69.42
695.39	67.71	701.95	65.83	715.07	63.36	721.63	62.27	724.91	60.5
728.19	57.64	738.19	52.04	748.19	50.94	768.19	50.44	778.19	49.94
788.19	49.74	798.19	49.94	808.19	50.64	818.19	50.64	828.19	51.54
838.19	51.64	848.19	51.54	858.19	51.74	868.19	53.64	878.19	54.44
882.36	59.38	885.64	60.06	892.2	63.29	895.48	64.32	902.04	63.85
905.32	63.92	915.16	66.8	918.44	66.51	925	64.82	928.28	64.45
941.4	64.5	947.96	64.26	957.8	63.26	964.36	63.45	977.48	66.52
984.04	68.83	987.32	69.22	993.88	69.21	1003.73	72.41	1007.01	73.2
1020.13	74.88	1036.53	74.57	1046.37	73.78	1052.93	74.58	1059.49	74.73
1066.05	74.56	1075.89	74.82	1085.73	74.46	1095.57	74.47	1115.25	74.19
1125.09	74.28	1138.21	74.04	1148.05	74.03	1161.17	74.3	1187.41	74.53
1210.37	75.15	1233.34	75.22	1239.9	75.06	1256.3	75.12	1275.98	75.31
1289.1	75.54	1308.78	75.47	1318.62	75.62	1335.02	75.57	1341.58	75.66
1371.1	75.54	1400.62	75.61	1413.74	75.74	1453.11	75.76	1459.67	75.87
1485.91	75.89	1508.87	76.05	1531.83	75.98	1538.39	76.11	1551.51	76.09
1564.63	76.24	1600.71	76.35	1620.39	76.32	1649.92	76.63	1663.04	76.58
1689.28	76.73	1702.4	76.66	1708.96	76.77	1731.92	76.74	1774.56	76.96
1790.96	76.92	1800.8	77.07	1807.36	76.94	1817.2	77.07	1846.72	77.1
1853.29	77.21	1876.25	77.26	1905.77	77.42	1958.25	77.57	1968.09	77.77
1994.33	77.79	2000.89	77.89	2020.57	77.84	2030.41	77.96	2046.81	77.85
2059.94	78.05	2082.9	78.09	2092.74	78.22	2102.58	78.14	2109.14	78.29
2118.98	78.24	2138.66	78.4	2145.22	78.77	2158.34	78.98	2164.9	80.32
2168.18	80.71	2174.74	79.98	2178.02	80.99	2184.58	80.09	2200.98	79.69
2210.82	79.72	2227.22	79.57	2260.02	79.63	2282.98	79.74	2305.94	79.68
2322.34	79.74	2351.87	79.72	2374.83	79.78	2381.39	79.67	2420.75	79.58
2453.55	79.65	2499.47	79.52	2515.87	79.55	2535.55	79.42	2561.79	79.48
2584.75	79.29	2607.71	79.43	2614.27	80.12	2620.83	79.08	2627.4	79.59
2640.52	78.83	2660.2	78.85	2689.72	78.5	2709.4	78.57	2729.08	78.54
2735.64	78.67	2775	78.49	2784.84	78.54	2794.68	78.37	2804.52	78.51
2824.2	78.32	2830.76	78.41	2870.12	78.22	2879.96	78.25	2902.92	78.05
2925.89	77.99	2942.29	77.76	2948.85	77.83	2965.25	77.67	3001.33	77.7
3024.29	77.59	3040.69	77.67	3073.49	77.22	3086.61	77.33	3099.73	77.17
3116.13	77.21	3132.53	77.01	3162.05	76.97	3171.89	76.78	3181.73	76.99
3188.29	76.91	3207.98	76.97	3237.5	76.8	3270.3	76.9	3289.98	76.77
3312.94	76.83	3326.06	76.72	3355.58	76.78	3368.7	76.68	3417.9	76.77
3424.46	76.67	3453.98	76.76	3483.51	76.76	3516.31	76.85	3522.87	76.75
3572.07	76.78	3588.47	76.71	3604.87	76.75	3627.83	76.62	3693.43	76.67
3699.99	76.43	3706.55	76.62	3713.11	76.53	3732.79	76.61	3745.91	76.51
3755.76	76.66	3791.84	76.53	3824.64	76.5	3841.04	76.6	3844.32	76.74
3867.28	76.53	3883.68	76.68	3909.92	76.62	3952.56	76.68	3962.4	76.76
3978.8	76.53	3998.48	76.51	4018.16	76.66	4024.72	76.55	4077.21	76.77
4090.33	76.68	4100.17	76.81	4119.85	76.67	4132.97	76.8	4146.09	76.71
4155.93	76.81	4185.45	76.72	4195.3	76.79	4237.94	76.67	4257.62	76.81
4264.18	76.69	4283.86	76.7	4333.07	76.84	4356.03	76.61	4369.15	76.69
4375.71	76.55	4415.07	76.54	4464.28	76.64	4477.4	76.57	4483.96	76.68
4513.48	76.75	4523.32	76.66	4552.85	76.7	4592.21	76.51	4602.05	76.57
4621.73	76.45	4657.81	76.5	4664.37	76.6	4723.42	76.52	4736.54	76.62
4752.94	76.51	4782.46	76.51	4785.74	76.67	4818.55	76.55	4838.23	77.01
4851.35	76.83	4857.91	76.59	4867.75	76.63	4890.71	77	4916.96	79.01
4926.8	79.11	4936.64	78.94	4956.32	79.06	4969.44	78.3	4976	77.07
4982.56	76.64	4995.68	76.29	5005.52	75.81	5012.08	75.89	5018.64	75.59
5025.2	75.87	5038.33	75.9	5044.89	76.08	5058.01	75.93	5064.57	75.71
5074.41	76.69	5087.53	77.07	5107.21	76.4	5110.49	76	5117.05	76.12
5123.61	76.64	5130.17	76.55	5156.42	76.5	5162.98	76.35	5176.1	76.48
5208.9	76.24	5215.46	76.29	5228.58	76.11	5274.51	75.89	5294.19	75.64
5333.55	75.51	5356.51	75.26	5386.03	75.18	5392.6	74.93	5399.16	74.99
5418.84	74.84	5428.68	74.86	5441.8	74.56	5454.92	74.47	5487.72	74.07
5504.12	74.28	5527.09	73.95	5536.93	74.02	5550.05	73.76	5563.17	73.78
5576.29	73.66	5589.41	73.27	5602.53	73.16	5618.93	73.29	5622.21	73.65
5628.77	74.98	5635.34	76.86	5641.9	78.25	5645.18	78.34	5651.74	77.42
5661.58	76.64	5674.7	77.55	5710.78	77.75	5733.74	77.51	5746.86	77.65
5756.71	77.47	5776.39	77.39	5815.75	77.61	5825.59	77.44	5838.71	77.54
5855.11	77.51	5861.67	77.22	5874.8	77.43	5894.48	77.4	5917.44	77.26
5924	77.12	5940.4	77.3	5956.8	77.17	5976.48	77.32	5989.6	77.1
6015.85	77.2	6022.41	77.06	6035.53	77.06	6055.21	76.89	6061.77	77.02
6081.45	76.99	6110.98	76.83	6137.22	76.9	6163.46	76.7	6186.42	76.78
6192.98	76.61	6222.5	76.64	6248.75	77.03	6265.15	76.66	6288.11	76.55
6291.39	76.38	6314.35	76.34	6337.31	76.6	6343.87	76.36	6350.44	76.61
6366.84	76.79	6386.52	76.67	6399.64	76.18	6409.48	76.32	6416.04	76.15
6429.16	76.54	6439	76.62	6448.84	76.4	6455.4	76.47	6465.24	76.13
6475.09	76.42	6481.65	76.23	6501.33	76.42	6507.89	76.17	6514.45	76.21
6527.57	75.92	6540.69	76.52	6547.25	76.34	6560.37	76.31	6589.9	75.97

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 6596.46   75.73  6606.3   76.04 6612.86   75.84  6639.1   75.87 6675.18   75.72
 6685.02   76.27 6707.98   76.29 6717.83   75.33 6734.23   74.72 6744.07   74.91
 6757.19    75.4 6776.87   75.35 6783.43    75.2 6793.27   75.37 6816.23   75.33
 6832.64   74.58 6845.76   74.63 6858.88   75.52 6865.44   75.72 6881.84   76.69
 6898.24   76.79 6908.08   77.15 6934.32   77.33 6954.01   77.27 6963.85   77.82
 6980.25   77.75 7009.77   77.45 7042.57   77.45 7055.69   77.18 7065.53   76.27
 7081.94   74.54  7088.5   74.23 7111.46   74.06  7121.3   74.36 7124.58   74.24
  7137.7   74.32 7150.82   74.13 7180.34   74.07 7213.15   73.68 7239.39   73.63
 7259.07   75.05 7265.63   75.83 7275.47   76.31 7278.75   76.83 7288.45   80.55
 7291.66   81.11  7304.5   81.52 7314.13   81.65 7317.34    81.1 7326.97   77.67
  7336.6   76.24 7343.02   75.97 7352.65   74.83

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0      .1  649.47    .066  724.91    .025  885.64    .066 1020.13     .07

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        678.99 1020.13          1216.82    1719 1770.81             .1      .3
Left Levee      Station=    32.8      Elevation=   87.73
Right Levee     Station= 7314.13      Elevation=   81.65
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  -53.81  679.09   76.93 1018.69 1208.73   74.87 2178.35 7300.22   80.54

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)              79.42    Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.10    Wt. n-Val.                 0.098      0.049      0.070
  W.S. Elev (ft)              79.32    Reach Len. (ft)          1216.82    1719.00    1770.81
  Crit W.S. (ft)              59.67    Flow Area (sq ft)        1504.90    6684.14    3349.78
  E.G. Slope (ft/ft)      0.000151    Area (sq ft)             1504.90    6684.14    3349.78
  Q Total (cfs)           20000.00    Flow (cfs)                502.46   17702.62    1794.92
  Top Width (ft)           2111.61    Top Width (ft)            630.60     341.14    1139.87
  Vel Total (ft/s)            1.73    Avg. Vel. (ft/s)            0.33       2.65       0.54
  Max Chl Dpth (ft)          29.58    Hydr. Depth (ft)            2.39      19.59       2.94
  Conv. Total (cfs)       1625496.0    Conv. (cfs)              40837.4   1438777.0   145881.7
  Length Wtd. (ft)           1683.56    Wetted Per. (ft)          632.04     353.39    1139.95
  Min Ch El (ft)               49.74    Shear (lb/sq ft)            0.02       0.18       0.03
  Alpha                         2.08    Stream Power (lb/ft s)      0.01       0.47       0.01
  Frctn Loss (ft)               0.19    Cum Volume (acre-ft)    11355.51    9537.01    4499.25
  C & E Loss (ft)               0.02    Cum SA (acres)           3098.16     516.46    1616.02


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 123.48*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   80.62   14.67   81.11   31.43   81.82   37.72   82.75   54.48   86.49
   58.68   87.21   67.06   87.62   75.44   87.68   94.47   86.66  105.89   85.16
   113.5   83.46  122.91   82.48  134.78   78.49  146.65   76.37  155.36   75.71
  164.88   75.26  185.81   75.15  204.84   75.25  235.29   75.21  248.61   75.37
  280.96    75.1  284.76   75.19  301.89   75.12  311.41   75.35  317.11   75.29
  336.14   75.57  339.95   76.03  347.56    76.4  351.37   76.14  362.78   76.02
  366.59    76.3  395.93   75.75  412.26   76.57  431.54   76.93  448.42   76.69
  471.25   76.51  480.77   76.53  518.82   76.28   568.3    76.3  577.81   76.44
  589.23   76.29  600.65   76.42  615.87   76.33  640.61   76.41  646.32   76.33
  676.76    76.4  686.28   76.29   697.7   76.52  703.41   76.32  733.85    76.4
  741.47   76.31  771.91   76.46  798.55   76.33     829   76.38  834.71   76.56
  848.03    76.4  863.25   76.49  945.08   76.47  983.14   76.74  1017.4   76.64
 1070.68    76.7 1099.22   76.65 1108.74   76.71 1137.28   76.61 1171.54   76.71
 1201.98    76.7  1215.3   76.76 1240.04   76.68 1247.65   76.79 1260.97   76.72
 1289.52   76.77 1295.23   76.71 1318.06   76.77 1337.09    76.7  1342.8   76.77
 1365.64   76.68 1380.86   76.76 1397.99   76.66 1428.43   76.76 1451.27   76.72
 1477.91   76.83 1495.04    76.8 1512.16   76.87 1521.68   76.79 1561.64   76.92
 1582.57   76.94 1593.99   76.79  1599.7   76.88 1626.34   76.75 1647.27    76.9
  1662.5   76.85 1677.72   76.94 1696.75   76.82 1719.58   76.94    1731   76.88
 1761.45   76.91 1803.31   76.87 1826.15   77.01 1837.57   76.95 1841.37   76.64
1847.36 75.4137 1848.99   75.08 1862.31    74.4 1875.63   74.32 1911.78   74.44
 1972.68   74.34  1987.9   74.44 2018.35   74.29 2029.76   74.49 2060.21   74.38
 2065.92   74.43 2084.95   74.26  2117.3   74.45 2123.01   73.83 2130.62   73.52
 2153.46   73.43 2159.17    73.3 2170.58   73.39    2182   73.04 2192.1572.98241
 2201.01   73.01  2218.1   72.87 2229.49    73.1 2242.78   72.59 2248.48   72.69
 2271.26   72.61 2286.46   73.16 2301.65   74.13 2308.7574.14562 2322.54   74.32
 2339.63   74.13 2347.23   74.51 2362.42   74.28 2371.91   74.39 2383.31   74.29
    2389   73.97  2404.2   74.21 2413.69   74.86 2418.07   74.59 2429.02   72.39
 2439.97   69.06 2446.14    68.1 2455.31   67.54 2463.6865.95671 2475.02   63.76
 2481.59   63.84 2492.53   63.27 2504.55   61.07 2510.05   60.49 2511.04   59.42
 2521.01   57.35 2530.83   56.75 2542.91   56.77 2549.48   55.86 2553.86   55.57
 2562.62   56.13    2567   55.94 2573.57   53.33 2578.25   52.75 2590.19   51.64
 2606.35   49.52 2613.71    49.5 2629.77   48.52 2634.6748.62254 2638.6448.78689
 2649.85   49.09 2656.55   49.62 2676.63   50.55 2683.33   52.16 2690.02   53.25
 2692.81   56.01 2695.01   56.58  2698.9   58.41  2701.6   59.12 2708.18   58.94
 2714.77   60.59 2723.56   60.24 2732.34   61.08 2740.13   61.43 2746.55   61.32
 2751.1962.83026 2756.49    65.1 2760.88    67.7 2767.47   70.61 2772.23   73.72
 2778.65    76.2 2785.04   76.97 2798.47    76.5 2806.53   75.99  2811.9   76.32
 2822.64   76.21 2830.69   76.31 2838.75   76.11 2862.91   76.17 2885.24   76.84
 2906.11   76.01 2921.98   76.25 2931.16    76.5 2943.68   76.54 2952.03   76.71
 2964.95   76.55 2977.08   76.64  3006.3   76.68 3029.39   77.03 3052.43   76.89
 3060.86   76.65 3090.34   76.68 3102.97   77.81  3111.4   77.78 3124.03   77.13
  3145.1    77.7    3183   76.42 3203.93   76.04 3220.04   75.97 3241.96   76.07
 3276.42   76.02 3288.29   76.18 3311.34   76.12 3321.98   76.21  3330.4   76.11
 3359.88   76.28 3416.05   76.22 3429.48   76.24 3448.33   76.44  3461.7   76.33
 3482.01    76.5 3503.07   76.43 3519.92   76.64 3532.55   76.49 3545.19   76.72
    3553   76.68  3587.9    76.9 3595.73   76.86 3604.15   77.04    3621   76.91
 3636.24   77.11 3671.15    77.1 3700.68   77.29 3716.79   77.56 3724.85   78.41
 3730.22   78.07  3732.9   78.59 3738.27   78.17  3751.7    77.9 3776.83    77.8
 3789.46   77.93  3806.3   77.83 3848.42   78.01 3882.11   77.81 3894.01    77.9
 3911.59   77.73 3920.02    77.9 3936.86   77.71 3958.45   77.79 3970.56   77.71
 3983.19   77.86 3991.61   77.73 4012.67   77.79 4029.52   77.55 4047.06   77.66
 4084.65   77.69 4090.02      78 4095.39   77.46 4100.77   77.69 4111.51   77.31
 4127.62   77.39 4151.79   77.22 4214.82   77.29 4237.71   77.07 4245.76   77.13
 4261.87   77.04 4286.42   77.09 4299.06   76.97 4311.69   77.05 4332.76   76.86
 4363.91   76.82 4379.08   76.66 4406.87   76.77 4446.46   76.57 4476.68   76.52
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 4487.42   76.43 4518.06   76.45 4546.49   76.22 4554.55   76.33 4576.04   76.34
 4602.29   76.23 4631.77   76.43 4648.62   76.24 4682.31   76.28  4707.6    76.2
 4747.88   76.28 4800.23   76.22  4825.5    76.4 4833.81   76.33 4887.51   76.27
 4919.73   76.39 4973.43   76.45  4978.8   76.34 5016.39   76.51 5024.45   76.62
 5057.14   76.66 5080.84    76.6  5116.1   76.82 5124.52   77.14    5154   76.94
 5183.48   76.06 5193.61   76.05 5207.04   75.87 5223.15   75.81 5239.26   75.92
 5306.39   75.95  5322.5   75.85 5352.04   75.96 5384.26      76 5419.17   75.92
 5435.28   75.98 5456.76   75.94 5497.04   76.06 5515.84   75.93 5564.17   75.96
 5604.45    76.1 5620.56   76.05 5644.73   76.09  5663.6   76.05 5676.96   76.13
 5709.18   76.04  5735.2   76.03 5747.84   75.89 5768.25    76.1 5815.22   76.12
 5864.92   76.09  5867.6   76.17 5894.46   76.11 5910.57   76.33 5934.74   76.18
 5953.53   76.34 5975.02   77.37 5991.13   77.35 6007.24   77.44 6017.98   77.09
 6023.35   76.49 6047.52   75.88 6058.26   75.78 6063.63   75.92 6079.75   76.03
 6095.86   75.91 6103.91   76.43 6114.65   76.63 6130.76   76.27 6133.45   76.07
 6144.19   76.41 6190.04    76.4 6230.12   76.21 6267.71   76.17 6283.83   76.06
 6334.84   75.98 6359.01   76.03 6375.36   75.84 6393.92   75.87 6417.47   75.63
 6442.25   75.53 6455.68   75.67 6474.48   75.52 6514.75    75.4 6536.23   75.09
 6549.66   75.15 6557.72   76.03 6568.46   77.68 6584.57   76.86 6595.31    77.3
 6624.85   77.38 6643.64   77.29 6654.38   77.37 6678.59   77.22 6724.91   77.43
 6741.75   77.28 6750.18   77.53  6754.4   77.02 6762.81   77.55 6799.39   77.32
 6812.82   77.42 6842.35   77.43 6853.09    77.3 6874.58   77.31  6906.8    77.1
 6918.64    77.2  6935.5   77.01 6952.34   76.61 6981.82   76.88 6994.45   76.67
  7011.3   76.78 7019.58   76.68 7043.75   76.63 7065.24   76.73 7078.66   76.48
 7112.38   76.28 7120.79   75.98 7137.73   76.01 7161.91    75.8 7178.02   75.48
 7188.76   75.12 7202.18   74.95 7212.92   75.02  7234.4   74.78 7242.46   74.56
 7250.52   74.65 7277.37   74.22 7293.48   74.37 7301.89   74.93 7327.16   72.58
 7335.59   71.58 7349.87   70.52 7357.93   70.46  7377.7   69.86 7394.54   69.95
 7407.18   69.76 7422.37      70 7440.88   69.75 7462.65   69.25 7481.45   69.49
 7502.93   69.31 7510.98   69.45 7529.78   69.29 7543.21    68.9 7553.95   69.04
 7564.69   69.49 7575.64   69.71 7583.49   70.07 7613.55   70.24 7626.18   70.48
 7642.57   70.39 7655.67   70.85 7672.51   70.47 7693.58   70.43 7710.42   72.64
 7723.04   75.69 7727.26   75.93  7739.9   75.74 7752.53   74.79 7771.46   74.86
 7779.51   75.08 7803.68   74.88  7854.7   74.87 7876.18   74.99 7878.88   75.13
  7887.3   76.23 7895.73   77.93 7905.72   78.39  7908.4   78.68 7916.34    80.6
 7924.89   81.15 7937.36   82.24 7942.74   81.53 7948.12   79.02 7953.49   77.23
 7956.18   77.17 7961.57   77.76 7966.94   77.66 7980.39   76.06 7985.76   75.85

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 1826.15    .085 2413.69     .07 2542.91    .025 2692.81     .07
 2785.04    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2413.69 2785.04          1216.82    1719 1770.81             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2413.69   74.86       T
 2785.04 7985.76   76.97       T
Left Levee      Station=   75.44      Elevation=  87.685
Right Levee     Station=7937.365      Elevation=82.24001
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 7302.35  7729.2   75.13

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 123.15

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   76.21   22.96   76.22    49.2   76.78   59.04   78.46   85.28   85.51
   91.84   86.88  104.96   87.62  118.08   87.64  141.04   86.43  150.88   85.67
  170.56   82.73  183.68   79.85   196.8   79.69  206.64   79.95  216.48   79.85
   229.6   78.96  255.84   76.79  272.24   75.86  308.32   75.45  341.12   75.48
  364.08   75.29  383.76   75.49   393.6   75.32  416.56   75.59  439.52   75.15
  472.32   74.77  478.88   74.92   508.4    74.7   524.8   75.14  534.64      75
  551.04   75.36  567.44    75.5     574   76.41  587.12   77.13  593.68   76.59
  613.36   76.35  619.92   76.96  646.16   76.95  652.72    77.2  675.68    77.1
  698.64   77.39  708.48   77.23  760.96   77.19   770.8   77.33  800.32    77.2
  816.72   77.33  833.11   77.19  859.35   77.21  865.91    77.4  882.31   77.12
  888.87   77.32  911.83    77.2  967.59   77.23  983.99   77.49  997.11   77.46
 1003.67   77.17 1023.35   77.41 1049.59   77.28 1092.23   77.46 1102.07    77.3
 1125.03   77.27 1154.55   77.38 1170.95   77.14 1190.63   77.58 1200.47   77.18
 1223.43   77.32 1236.55   77.19 1252.95   77.28 1266.07    77.1 1285.75   77.37
 1292.31   77.23 1318.55    77.4 1331.67   77.22 1364.47   77.14 1384.15   77.25
 1416.95   77.23 1426.79    77.6 1449.75   77.28 1469.43   77.29 1475.99   77.46
 1498.95   77.29 1505.51   77.46 1617.03   77.45 1623.59   77.59 1656.39   77.74
 1676.08   77.71 1682.64   77.92 1702.31   77.78 1708.88   77.46 1718.72   77.76
 1741.68   77.69  1787.6   77.81 1826.96   77.76 1833.52   77.84 1882.72   77.74
 1899.12   77.85 1948.32   77.63 1961.44    77.8 1974.56   77.71 2007.36   77.81
 2059.84   77.76  2082.8   77.86 2109.04   77.83 2125.44   77.69 2138.56   77.91
 2161.52   77.75 2210.72   77.85 2220.56   77.74 2259.92   77.86 2266.48   77.73
 2292.72   77.72 2302.56   77.86 2335.36   77.79 2341.92   77.68 2368.16   77.83
 2397.68   77.64 2450.16   77.84 2489.52   77.71 2522.32   77.73 2535.44   77.84
 2564.96   77.78 2594.48   77.92 2610.88   77.75 2679.76      78  2689.6   77.88
 2715.84   78.05 2735.52   77.75 2745.36   77.94  2771.6   77.95 2791.28   77.73
 2797.84   77.93 2810.96   77.83 2827.36      78  2853.6   77.87 2879.84   78.04
 2912.64   77.77 2932.32    77.8    2952      78 2971.68    77.9 3024.16   77.98
 3060.24   77.87 3073.36   78.01 3096.32   77.89 3135.68   78.15 3155.36   78.03
 3161.92   77.41 3175.04   74.29 3188.16   73.29    3198   72.92 3220.96   72.79
  3247.2      73 3257.04   72.91 3283.28   73.07  3345.6   72.92 3358.72      73
 3388.24   72.81 3398.08   73.01 3414.48   72.99 3434.16   72.77 3453.84   72.81
 3466.96   72.67 3486.64   73.05 3539.12   72.82 3548.96   72.93 3581.76   72.61
 3598.16   72.69    3608   72.95 3621.12   72.96 3630.96   73.25 3637.52   73.03
 3647.36    71.8 3660.48    71.2 3670.32   71.28 3680.16   71.02 3699.84   71.04
 3709.68   70.79 3729.36   70.97 3749.04    70.3 3775.25   70.11  3781.8   70.21
 3811.26   69.88  3817.8   70.24 3830.89   70.31 3853.81   69.26 3863.63   69.45
 3886.54   69.21  3902.9   69.23 3929.09    70.4 3935.64   71.04 3955.27    72.4
 3961.82   72.55 3974.91   72.29 3991.28   72.67 4020.74   72.14 4033.83   72.83
  4050.2   72.63 4060.02   72.25 4076.38   72.38 4089.47   71.98 4096.02   72.07
 4105.84   71.39 4115.66   71.72 4132.03   71.71 4148.39   72.82 4154.94   72.72
 4161.49   71.66 4171.31   71.62 4187.67   68.79 4194.22   68.45 4210.59   68.69
 4213.86   68.32 4240.05    63.2 4249.87   63.98 4266.23    63.8 4276.05   61.96
 4292.42   61.33 4308.79   59.87 4312.06   60.03 4325.16   61.66 4341.52   62.17
 4351.34   60.71 4357.89   60.25 4370.98   61.47 4377.53   61.15 4387.35   59.15
 4387.35      56 4394.35    54.9 4413.35    52.7 4420.35    51.7 4436.35      49
 4447.35    49.1 4459.35      48 4471.35    47.3 4484.35    47.6 4495.35    49.4
 4506.35    53.9 4513.35      54 4527.22   59.12 4530.47   59.24 4533.72   61.67
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4536.97	65.34	4543.47	75.92	4546.72	78.75	4549.96	79.06	4559.71	78.45
4575.96	77.88	4598.71	77.7	4614.95	78.32	4627.95	79.64	4644.2	77.66
4663.7	78.16	4673.44	77.91	4679.94	78.22	4686.44	77.99	4699.44	78.16
4722.19	77.82	4738.43	78.46	4758.1	78.14	4764.66	77.71	4787.61	77.76
4797.44	79.94	4804	79.81	4813.83	78.5	4830.23	79.53	4859.73	76.8
4879.4	75.96	4899.07	75.74	4905.63	75.85	4931.85	75.72	4941.69	75.88
4954.8	75.61	4967.92	75.77	4974.47	75.51	4997.42	75.81	5030.2	75.49
5056.43	75.56	5066.27	75.8	5079.38	75.51	5092.49	75.75	5108.88	75.49
5122	75.82	5131.83	75.49	5141.67	75.89	5154.78	75.66	5171.17	75.95
5181.01	75.86	5187.56	76.23	5200.68	75.93	5210.51	76.18	5246.57	76.02
5253.13	76.21	5282.64	76.11	5295.75	76.3	5305.58	76.03	5321.98	76.03
5331.81	76.25	5344.92	75.99	5377.71	76.3	5403.93	75.87	5417.05	76.09
5426.88	75.82	5433.44	76.19	5446.55	75.82	5462.94	75.94	5472.78	75.81
5482.61	76.15	5489.17	75.92	5505.56	76.06	5518.68	75.66	5551.46	76.07
5577.69	75.74	5597.36	75.95	5636.7	75.92	5646.53	75.76	5662.92	76.06
5676.04	75.78	5695.71	75.73	5718.65	75.88	5728.49	75.71	5738.32	75.89
5754.72	75.69	5774.39	75.87	5790.78	75.65	5810.45	75.85	5843.23	75.59
5856.34	75.8	5872.74	75.67	5898.96	75.89	5908.8	75.63	5948.14	75.73
5964.53	75.66	5987.48	76	6000.59	75.69	6026.82	75.82	6036.65	75.69
6089.11	75.81	6118.61	75.68	6138.28	75.95	6174.34	75.76	6197.29	75.9
6207.13	76.16	6275.97	76.27	6285.81	76.51	6318.59	76.8	6348.09	76.63
6364.49	77.11	6371.04	77.65	6393.99	77.26	6416.94	75.45	6443.17	75.1
6479.23	75.25	6528.4	75.02	6571.02	75.22	6623.47	75.14	6652.98	75.29
6675.93	75.25	6711.99	75.37	6744.77	75.57	6751.33	75.41	6790.67	75.43
6797.23	75.55	6846.4	75.6	6856.24	75.31	6872.63	75.61	6908.69	75.71
6984.09	75.65	6993.93	75.79	7010.32	75.67	7052.94	75.79	7075.88	75.94
7115.22	75.99	7138.17	76.21	7151.29	76.12	7200.46	76.34	7239.8	76.31
7262.75	76.47	7295.53	76.52	7338.15	76.95	7344.71	76.75	7370.93	76.97
7377.49	76.83	7407	77.06	7452.89	77.14	7475.84	76.98	7492.23	77.12
7534.85	77	7567.63	77.12	7580.75	77.04	7606.97	77.17	7616.81	77.36
7629.92	77.04	7636.48	77.81	7639.76	76.71	7646.31	77.67	7659.43	77.49
7702.05	77.58	7761.06	77.29	7767.61	77.39	7780.73	77.08	7793.84	76.38
7816.79	76.94	7826.62	76.63	7839.74	76.79	7862.68	76.65	7902.02	76.19
7918.42	76.2	7924.97	75.6	7944.64	75.34	7967.59	74.35	8006.93	73.21
8033.16	72.76	8042.99	72.17	8056.11	72.5	8065.94	73.46	8085.61	68.94
8092.17	67.06	8102	65.4	8124.95	63.85	8138.06	64.07	8147.9	63.77
8154.46	63.92	8174.13	63.21	8180.68	63.68	8190.52	63.78	8220.02	63.39
8229.86	63.54	8236.42	63.29	8252.81	63.19	8265.92	63.55	8279.03	63.29
8288.87	63.55	8308.54	63.26	8318.37	63.64	8334.76	63.47	8341.32	63.9
8354.43	63.3	8370.83	63.41	8383.94	67.84	8393.77	74.13	8397.05	74.85
8406.89	75.99	8416.72	75.35	8439.67	75.84	8449.51	75.6	8475.73	75.72
8515.07	76.39	8521.63	77.84	8528.19	80.32	8547.65	80.72	8550.89	80.95
8560.6	82.83	8567.07	82.34	8573.55	78.84	8580.02	76.78	8583.26	76.98
8589.74	78.8	8596.21	79.13	8605.92	77.39	8612.4	76.79	8618.87	76.88

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	3175.04	.085	4148.39	.07	4387.35	.025	4513.35	.07
4549.96	.066								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4148.39	4549.96	1667.19	1702.07 1720.26	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	4148.39	72.82	T
4549.96	8618.87	79.06	T

Left Levee Station= 118.08 Elevation= 87.64
Right Levee Station= 8560.6 Elevation= 82.83
Blocked Obstructions num= 1

Sta L	Sta R	Elev
7837.11	8407.1	75.95

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	79.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.079	0.058	
W.S. Elev (ft)	79.01	Reach Len. (ft)	1667.19	1702.07	1720.26
Crit W.S. (ft)	59.92	Flow Area (sq ft)	10853.62	7608.07	
E.G. Slope (ft/ft)	0.000117	Area (sq ft)	11736.98	7608.07	11073.57
Q Total (cfs)	20000.00	Flow (cfs)	5431.15	14568.85	
Top Width (ft)	8252.45	Top Width (ft)	3919.52	401.04	3931.89
Vel Total (ft/s)	1.08	Avg. Vel. (ft/s)	0.50	1.91	
Max Chl Dpth (ft)	31.71	Hydr. Depth (ft)	2.77	18.97	
Conv. Total (cfs)	1852646.0	Conv. (cfs)	503099.8	1349546.0	
Length Wtd. (ft)	1694.01	Wetted Per. (ft)	3920.75	417.81	
Min Ch El (ft)	47.30	Shear (lb/sq ft)	0.02	0.13	
Alpha	2.33	Stream Power (lb/ft s)	0.01	0.25	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	10958.81	8961.08	3623.92
C & E Loss (ft)	0.00	Cum SA (acres)	2970.89	487.16	1304.57

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 122.83*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.96	16.9	80.96	36.22	81.25	43.46	82.09	62.78	85.62
67.61	86.3	71.59	86.46	81.81	87.64	86.93	87.84	102.94	87.21
114.7	86.23	131.36	84.17	142.47	82.53	153.58	82.29	170.24	82.44
179.05	82.21	195.07	82	215.09	81.3	219.1	81.05	223.11	78.32
227.12	76.15	231.12	75.75	255.15	75.54	287.19	75.11	299.21	75.13
311.89	75.54	347.28	75.35	359.29	75.41	383.33	75.13	403.36	75.25
417.43	75.12	431.31	75.39	439.65	75.31	455.42	75.55	467.42	75.54
472.97	75.96	484.08	76.35	489.64	76.15	499.49	76.2	506.3	76.05
511.86	76.27	534.07	76.24	578.51	76.49	591.61	76.31	615.64	76.36
623.66	76.47	651.69	76.31	679.73	76.44	691.74	76.3	714.59	76.31
720.15	76.44	734.03	76.3	743.82	76.48	763.84	76.3	787.88	76.21
831.24	76.52	836.79	76.35	855.97	76.5	867.99	76.43	884.01	76.57
920.11	76.4	932.07	76.46	940.08	76.33	956.11	76.41	978.44	76.29
995.1	76.49	1003.43	76.28	1012.18	76.43	1033.98	76.33	1047.87	76.39
1058.98	76.26	1075.64	76.39	1120.34	76.31	1128.34	76.49	1148.37	76.36
1168.39	76.39	1176.4	76.26	1186.74	76.31	1196.44	76.65	1214.51	75.94
1220.47	75.81	1244.5	75.88	1256.17	75.19	1280.55	74.12	1284.56	74.02

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 1332.62    73.8 1356.15   73.87 1380.69   74.06 1396.71   74.01 1411.71   74.14
 1433.93   73.93 1442.26   74.05  1460.8   73.91 1480.82   74.08 1504.85   74.06
 1516.88   74.19 1533.91   73.99 1556.92   74.12 1568.94   74.04 1596.99    74.2
    1613   74.03 1647.78   74.07 1653.05      74 1689.11   74.12 1713.14   74.11
 1737.17   74.28 1749.18   74.15 1765.21   74.25 1786.65   74.18 1821.28   74.23
 1833.31   74.35 1841.32   74.27 1867.19   74.38 1881.37   74.52 1889.38   74.77
 1906.07   74.76 1929.44   75.06 1945.46    75.6 1969.95   75.71  1981.5   75.94
 1992.17   75.95 2017.16   75.79 2025.57   75.92 2041.58   75.86  2053.6   76.03
 2065.61   75.94 2081.65   76.09 2097.67   75.91 2117.69   76.04 2149.74   76.11
 2165.76   75.99 2193.79   75.98 2225.84   76.17 2233.85   76.13 2253.88   76.32
  2269.9   76.34 2303.23   76.15 2313.96   76.29 2350.44   76.16 2367.11   76.19
 2380.99   76.32 2398.08   76.24 2410.09   76.32 2462.16   76.28 2470.18   76.16
 2478.19   76.34  2503.2   76.28 2526.25   76.44 2530.25   76.34 2554.29   76.37
  2562.3   76.16 2570.31   76.37 2582.33   76.46 2608.73   76.29 2626.38   76.45
 2658.73   76.38 2664.28   76.03 2675.39   74.46 2678.4574.33606 2694.83   73.88
 2702.48   74.01 2714.27   73.87 2744.82   73.79 2766.57   73.98 2778.59   73.88
 2830.92   73.92 2842.68   73.81 2866.71   73.95 2878.72   73.84 2911.46      74
 2926.79   73.96 2950.82   74.22 2958.83   74.05 2970.86   74.01 2992.01   74.09
 3018.92   73.97 3026.92   73.86 3040.4773.91731 3053.11   73.94 3066.99   74.23
    3075    74.1    3079   74.47 3087.01    75.9 3091.01   76.19 3100.8876.05425
 3111.04    76.2 3115.04   76.02 3123.05   74.93 3135.08   74.07 3144.76   73.77
 3161.42   73.07 3189.16   72.53 3203.16   72.07 3219.64   71.99 3230.73   71.82
 3250.14   71.21 3263.25   71.12 3271.26   71.34 3283.27   71.11  3291.7   71.19
 3303.31   71.76 3313.88   71.91 3336.05   72.62 3352.68    72.3 3363.38    72.4
  3371.4   72.68 3379.41   72.63 3391.48   72.08 3402.57   72.32 3415.46   72.29
 3423.47   72.42 3443.49   71.82 3455.23      72 3463.54   71.53 3479.55   71.27
 3491.56   71.56 3499.57   72.21 3505.31   72.05 3511.05    71.4 3519.66   69.99
 3530.13   67.76 3539.74   66.71 3556.95   65.85 3564.49   64.81 3568.31   63.93
 3575.94   61.68 3578.9661.21596 3588.51   60.63 3596.39   59.51 3602.85   59.33
 3611.46   58.34 3625.81   58.06 3640.16   57.17  3654.5    57.9 3668.84   58.14
 3683.19   57.29 3694.66   57.84 3701.15   57.51 3709.01   54.95 3718.6154.09272
  3731.8   53.01 3751.96   50.69  3761.6   50.67 3772.12   50.05 3782.64   49.62
 3791.93   50.22  3796.7   50.27 3808.59   51.25 3810.53   51.64 3823.55   56.28
 3828.01   56.41  3834.158.23349 3835.1958.58248 3843.06   60.88 3846.58   61.18
 3850.09    62.7 3853.61   65.24 3860.64   72.99 3864.16   75.81 3867.66   77.35
 3871.88   78.11 3876.09   78.05 3888.93   77.19 3897.19   76.78 3907.55   76.49
 3920.83    76.7 3931.47   77.39 3944.77   76.34 3960.72   76.56 3968.69   76.48
 3974.01   76.66 4008.57   76.47 4021.86   76.76 4037.96   76.61 4043.32   76.38
  4062.1   76.33 4070.12   77.39 4075.51   77.33 4083.55   76.67 4096.97   77.17
 4121.11   75.79  4137.2   75.32 4180.11   75.15 4188.16   75.22 4198.89   75.07
 4209.63   75.13 4214.98   74.98 4233.76   75.06 4260.58   74.88 4282.04   74.91
 4290.09      75 4300.82   74.81 4311.55   74.96 4324.96   74.83 4335.69   74.96
 4343.73   74.79 4351.78   74.98 4362.51   74.82 4383.97   74.86 4389.33   75.07
 4400.06   74.87 4408.11   74.95 4437.61   74.89 4467.12      75 4491.91   75.32
 4500.34   75.25 4507.35   75.47 4517.21   75.53 4534.08   74.96 4544.91   74.87
 4559.38   74.42 4577.09   74.39 4585.14   74.13  4590.5   74.26 4601.56   73.97
 4614.64   74.37 4630.73   74.63  4636.1   74.48 4649.51   74.49 4660.25   74.31
 4687.06   74.51 4702.79   74.29 4728.09   74.27 4744.96   74.34 4764.85   74.16
 4778.26   74.31 4788.99   74.14 4823.86   74.01 4853.37    73.9 4869.46   73.95
 4882.87    73.8 4898.96   73.82 4925.78   73.66 4936.51   73.73 4949.93   73.64
 4971.38   73.69 4985.38   73.48 5002.25   73.54 5025.03    73.4 5043.81   73.54
 5054.53   73.34 5084.04   73.21 5120.34   73.26 5151.09   73.05 5167.19   73.11
  5204.7   72.95 5223.52    73.1 5263.75   73.02 5305.92    73.2 5338.85   73.08
 5352.27   73.36 5357.63   73.61  5376.4   73.34 5395.18   72.35 5402.93   72.25
 5445.12   72.15 5457.77   72.27 5499.94   72.18 5537.91   72.25 5564.16   72.16
 5607.08   72.19  5663.4   72.34 5693.96    72.2 5715.04   72.32 5723.48   72.24
 5746.56   72.26 5754.61    72.1 5768.02   72.21 5803.61    72.3 5820.48    72.4
 5833.15   72.32 5867.26   72.48 5909.06   72.57 5938.59   72.88  5966.5   72.92
 5985.27    73.2 5996.01   73.22  6014.5   73.43 6036.24   73.56 6052.47   73.55
 6073.55   73.79 6090.42   73.86 6132.59   74.18 6148.89   74.42 6154.26   74.34
 6175.71   74.59  6204.3   74.73 6233.83   74.98 6261.55      75 6271.79   75.09
 6318.17    75.1 6330.84   75.23 6356.14   75.23 6376.89   75.39 6387.61   75.19
 6392.98   75.55 6395.66      75 6401.02   75.49 6411.76   75.42 6427.83   75.55
  6491.1   75.59 6503.76   75.51 6512.19   74.99 6521.73   75.05 6529.06   75.32
 6541.72   76.11 6548.55   75.81 6558.59   75.65 6567.03   75.72 6592.33   75.49
 6600.76   75.02 6623.66   74.62 6629.02   74.27 6645.11   74.02 6676.69   73.13
 6701.99   72.75 6710.42   72.75 6718.86    72.2 6725.58   72.05 6736.31    72.2
 6744.36   72.51 6760.45   70.04 6765.82   68.99 6773.86   68.08 6792.64   67.13
 6803.36   67.12 6811.41   66.88 6816.78   66.94 6832.75   66.38 6846.28   66.58
 6870.42   66.27 6897.25    66.2 6912.87   66.62 6925.53   68.19 6938.19    68.4
 6950.89   68.89 6969.67   68.76 6980.39   68.17 6993.81   68.11 7004.54   70.29
 7012.58   73.36 7023.31   73.99 7031.36   73.59 7050.13   73.98 7079.64   73.98
 7094.24   74.14 7111.82   74.53 7117.19   75.37 7122.56   76.83 7132.19   77.47
 7141.13   79.15 7149.07   81.26 7153.95   81.15 7158.83   79.39  7163.7   78.34
 7166.14   78.43 7171.03   79.32  7175.9   79.46  7188.1   78.01 7192.97    77.8

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2678.45    .085 3499.57     .07 3709.01    .025 3823.55     .07
 3867.66    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3499.57 3867.66          1667.19 1702.07 1720.26             .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0 3499.57   72.21       T
Left Levee      Station=  86.925      Elevation=   87.84
Right Levee     Station= 7149.07      Elevation=   81.26
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   224.9 3084.34    76.2 3878.37  7146.3   77.46

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 122.5

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    85.7   45.93   85.73   52.49   87.65   55.77   88.04   68.89   87.78
   88.57   85.76  108.26   84.92   118.1   84.82  131.22   85.28  144.34   86.37
  154.18   86.66  160.74   86.58  164.02   86.26  167.31   80.85  170.59   76.56
  173.87   75.82  193.55   75.62  219.79   74.85  229.63   74.93   236.2   75.57
  249.32   75.62  262.44   75.28     269   75.28  278.84   75.67   285.4    75.5
  298.53   75.44  314.93   75.68  324.77   75.52  334.61   75.66  351.01    75.6
  357.57   75.73  377.26   75.44  393.66   75.96   403.5   75.59  423.18   75.52
  429.75   75.39  449.43   75.75  469.11    75.4  488.79   75.52  495.36   75.75
   505.2   75.49  518.32   75.35  541.28   75.56  551.12   75.41  557.68   75.55
  570.81    75.4  580.65   75.62  587.21   75.44  593.77   75.67  610.17   75.39
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629.86	75.21	642.98	75.48	649.54	75.42	662.66	75.62	679.06	75.42
685.62	75.61	695.47	75.53	708.59	75.82	721.71	75.57	734.83	75.45
747.95	75.63	754.51	75.39	767.64	75.48	777.48	75.33	784.04	75.44
807	75.37	813.56	75.61	829.97	75.46	839.81	75.53	859.49	75.36
869.33	75.43	892.29	75.32	902.14	75.41	908.7	75.79	918.54	75.83
925.1	75.53	941.5	75.53	948.06	75.29	954.62	75.32	964.47	75.73
980.87	74.47	984.15	74.33	1003.83	74.37	1020.23	72.18	1033.36	70.78
1036.64	70.58	1062.88	70.23	1076	70.14	1085.84	70.28	1108.81	70.32
1115.37	70.43	1128.49	70.3	1138.33	70.39	1151.45	70.23	1161.3	70.45
1171.14	70.2	1180.98	70.13	1197.38	70.42	1217.06	70.32	1226.91	70.59
1233.47	70.31	1243.31	70.2	1259.71	70.44	1269.55	70.31	1282.67	70.6
1292.52	70.56	1305.64	70.31	1328.6	70.45	1338.44	70.25	1348.28	70.41
1354.85	70.3	1367.97	70.43	1387.65	70.43	1407.33	70.77	1417.17	70.44
1430.3	70.65	1453.26	70.68	1459.82	70.58	1476.22	70.71	1486.07	70.91
1492.63	70.74	1509.03	70.92	1525.43	71.24	1531.99	71.72	1541.83	71.66
1564.8	72.38	1577.92	73.36	1594.32	73.59	1607.44	74.13	1636.97	73.94
1643.53	74.16	1656.65	73.97	1666.49	74.26	1676.33	74.06	1689.46	74.42
1702.58	74.1	1718.98	74.36	1738.66	74.27	1745.23	74.41	1758.35	74.16
1781.31	74.16	1787.87	74.42	1794.43	74.32	1807.56	74.46	1814.12	74.35
1830.52	74.65	1837.08	74.57	1843.64	74.75	1853.48	74.41	1879.73	74.63
1902.69	74.45	1909.25	74.6	1925.65	74.54	1932.21	74.65	1948.62	74.57
1958.46	74.71	1968.3	74.56	1987.98	74.78	2001.1	74.78	2007.67	74.51
2014.23	74.78	2024.07	74.64	2040.47	74.68	2053.59	74.94	2056.87	74.73
2076.56	74.79	2083.12	74.4	2089.68	74.84	2099.52	74.99	2106.08	74.66
2109.36	74.79	2129.04	74.63	2135.6	74.87	2148.73	74.64	2158.57	74.8
2171.69	74.57	2191.37	74.82	2197.93	75.15	2217.62	74.74	2230.74	74.65
2250.42	74.9	2260.26	74.72	2273.38	74.82	2276.67	75.02	2283.23	74.8
2302.91	74.84	2312.75	74.7	2319.31	74.92	2332.43	74.89	2342.27	74.7
2361.96	75.12	2375.08	75.25	2381.64	75.16	2398.04	75.29	2401.32	75.44
2407.88	75.15	2417.73	75.14	2427.57	75.36	2440.69	75.15	2457.09	75.32
2463.65	75.07	2470.21	75.23	2476.77	74.81	2489.9	74.97	2496.46	75.43
2503.02	76.35	2506.3	77.33	2512.86	80.59	2516.14	81.13	2525.98	81
2532.54	81.38	2535.82	81.01	2542.38	78.92	2552.23	77.28	2565.35	76.11
2581.75	75.6	2594.87	75.01	2601.43	74.39	2607.99	74.12	2617.84	73.98
2627.68	73.32	2640.8	73.33	2657.2	72.85	2663.76	73.38	2673.6	73.01
2683.45	73.22	2690.01	73.68	2696.57	73.53	2706.41	72.99	2709.69	73.08
2719.53	72.76	2726.09	72.34	2739.21	72.22	2745.78	72.79	2752.34	72.87
2765.46	71.75	2781.86	71.93	2788.42	72.54	2794.98	72.21	2801.54	71.47
2804.82	71.43	2811.39	71.96	2817.95	71.88	2834.35	70.83	2844.19	70.94
2850.75	71.61	2860.59	71.15	2870.44	67.45	2877	65.97	2896.68	63.58
2906.52	62.99	2909.8	62.08	2916.36	59.28	2922.92	58.62	2933.92	55.14
2943.92	54.64	2953.92	54.94	2983.92	54.14	2993.92	54.04	3003.92	54.34
3013.92	54.34	3023.92	54.04	3043.92	53.64	3053.92	53.14	3063.92	52.44
3093.92	51.94	3103.92	52.94	3113.92	52.94	3123.92	53.14	3133.92	56.24
3137.92	58.62	3142.72	58.83	3146	59.5	3155.84	62.24	3165.68	63.5
3168.96	64.48	3172.24	66.14	3175.52	68.37	3185.36	75.65	3188.64	77.49
3191.92	77.66	3208.33	75.76	3218.17	75.18	3231.29	75.03	3234.57	75.14
3254.25	74.91	3273.94	75.19	3280.5	75.05	3293.62	75.14	3300.18	75.01
3313.3	75.12	3342.83	74.85	3362.51	74.83	3375.63	74.71	3385.47	74.8
3392.03	74.69	3447.8	74.52	3470.77	74.31	3487.17	74.25	3503.57	74.31
3523.25	74.1	3536.38	74.22	3552.78	74.06	3559.34	74.11	3582.3	73.83
3592.14	73.91	3605.27	73.72	3628.23	73.76	3641.35	73.68	3657.75	74
3670.88	74.6	3677.44	74.44	3690.56	75.05	3697.12	74.27	3703.68	73.75
3710.24	73.54	3723.36	72.84	3733.2	72.84	3743.05	72.44	3756.17	72.11
3766.01	72.79	3775.85	73.15	3792.25	72.91	3808.66	73.01	3828.34	72.92
3834.9	72.76	3844.74	72.8	3854.58	72.59	3867.7	72.74	3874.26	72.52
3890.67	72.59	3913.63	72.4	3933.31	72.08	3946.43	72.14	3972.68	71.97
3985.8	71.8	4008.76	71.72	4048.13	71.47	4054.69	71.32	4067.81	71.37
4080.93	71.15	4103.9	71.06	4123.58	70.73	4159.66	70.72	4199.03	70.24
4215.43	70.27	4225.27	70.08	4235.11	70.15	4241.67	69.99	4271.2	69.8
4287.6	69.83	4304	69.7	4313.84	69.51	4326.97	69.5	4340.09	69.62
4379.45	69.18	4389.29	69.3	4412.26	69.05	4422.1	69.35	4448.34	69.39
4454.9	69.26	4477.86	69.24	4484.43	69.32	4513.95	69.12	4553.31	69.15
4573	69.07	4595.96	69.15	4605.8	68.98	4622.2	69.08	4628.76	68.91
4648.45	68.92	4661.57	68.81	4691.09	68.9	4704.21	69.12	4714.06	68.97
4720.62	69.11	4746.86	69.18	4753.42	69.33	4773.1	69.37	4796.07	69.82
4819.03	69.85	4825.59	70.08	4848.55	70.44	4855.11	70.64	4868.23	70.77
4884.64	70.78	4901.04	71.22	4914.16	71.24	4933.84	71.58	4946.96	71.62
4953.53	71.85	4963.37	71.92	4986.33	72.32	5002.73	72.4	5025.7	72.83
5055.22	73.09	5061.78	73.05	5078.18	73.21	5091.3	73.16	5101.15	73.37
5120.83	73.36	5130.67	73.49	5150.35	73.29	5170.03	73.39	5176.59	73.56
5189.72	73.52	5199.56	73.67	5212.68	73.66	5225.8	73.86	5235.64	73.74
5242.2	72.97	5248.76	73.67	5255.32	74.05	5265.17	75.32	5278.29	74.52
5284.85	74.7	5304.53	74.54	5311.09	73.72	5327.49	73.06	5343.9	72.71
5357.02	72.71	5370.14	72.36	5376.7	72.53	5389.82	72.41	5396.38	72.6
5402.94	71.73	5412.78	72.11	5422.63	71.57	5429.19	71.47	5442.31	70.77
5448.87	70.75	5475.11	69.98	5481.67	69.95	5491.52	69.55	5514.48	69.16
5537.44	69.1	5550.56	69.45	5553.84	69.81	5560.4	72.02	5563.68	72.87
5573.53	73.46	5580.09	74.06	5586.65	74.23	5593.21	74.08	5603.05	73.12
5619.45	72.74	5629.29	72.74	5642.41	71.81	5652.26	71.85	5668.66	72.39
5688.34	72.19	5694.9	72.25	5711.3	72.75	5721.14	73.79	5724.42	74.38
5734.27	78.6	5737.55	79.68	5740.83	79.97	5760.51	79.74	5767.07	78.72

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.099	2476.77	.099	2525.98	.066	2922.92	.025	3155.84	.066

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2850.75	3185.36	1373.09	1755.19 2222.98	.1	.3

Left Levee Station= 55.77 Elevation= 88.04
Right Levee Station= 5740.83 Elevation= 79.97
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
21.51	2534.52	81.35	3190.79	5900.24	77.64

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	78.68	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.10	Wt. n-Val.	0.066	0.040	0.066	
W.S. Elev (ft)	78.58	Reach Len. (ft)	1373.09	1755.19	2222.98	
Crit W.S. (ft)	60.45	Flow Area (sq ft)	1633.11	6945.92	2406.04	
E.G. Slope (ft/ft)	0.000092	Area (sq ft)	1633.11	6945.92	2406.04	
Q Total (cfs)	20000.00	Flow (cfs)	1077.43	18421.50	501.07	
Top Width (ft)	3189.83	Top Width (ft)	306.35	334.61	2548.87	
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)	0.66	2.65	0.21	
Max Chl Dpth (ft)	26.64	Hydr. Depth (ft)	5.33	20.76	0.94	
Conv. Total (cfs)	2080195.0	Conv. (cfs)	112063.2	1916015.0	52116.6	
Length Wtd. (ft)	1780.64	Wetted Per. (ft)	306.92	342.30	2549.59	
Min Ch El (ft)	51.94	Shear (lb/sq ft)	0.03	0.12	0.01	
Alpha	1.96	Stream Power (lb/ft s)	0.02	0.31	0.00	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	10322.93	8389.04	3182.71	
C & E Loss (ft)	0.00	Cum SA (acres)	2764.59	458.41	1047.40	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 121.98*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.13	11.36	84.23	18.93	84.14	26.5	83.95	40.52	83.88
46.31	84.83	49.2	85.01	56.05	84.87	66.33	83.85	76.62	83.42
81.75	83.36	88.61	83.58	95.46	84.12	100.6	84.25	104.03	84.21
105.74	84.04	107.46	81.33	109.17	79.19	110.88	78.81	121.16	78.69
134.87	78.29	140.01	78.32	143.44	78.63	150.29	78.65	157.14	78.47
160.57	78.46	165.71	78.65	175.99	78.52	184.56	78.62	189.7	78.53
194.84	78.59	203.4	78.55	206.83	78.61	217.11	78.44	225.68	78.69
230.82	78.49	241.1	78.44	244.53	78.36	254.81	78.52	265.09	78.32
275.36	78.36	278.8	78.47	283.94	78.32	290.79	78.23	302.78	78.3
307.92	78.21	311.35	78.27	318.2	78.18	323.34	78.27	326.77	78.17
330.19	78.27	338.76	78.1	349.04	77.98	355.9	78.09	366.18	78.12
374.74	78	378.17	78.08	383.31	78.02	390.16	78.15	403.87	77.92
410.72	77.99	414.15	77.86	421.01	77.89	441.56	77.77	444.99	77.88
453.56	77.77	458.7	77.79	468.98	77.67	474.12	77.7	486.11	77.62
491.26	77.65	494.68	77.84	499.82	77.85	503.25	77.69	511.81	77.67
518.67	77.55	523.81	77.74	534.09	77.02	544.37	77.01	552.93	75.89
561.5	75.07	575.21	74.86	582.06	74.8	587.07	74.86	599.2	74.85
602.62	74.9	609.48	74.82	614.62	74.85	621.47	74.76	626.61	74.86
636.89	74.69	645.46	74.83	655.74	74.77	660.88	74.9	664.31	74.75
669.45	74.7	678.01	74.81	683.15	74.74	690	74.88	695.15	74.86
702	74.73	713.99	74.79	719.13	74.68	724.27	74.76	727.7	74.7
734.56	74.76	744.83	74.75	755.11	74.91	760.25	74.74	767.11	74.84
779.16	74.85	782.53	74.79	796.24	74.93	799.67	74.84	816.8	75.06
820.22	75.3	825.36	75.27	837.36	75.62	844.21	76.11	852.78	76.23
859.63	76.49	875.05	76.39	878.48	76.5	885.33	76.4	890.47	76.54
895.61	76.43	902.47	76.6	909.32	76.44	917.89	76.55	928.17	76.5
931.6	76.56	938.45	76.43	950.44	76.43	953.87	76.56	957.29	76.51
964.15	76.58	967.58	76.52	976.14	76.67	983	76.72	988.14	76.55
1001.85	76.65	1013.84	76.56	1017.26	76.64	1025.83	76.61	1029.26	76.67
1037.83	76.63	1042.97	76.7	1048.11	76.63	1058.38	76.75	1065.24	76.75
1068.67	76.62	1072.09	76.75	1077.23	76.69	1085.8	76.71	1092.65	76.84
1094.37	76.74	1104.65	76.78	1108.08	76.58	1111.5	76.81	1116.64	76.88
1132.06	76.71	1135.49	76.83	1142.34	76.71	1147.48	76.79	1154.34	76.67
1164.61	76.79	1168.04	76.95	1178.32	76.73	1185.18	76.67	1195.46	76.78
1200.59	76.68	1207.45	76.73	1209.17	76.83	1212.59	76.71	1222.87	76.73
1228.01	76.65	1231.44	76.76	1243.43	76.65	1253.71	76.86	1272.56	76.96
1274.27	77.04	1277.7	76.89	1282.84	76.89	1287.98	77	1294.83	76.9
1303.4	76.99	1306.82	76.86	1311.0476	.89163	1313.68	76.73	1320.53	76.8
1323.96	77.01	1327.39	77.46	1329.1	77.94	1332.53	79.56	1334.24	79.82
1337.09	79.7701	1339.38	79.73	1342.81	79.91	1344.52	79.72	1347.94	78.66
1353.09	77.81	1359.94	77.18	1368.51	76.86	1375.36	76.51	1378.79	76.18
1387.36	75.9	1392.5	75.53	1399.35	75.41	1407.91	74.99	1411.34	75.19
1416.48	74.89	1421.62	74.89	1425.05	75.05	1428.48	74.9	1433.62	74.51
1440.47	74.16	1443.9	73.83	1450.75	73.54	1454.18	73.71	1457.61	73.63
1464.46	72.84	1473.02	72.63	1476.45	72.81	1479.88	72.52	1483.3	72.02
1485.02	71.93	1488.45	72.07	1491.87	71.9	1500.44	71.06	1505.58	70.92
1509.01	71.12	1514.86	69.97	1520.6267	.23315	1524.63	65.76	1536.35	62.56
1539.71	61.82	1542.21	61.49	1544.16	60.88	1548.07	59.17	1551.98	58.67
1560.18	56.37	1564.48	55.76	1571.6155	.15474	1588.3	53.1	1594.25	52.56
1600.2	52.34	1606.16	51.97	1612.11	51.44	1622.59	50.61	1629.97	50.09
1635.93	49.54	1653.79	48.69	1661.08	49.57	1668.37	50.7	1675.67	50.84
1683.251	.15811	1690.25	51.72	1701.51	52.28	1712.12	53.72	1717.42	54.6
1723.79	56.31	1725.17	58.61	1727.56	58.83	1732.34	60.53	1734.73	60.97
1737.12	61.17	1744.29	62.27	1752.29	62.64	1756.23	62.6	1761.02	62.97
1765.79	63.82	1770.58	65.15	1773.6565	.74551	1778.38	66.95	1782.52	68.45
1787.3	69.78	1792.08	71.48	1799.26	73.43	1801.43	74.39	1803.61	74.5
1814.51	73.56	1821.04	73.28	1829.76	73.13	1831.94	73.16	1839.04	73.01
1845	72.98	1858.08	73.18	1862.44	73.11	1871.15	73.12	1875.51	73.06
1892.09	73.26	1903.83	73.36	1916.9	73.52	1938.51	73.52	1951.77	73.72
1965.04	73.71	1973.54	73.76	1988.79	73.74	1998.2	73.82	2018.1	73.72
2024.73	73.77	2031.35	73.99	2047.61	74.07	2062.86	73.94	2071.15	74.09
2077.77	73.88	2084.41	73.59	2091.02	73.45	2102.08	73.38	2110.91	73.52
2121.69	73.45	2126.04	73.17	2134.76	73.14	2139.11	72.66	2143.47	72.39
2147.83	72.33	2156.54	72.06	2163.07	72.07	2170.59	71.86	2178.33	71.76
2184.86	72.17	2191.4	72.38	2202.29	72.34	2213.19	72.47	2226.26	72.46
2230.61	72.39	2237.15	72.42	2243.68	72.33	2252.4	72.48	2256.75	72.36
2276.64	72.34	2289.89	72.12	2303.14	72.14	2309.78	72.08	2323.04	72.13
2330.82	72.01	2356.18	71.93	2376.57	71.61	2385.29	71.63	2395.96	71.52
2409.25	71.52	2422.32	71.33	2429.11	71.35	2442.36	71.27	2448.98	71.27
2462.25	71.08	2472.43	71.02	2483.32	71.04	2489.86	70.93	2496.39	70.96
2500.75	70.89	2521.9	70.82	2542.14	70.67	2548.68	70.54	2555.05	70.53
2566.11	70.66	2592.25	70.47	2598.78	70.5	2614.04	70.36	2620.57	70.48
2634.59	70.35	2642.35	70.32	2661.96	70.43	2680.99	70.27	2707.71	70.26
2720.77	70.12	2736.03	70.18	2742.56	70.09	2753.92	70.16	2757.81	70.07
2770.89	70.02	2779.6	69.93	2793.68	69.93	2807.92	70.08	2814.46	69.98
2818.82	70.04	2833.46	70.02	2840.6	70.14	2853.67	70.12	2868.92	70.38
2879.86	70.28	2884.17	70.29	2888.53	70.43	2899.75	70.6	2919.62	70.77
2927.74	70.75	2938.63	70.99	2947.35	71.02	2959.4	71.18	2969.13	71.19
2980.03	71.26	2995.27	71.44	3006.17	71.51	3019.05	71.64	3032.31	71.84
3045.58	71.86	3056.27	71.94	3064.98	71.92	3071.53	72	3084.59	71.94
3091.98	72.03	3105.24	71.87	3121.62	72.06	3131.74	71.98	3136.88	72.06
3154.3	72.2	3160.84	72.15	3165.2	71.78	3169.55	72.13	3173.91	72.32
3180.45	72.96	3189.16	72.52	3193.52	72.57	3206.59	72.49	3210.95	72.1
3221.84	71.76	3232.73	71.59	3241.45	71.62	3250.16	71.43	3254.52	71.52
3263.23	71.49	3267.59	71.58	3271.94	71.14	3278.48	71.33	3285.02	71.06
3289.38	71	3298.09	70.65	3302.45	70.61	3319.87	70.28	3323.99	70.3
3330.61	70.1	3346.02	69.87	3361.26	69.89	3369.98	70.04	3372.16	70.21
3376.51	71.32	3378.69	71.75	3385.23	72.05	3389.59	72.37	3393.94	72.55
3398.3	72.59	3404.84	72.26	3410.15	72.26	3415.73	72.16	3422.26	72.14
3430.97	71.85	3436.68	72.14	3443.3	72.82	3448.41	73.45	3456.55	74.22
3463.19	75.1	3469.83	75.82	3476.72	76.27	3483.08	76.85	3485.44	77.15
3491.98	79.3	3494.16	79.88	3496.33	80.07	3508.63	80.03	3512.73	79.52

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.111	1509.01	.066	1520.62	.025	1773.65	.066	1799.26	.071

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1509.01 1799.26          1373.09 1755.19 2222.98            .1       .3
Left Levee      Station=    49.2      Elevation=   85.01
Right Levee     Station= 3496.33      Elevation=   80.07
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   54.95 1342.71   79.82 1803.79 3472.17   74.52

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 121.46

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     357
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.57    3.28   82.65    6.56   82.69    9.84   82.75   13.12   82.69
    16.4   82.57   19.68   82.38   22.96   82.19   26.24   82.09   29.52   82.04
    32.8   82.02   36.08   82.02   39.36   82.03   42.63   81.97   45.91   81.89
   49.19   81.75   52.47   81.63   55.75    81.5   59.03   81.35   62.31   81.18
   65.59   80.96   68.87   80.69   72.15   80.44   75.43   80.22   78.71   79.97
   81.99   79.82   85.27   79.63   88.55   79.44   91.83   79.27   95.11    79.2
   98.39   79.15  101.67   79.07  104.95   79.02  108.23   78.88  111.51   78.86
  114.79   78.81  118.07   78.71  121.35   78.69  124.62   78.67   127.9    78.7
  131.18   78.74  134.46   78.79  137.74   78.76  141.02   78.64   144.3   78.59
  147.58   78.64  150.86   78.66  154.14   78.33  157.42   77.73   160.7   76.12
  163.98   73.52  167.26   70.64  170.54   67.42  173.82   63.88   177.1   60.39
  180.38   58.75  183.66   57.74  193.66   51.44  203.66   47.54  213.66   45.44
  223.66   46.74  233.66   48.54  243.66   48.74  253.66   49.34  263.66   50.44
  273.66   51.04  283.66   51.74  293.66   52.24  303.66   53.24  311.55   58.56
  314.83   58.94   318.1   60.52  321.38   62.11  324.66   62.69  327.94   62.75
  331.21   63.11  334.49    63.5  337.77   63.71  341.04   63.45  344.32   63.23
   347.6   63.15  350.88   62.85  354.15   62.64  357.43   62.69  360.71      63
  363.99   63.56  367.26   64.31  370.54   65.36  373.82    66.3   377.1   66.72
  380.37    67.2  383.65    67.6  386.93   68.21   390.2   68.99  393.48   69.42
  396.76   69.47  400.04    70.1  403.31   70.65  406.59   70.94  409.87   71.04
  413.15   71.22  416.42   71.41   419.7   71.36  422.98   71.38  426.26   71.36
  429.53   71.16  432.81      71  436.09   71.06  439.36   71.12  442.64   71.18
  445.92   71.17   449.2   71.09  452.47   71.12  455.75   71.21  459.03   71.51
  462.31   71.69  465.58   71.93  468.86   72.12  472.14   72.24  475.42   72.28
  478.69   72.25  481.97   72.36  485.25   72.63  488.52   72.82   491.8    72.9
  495.08   72.86  498.36   72.97  501.63   73.06  504.91   73.11  508.19   73.23
  511.47   73.38  514.74   73.31  518.02   73.18   521.3   73.25  524.58   73.42
  527.85   73.77  531.13   73.96  534.41   74.02  537.68   74.02  540.96   73.99
  544.24   74.06  547.52    74.3  550.79   74.03  554.07   73.45  557.34   73.14
  560.62   73.07   563.9    73.1  567.17   73.11  570.45    72.7  573.72   72.06
     577   71.49  580.28   71.05  583.55   71.03  586.83    71.2   590.1    71.3
  593.38   71.31  596.66   71.32  599.93   71.39  603.21   71.54  606.48    71.6
  609.76   71.66  613.03   71.81  616.31    71.9  619.59   71.97  622.86   71.99
  626.14   72.02  629.41   72.03  632.69   72.06  635.97   72.23  639.24    72.2
  642.52   72.11  645.79   72.11  649.07    72.2  652.35   72.11  655.62   72.02
   658.9   72.13  662.17   72.15  665.45   72.06  668.73   72.19     672    72.3
  675.28   72.23  678.55    72.2  681.83   72.18  685.11    72.2  688.38   72.24
  691.66   72.11  694.93   71.97  698.21    71.9  701.48   71.88  704.76   71.91
  708.04   71.91  711.31   71.94  714.59   71.98  717.86   72.01  721.14   71.93
  724.42   71.98  727.69   71.89  730.97   71.81  734.24   71.86  737.52   71.83
   740.8   71.74  744.07   71.78  747.35   71.83  750.62   71.82   753.9   71.79
  757.18   71.76  760.45    71.8  763.73   71.83     767   71.83  770.28   71.84
  773.55   71.73  776.83   71.65  780.11   71.64  783.38   71.58  786.66   71.55
  789.93   71.74  793.21   71.69  796.49   71.72  799.76   71.74  803.04   71.75
  806.31   71.77  809.59   71.65  812.87   71.67  816.14   71.68  819.42   71.61
  822.69   71.46  825.97   71.31  829.25   71.38  832.52   71.41   835.8   71.48
  839.07   71.55  842.35   71.48  845.63   71.45   848.9   71.41  852.18   71.38
  855.45   71.36  858.73   71.41     862   71.38  865.28   71.26  868.56   71.16
  871.83   71.18  875.11   71.21  878.38    71.2  881.66   71.21  884.94   71.25
  888.21    71.2  891.49   71.14  894.76   71.09  898.04   71.04  901.32      71
  904.59   70.99  907.87   71.04  911.14   71.04  914.42   70.99   917.7   70.96
  920.97   70.93  924.25   70.87  927.52   70.95   930.8   70.92  934.08   70.87
  937.35   70.94  940.63   70.96   943.9    70.9  947.18   70.71  950.45   70.74
  953.73   70.85  957.01   70.85  960.28   70.72  963.56   70.69  966.83   70.76
  970.11   70.72  973.39   70.68  976.66   70.77  979.94    70.8  983.21    70.8
  986.49   70.81  989.77   70.81  993.04   70.69  996.32    70.6  999.59   70.56
 1002.87   70.54 1006.15   70.57 1009.42   70.62  1012.7   70.58 1015.97   70.52
 1019.25    70.6 1022.52   70.71  1025.8   70.68 1029.08   70.66 1032.35   70.68
  1038.9   70.68 1042.18   70.62 1045.46   70.51 1048.73   70.53 1052.01   70.58
 1055.28   70.49 1058.56   70.45 1061.84   70.54 1065.11   70.59 1068.39   70.51
 1071.66   70.41 1074.94   70.46 1078.22   70.56 1081.49   70.54 1084.77   70.54
 1088.04   70.58 1091.32   70.59  1094.6   70.58 1097.87   70.62 1101.15   70.48
 1104.42   70.38  1107.7   70.43 1110.97   70.49 1114.25   70.48 1117.53   70.46
  1120.8   70.46 1124.08    70.5 1127.35   70.56 1130.63    70.5 1133.91   70.51
 1137.18   70.57 1140.46   70.54 1143.73   70.55 1147.01   70.55 1150.29   70.53
 1153.56   70.53 1156.84   70.44 1160.11   70.47 1163.39   70.55 1166.67   70.64
 1169.94   70.64 1173.22   70.66 1176.49   70.59 1179.77   70.58 1183.05   70.68
 1186.32   70.67  1189.6   70.62 1196.15   70.62 1199.42   70.68  1202.7   71.03
 1205.98   71.36 1209.25   71.59 1212.53   71.58  1215.8   71.52 1219.08   71.81
 1222.36   72.44 1225.63    73.5 1228.91    74.8 1232.18   76.18 1235.46   77.98
 1238.74    79.2 1242.01   79.79 1245.29   79.93 1248.56   79.91 1251.84   80.17
 1255.12   80.32 1258.39   80.32

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .111  167.26    .066  173.82    .025  321.38    .066  413.15    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       167.26  413.15          1874.31 1742.61 1664.76            .1       .3
Left Levee      Station=   39.36      Elevation=   82.03
Right Levee     Station= 1258.39      Elevation=   80.32
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   88.39   150.9   79.37  547.67 1268.48   74.29

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             78.36    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.16    Wt. n-Val.                0.111      0.044     0.071
  W.S. Elev (ft)             78.21    Reach Len. (ft)         1874.31    1742.61   1664.76
  Crit W.S. (ft)             59.55    Flow Area (sq ft)         36.03    5139.33   3460.39
  E.G. Slope (ft/ft)      0.000183    Area (sq ft)              36.03    5139.33   3460.39
  Q Total (cfs)           20000.00    Flow (cfs)                11.79   17436.58   2551.64
  Top Width (ft)           1081.26    Top Width (ft)            12.45     245.89    822.92
```

Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	0.33	3.39	0.74		
Max Chl Dpth (ft)	32.77	Hydr. Depth (ft)	2.89	20.90	4.21		
Conv. Total (cfs)	1477624.0	Conv. (cfs)	870.7	1288235.0	188517.9		
Length Wtd. (ft)	1733.57	Wetted Per. (ft)	14.85	257.35	823.93		
Min Ch El (ft)	45.44	Shear (lb/sq ft)	0.03	0.23	0.05		
Alpha	1.88	Stream Power (lb/ft s)	0.01	0.77	0.04		
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	10276.28	7897.80	2696.86		
C & E Loss (ft)	0.01	Cum SA (acres)	2754.53	435.02	875.11		

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 121.13*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.14	2.32	81.31	5.57	81.53	6.97	81.6	9.29	81.67
11.61	81.69	13.93	81.64	16.72	81.59	18.57	81.58	20.9	81.58
27.86	81.61	30.13	81.55	32.39	81.55	34.65	81.57	36.91	81.37
39.18	81.02	41.44	80.52	45.6	79.54	48.23	78.94	50.5	78.44
52.76	77.98	55.02	77.72	57.44	77.59	59.55	77.52	64.08	77.34
66.34	77.3	68.6	77.27	75.39	77.09	77.65	77.06	79.92	77.04
82.18	77	86.71	76.94	93.5	76.73	95.76	76.69	98.03	76.66
100.29	76.61	102.55	76.58	104.82	76.57	107.08	76.53	109.34	76.53
111.6	76.52	113.87	76.45	116.65	76.41	120.65	76.36	122.92	76.31
127.45	76.33	129.71	76.31	134.41	76.29	136.5	76.27	143.29	76.15
145.55	76.12	146.25	76.13	147.82	76.13	150.08	76.09	152.34	76.08
154.6	76.11	156.87	76.12	159.13	76.1	161.4	76.03	165.93	76.01
168.19	75.97	169.93	75.97	170.45	75.98	175.85	75.98	177.24	75.99
181.75	76.01	181.77	76.02	184.03	76.02	186.29	76.01	188.55	76.04
190.82	76.02	193.08	76.06	195.34	76.04	199.52	76.06	199.87	76.05
202.14	76.11	204.4	76.08	206.67	76.02	211.19	75.96	213.45	75.96
217.98	75.9	220.24	75.92	222.51	75.92	223.2	75.93	227.03	75.96
229.29	75.97	231.56	75.93	235.04	75.89	238.35	75.8	240.96	75.77
242.88	75.6	245.14	75.45	246.88	75.42	247.4	75.37	249.67	75.12
251.93	74.73	252.8	74.57	254.19	74.29	256.46	73.77	258.72	73.21
261.43	72.13	262.85	71.55	264.15	70.98	266.97	69.68	269.58	68.5
269.9968.27072		271.1	67.65	272.29	67.24	275.23	66.06	277.73	65.41
279.35	64.47	280.44	63.87	283.16	62.05	285.88	60.39	291.3	57.79
291.94	57.45	294.02	56.53	296.74	55.22	299.45	54.05	302.16	53.2
304.52	51.86	305.1851.53154		308.8	49.73	317.1	48.14	326.14	49.06
328.29	49.21	335.17	49.84	339.49	50.26	344.21	50.38	350.68	50.44
353.25	50.51	361.87	50.6	362.28	50.61	371.32	51.05	373.07	51.12
380.36	51.24	384.26	51.38	389.39	51.6	395.45	51.79	398.43	51.86
406.64	52.18	407.47	52.23	416.5	52.88	417.84	52.94	425.54	53.38
426.67	55.63	427.7655.71613		430.34	55.92	434	56.81	434.58	56.96
437.67	57.57	441.34	57.8	443.61	57.78	445.01	57.82	448.67	58.06
456.02	58.56	459.68	58.57	461.69	58.58	463.35	58.49	467.02	58.35
470.69	58.1	470.73	58.09	474.35	58.9	475.33	60.56	476.5160.72231	
478.02	60.93	478.28	60.98	481.24	61.85	481.69	61.95	484.2	62.61
485.36	62.74	487.15	62.98	489.03	63.17	492.7	63.68	493.07	63.72
496.37	64.19	498.98	64.44	501.94	64.89	503.7	65.2	504.9	65.4
507.37	65.88	507.86	65.99	510.81	66.62	513.77	67.42	514.7	67.61
516.73	67.92	518.37	68.09	522.04	68.26	525.61	68.66	528.56	68.96
529.38	69.09	531.52	69.34	533.05	69.56	534.47	69.73	537.43	70.06
540.39	70.36	542.6	70.46	544.82	70.44	546.67	70.45	549.25	70.4
551.47	70.26	552.94	70.18	553.68	70.15	555.9	70.16	559.24	70.19
560.33	70.21	562.55	70.21	564.77	70.18	566.98	70.2	569.19	70.26
571.41	70.41	573.63	70.5	575.84	70.62	578.06	70.71	580.28	70.76
582.5	70.77	584.71	70.75	586.92	70.8	589.14	70.94	591.35	71.03
593.57	71.07	595.79	71.05	600.22	71.13	602.44	71.14	604.65	71.2
606.87	71.28	609.48	71.23	611.3	71.23	613.52	71.32	615.75	71.47
617.95	71.78	620.16	72.01	622.03	72.15	624.59	72.35	626.81	72.5
629.03	72.71	631.25	73.01	633.46	73.05	635.68	72.95	637.89	72.98
640.1	73.13	640.87	73.2	644.53	73.4	646.75	73.31	647.15	73.27
648.96	72.99	651.18	72.69	653.4	72.46	655.61	72.43	657.83	72.5
660.04	72.54	662.26	72.55	664.47	72.55	666.68	72.59	668.9	72.67
671.11	72.69	673.33	72.73	675.54	72.81	677.76	72.86	679.98	72.9
684.41	72.92	684.84	72.93	686.62	72.92	688.84	72.93	691.05	73.01
691.12	73	693.27	72.99	695.48	72.95	697.69	72.96	699.91	73
702.13	72.96	704.34	72.91	706.56	72.97	708.77	72.98	710.99	72.94
713.21	73.02	715.42	73.08	717.63	73.05	719.85	73.05	722.53	73.06
726.49	73.13	730.92	73.03	733.14	73.02	735.08	73.03	735.35	73.02
737.57	73.04	739.79	73.03	746.43	73.09	748.64	73.05	750.86	73.08
753.93	73.01	755.29	73	757.5	73.03	760.2	73.03	761.94	72.99
766.37	73.03	768.58	73.02	770.79	72.99	772.77	72.97	773.01	72.96
775.22	72.98	777.44	72.99	779.65	72.99	781.87	72.98	784.08	72.92
786.3	72.87	788.52	72.86	790.73	72.83	792.95	72.81	795.16	72.9
797.37	72.87	797.89	72.87	801.8	72.91	806.23	72.93	808.45	72.88
810.67	72.89	812.88	72.91	815.1	72.9	816.74	72.85	819.53	72.78
821.74	72.83	823.95	72.85	828.38	72.93	830.6	72.9	832.82	72.91
837.25	72.89	839.46	72.87	841.68	72.89	843.89	72.88	848.14	72.79
850.54	72.8	852.75	72.82	857.18	72.82	859.4	72.84	861.61	72.81
863.83	72.77	866.04	72.74	868.26	72.7	870.48	72.65	872.69	72.63
874.9	72.63	877.12	72.62	879.33	72.58	881.55	72.57	885.98	72.53
888.19	72.57	890.41	72.56	892.63	72.54	894.84	72.58	897.06	72.59
899.27	72.57	901.48	72.47	903.7	72.49	905.91	72.54	908.13	72.55
910.34	72.49	912.56	72.47	914.77	72.49	917.22	72.46	919.21	72.42
921.42	72.44	925.85	72.42	928.06	72.42	930.28	72.41	932.49	72.37
934.71	72.34	936.92	72.33	939.14	72.34	941.36	72.37	942.34	72.39
943.57	72.4	948	72.34	950.22	72.38	952.43	72.43	954.64	72.42
954.89	72.41	956.86	72.4	959.07	72.41	961.19	72.4	963.5	72.42
965.72	72.4	967.94	72.36	970.15	72.36	972.37	72.37	974.58	72.32
976.8	72.3	979.01	72.35	981.23	72.37	983.44	72.33	985.65	72.28
987.87	72.3	990.09	72.34	992.3	72.33	992.59	72.32	994.52	72.33
996.73	72.35	998.86	72.36	1001.17	72.36	1003.38	72.38	1005.16	72.32
1007.81	72.26	1012.23	72.3	1014.45	72.3	1016.67	72.28	1018.88	72.27
1023.31	72.29	1025.53	72.25	1027.75	72.24	1030.28	72.26	1032.17	72.23
1034.39	72.23	1036.55	72.21	1036.6	72.22	1038.82	72.22	1041.03	72.23
1043.25	72.19	1045.46	72.18	1047.68	72.19	1049.9	72.21	1054.33	72.13
1055.4	72.1	1056.54	72.09	1058.75	72.1	1060.97	72.16	1063.18	72.21
1065.4	72.25	1067.95	72.32	1069.83	72.43	1072.04	72.6	1074.24	72.9
1076.48	73.3	1078.69	73.65	1080.52	73.84	1083.12	74.14	1085.33	74.57
1086.79	74.96	1087.55	75.15	1089.76	75.92	1091.98	76.81	1093.07	77.26
1094.19	77.68	1096.41	78.72	1098.63	79.47	1099.36	79.61	1100.84	79.84

1103.06	79.96	1105.27	79.99	1105.64	80.02	1107.49	80.13	1109.7	80.21		
1111.92	80.21	1113.55	80.19	1115.19	80.12	1116.82	80	1118.46	79.85		
1120.1	79.59	1121.73	79.19	1123.37	78.6	1125.01	78.18	1126.65	78.11		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.044	258.72	.066	291.3	.025	427.76	.066	540.39	.075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
258.72	540.39	1874.31	1742.61 1664.76	.1	.3

Left Levee Station= 27.86 Elevation= 81.61
Right Levee Station=1111.915 Elevation= 80.215

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.8

INPUT
Description: RGV-02. Begin Wall, 6-foot wall applied with 10:1 SS, Bathymetric elevations translated from IBWC 2008 120.7 Cross-section

Station Elevation Data num= 227

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	79.71	3.27	80.35	6.55	80.79	9.82	81.02	13.09	81.16
37.09	81.4	37.76	81.4	37.76	75.4	47.76	75.2	138.76	74.8
141.76	75.1	165.76	74.62	171.76	74.02	181.76	73.82	187.76	73.22
189.82	73.28	193.09	73.26	196.36	73.28	199.63	73.35	202.91	73.37
206.18	73.34	209.45	73.23	212.73	73.23	216	73.25	219.27	73.2
222.54	73.25	225.82	73.26	229.09	73.26	232.36	73.29	235.63	73.33
238.91	73.36	242.18	73.36	245.45	73.33	248.72	73.37	252	73.32
255.27	73.39	258.54	73.33	261.82	73.33	265.09	73.32	268.36	73.45
271.63	73.39	274.91	73.3	278.18	73.3	281.45	73.28	284.72	73.3
288	73.26	291.27	73.21	294.54	73.22	297.82	73.21	304.36	73.27
307.63	73.29	310.91	73.33	314.18	73.4	317.45	73.5	320.72	73.61
324	73.78	327.27	73.99	330.54	74.3	333.81	74.85	337.09	75.35
340.36	75.56	343.63	75.73	346.91	75.8	350.18	75.78	353.45	75.73
356.72	75.65	360	75.48	363.27	75.32	366.54	74.57	369.81	73.47
373.09	72.19	376.36	70.54	379.63	68.27	382.91	66.3	386.18	65.07
389.45	63.82	392.72	62.26	396	60.48	399.27	58.99	402.54	58.46
402.54	58.13	404.54	56.76	410.54	52.64	420.54	50.84	430.54	51.64
440.54	51.84	450.54	52.14	460.54	52.14	470.54	51.84	480.54	51.84
490.54	51.64	500.54	51.84	510.54	51.84	520.54	52.14	530.54	52.64
540.54	52.64	550.54	53.14	560.54	52.84	570.54	53.14	580.54	53.84
590.54	53.34	595.63	55.64	595.63	56.74	595.63	58.13	595.63	58.46
598.9	59.24	602.18	60.73	605.45	61.83	608.72	62.04	611.99	62.01
615.27	61.99	618.54	62.06	621.81	62.29	625.08	62.82	628.36	63.47
631.63	64.29	634.9	65.07	638.17	66.05	641.45	66.62	644.72	66.86
647.99	67.09	651.27	67.23	654.54	67.4	657.81	67.87	661.08	68.48
664.36	69.05	667.63	69.5	670.9	69.52	674.17	69.31	677.45	69.22
680.72	69.28	683.99	69.32	687.26	69.29	690.54	69.24	693.81	69.25
697.08	69.23	700.36	69.16	703.63	69.18	706.9	69.52	710.17	70.29
713.45	71.24	716.72	72.26	719.99	73.32	723.26	73.95	726.54	73.87
729.81	73.78	733.08	73.79	736.36	73.79	739.63	73.82	742.9	73.83
746.17	73.78	749.45	73.8	752.72	73.8	755.99	73.82	759.26	73.86
762.54	73.94	765.81	74.06	769.08	74.17	772.35	74.15	775.63	74.18
778.9	74.17	782.17	74.24	785.45	74.23	788.72	74.17	791.99	74.15
795.26	74.09	798.54	74.08	801.81	74.05	805.08	74.09	808.35	74.11
811.63	74.21	814.9	74.29	818.17	74.31	821.44	74.4	824.72	74.37
827.99	74.42	831.26	74.44	834.53	74.42	837.81	74.38	841.08	74.25
844.35	74.17	847.63	74.18	850.9	74.2	854.17	74.23	857.44	74.23
860.72	74.27	863.99	74.2	867.26	74.07	870.53	74.01	873.81	74.09
877.08	74.18	880.35	74.16	883.62	74.15	886.9	74.12	890.17	74.21
893.44	74.15	896.72	74.15	899.99	74.14	903.26	74.11	906.53	74.13
909.81	74.14	913.08	74.12	916.35	74.1	919.62	74.02	922.9	73.95
926.17	73.88	929.44	73.94	932.71	73.8	935.99	73.57	939.26	73.66
942.53	74.02	945.81	74.78	949.08	76.1	952.35	77.69	955.62	79.05
958.9	79.83	962.17	80.09	965.44	80.11	968.71	80.06	971.99	79.91
975.26	79.68	978.53	79.37	981.81	78.86	985.08	78.07	988.35	76.89
991.62	76.05	994.9	75.9						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.044	350.18	.066	402.54	.025	595.63	.066	667.63	.075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
350.18	667.63	249.26	264.4 279.46	.1	.3

Left Levee Station= 37.76 Elevation= 81.4
Right Levee Station= 965.44 Elevation= 80.11
Blocked Obstructions num= 1

Sta L	Sta R	Elev
14.13	347.28	75.81

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	77.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.044	0.044	0.075
W.S. Elev (ft)	77.61	Reach Len. (ft)	249.26	264.40	279.46
Crit W.S. (ft)	59.47	Flow Area (sq ft)	563.64	6249.15	1216.44
E.G. Slope (ft/ft)	0.000154	Area (sq ft)	563.64	6249.15	1216.44
Q Total (cfs)	20000.00	Flow (cfs)	348.51	18866.73	784.75
Top Width (ft)	914.43	Top Width (ft)	312.42	317.45	284.56
Vel Total (ft/s)	2.49	Avg. Vel. (ft/s)	0.62	3.02	0.65
Max Chl Dpth (ft)	26.77	Hydr. Depth (ft)	1.80	19.69	4.27
Conv. Total (cfs)	1612557.0	Conv. (cfs)	28099.8	1521184.0	63273.1
Length Wtd. (ft)	264.63	Wetted Per. (ft)	314.24	328.17	285.95
Min Ch El (ft)	50.84	Shear (lb/sq ft)	0.02	0.18	0.04
Alpha	1.39	Stream Power (lb/ft s)	0.01	0.55	0.03
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	10248.54	7439.91	2492.03
C & E Loss (ft)	0.00	Cum SA (acres)	2738.70	412.48	832.76

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.7

INPUT

Description: RGV-02. 6-foot wall applied with 10:1 SS, Original IBWC
Cross-section data applied to this section.

Station Elevation Data num= 221

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	74.05	3.27	74.24	6.54	74.55	9.81	75.15	13.08	75.71
16.35	76.14	19.62	76.67	22.89	77.4	26.16	78.31	29.43	79.37
32.7	80.45	35.97	81.05	39.24	81.31	42.51	81.41	66.51	81.65
67.18	81.65	67.18	75.65	77.18	75.45	168.18	75.04	171.18	75.34
195.18	74.86	201.18	74.26	211.18	74.06	217.18	73.46	219.11	73.45
222.38	73.34	225.65	73.32	228.92	73.34	232.19	73.37	235.46	73.44
238.73	73.43	242	73.39	245.27	73.47	248.54	73.53	251.81	73.54
255.08	73.45	258.35	73.4	261.62	73.44	264.89	73.52	271.43	73.46
274.7	73.46	277.97	73.49	281.24	73.47	284.51	73.43	287.78	73.46
291.05	73.45	294.32	73.39	297.59	73.33	300.86	73.36	304.13	73.36
307.4	73.44	310.67	73.43	313.94	73.42	317.21	73.38	320.48	73.35
323.75	73.36	327.02	73.38	330.29	73.49	333.56	73.66	336.83	73.96
340.1	74.39	343.37	74.64	346.64	74.87	349.91	75.33	353.18	75.61
356.45	75.67	359.72	75.67	362.99	75.57	366.27	75.34	369.54	75.14
372.81	74.99	376.08	74.82	379.35	74.61	382.62	74.37	385.89	74.11
389.16	73.39	392.43	72.13	395.7	70.64	398.97	68.45	402.24	65.92
405.51	63.3	408.78	60.44	412.05	58.51	412.05	58.13	414.05	56.76
420.05	52.64	430.05	50.84	440.05	51.64	450.05	51.84	460.05	52.14
470.05	52.14	480.05	51.84	490.05	51.84	500.05	51.64	510.05	51.84
520.05	51.84	530.05	52.14	540.05	52.64	550.05	52.64	560.05	53.14
570.05	52.84	580.05	53.14	590.05	53.84	595.18	53.34	595.18	55.64
595.18	56.74	595.18	58.13	595.18	58.47	598.45	58.79	601.72	60.03
604.99	61.28	608.26	62.18	611.53	62.72	614.8	62.99	618.07	63.03
621.34	63.14	624.61	63.3	627.89	63.25	631.16	63.11	634.43	63.12
637.7	63.31	640.97	63.5	644.24	63.77	647.51	64.14	650.78	64.5
654.05	65.05	657.32	65.63	660.59	65.82	663.86	66.12	667.13	66.48
670.4	66.94	673.67	67.49	676.94	68.05	680.21	68.71	683.48	69.28
686.75	69.61	690.02	69.79	693.29	69.92	696.56	69.74	699.83	69.51
703.1	69.49	706.37	69.65	709.64	69.92	712.91	70.37	716.18	70.85
719.46	71.3	722.73	71.71	726	72.07	729.27	72.34	732.54	72.59
735.81	72.74	739.08	72.82	742.35	72.9	745.62	72.99	748.89	73.02
752.16	73.04	755.43	73.14	758.7	73.29	761.97	73.44	765.24	73.47
768.51	73.52	771.78	73.64	775.05	73.65	778.32	73.63	781.59	73.69
784.86	73.84	788.13	73.92	791.4	73.98	794.67	74.07	797.94	74.18
801.21	74.3	804.48	74.41	807.75	74.49	811.03	74.54	814.3	74.5
817.57	74.45	820.84	74.54	824.11	74.56	827.38	74.6	830.65	74.67
833.92	74.52	837.19	74.24	840.46	74.18	843.73	74.13	847	74.21
850.27	74.19	853.54	74.24	856.81	74.24	860.08	74.28	863.35	74.34
866.62	74.35	869.89	74.4	873.16	74.47	876.43	74.55	879.7	74.67
882.97	74.76	886.24	74.87	889.51	75	892.78	75.23	896.05	75.51
899.33	75.72	902.6	75.94	905.87	76.13	909.14	76.46	912.41	76.81
915.68	77.05	918.95	77.32	922.22	77.65	925.49	77.95	928.76	78.12
932.03	78.31	935.3	78.44	938.57	78.41	941.84	78.32	945.11	78.27
948.38	78.18	951.65	77.95	954.92	77.72	958.19	77.55	961.46	77.42
964.73	77.22								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.044	362.99	.066	412.05	.025	595.18	.066	693.29	.075

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
362.99 693.29 517.73 423.08 373.07 .1 .3
Left Levee Station= 42.51 Elevation= 81.41
Right Levee Station= 935.3 Elevation= 78.44
Blocked Obstructions num= 1

Sta L	Sta R	Elev
44.74	356.73	75.66

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.70	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.14	Wt. n-Val.	0.044	0.046	0.075	
W.S. Elev (ft)	77.56	Reach Len. (ft)	517.73	423.08	373.07	
Crit W.S. (ft)	59.62	Flow Area (sq ft)	563.08	6202.80	870.82	
E.G. Slope (ft/ft)	0.000187	Area (sq ft)	563.08	6202.80	870.82	
Q Total (cfs)	20000.00	Flow (cfs)	397.99	19025.83	576.18	
Top Width (ft)	854.18	Top Width (ft)	295.81	330.30	228.07	
Vel Total (ft/s)	2.62	Avg. Vel. (ft/s)	0.71	3.07	0.66	
Max Chl Dpth (ft)	26.72	Hydr. Depth (ft)	1.90	18.78	3.82	
Conv. Total (cfs)	1461437.0	Conv. (cfs)	29082.0	1390252.0	42102.7	
Length Wtd. (ft)	423.46	Wetted Per. (ft)	297.71	343.67	228.43	
Min Ch El (ft)	50.84	Shear (lb/sq ft)	0.02	0.21	0.04	
Alpha	1.31	Stream Power (lb/ft s)	0.02	0.65	0.03	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	10245.31	7402.12	2485.34	
C & E Loss (ft)	0.00	Cum SA (acres)	2736.96	410.52	831.12	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.62

INPUT
Description: RGV-02. Enforcement Zone not applied to section - urban/Progreso
International Bridge. Original IBWC Cross-section data applied to
this section.

Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.98	10.5	82.09	17	82.14	23	79.94	24	79.54
38	75.44	53.4	75.37	54.7	75.36	83.4	75.22	84.7	75.21
100	75.14	113.4	75.26	114.7	75.27	143.4	75.53	144.7	75.55
166	75.74	173.4	75.86	174.7	75.88	184	76.04	200	76.04
204	76.15	207	76.23	211	76.34	217	71.74	222	69.94
230	63.54	238	57.8	239.3	56.66	240	56.04	250	51.44
260	47.84	270	46.54	280	46.64	290	47.44	300	47.84
320	49.44	330	50.84	340	51.04	350	50.24	360	50.24
370	52.04	376	52.76	380	53.24	390	52.84	400	54.84
420	56.84	430	57.8	457	60.94	476	63.54	478	66.34
500	67.94	548	73.74	549	73.76	552	73.84	562	74.09
583.9	74.64	585.2	74.67	600	75.04	617.4	75.78	618.7	75.83
640	76.74	652	79.29	656	80.14	676	81.44		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
      0    .088     166    .088     211    .066     238    .025     430    .066
    548     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          211     548           119.42     110  109.64             .2       .5
Left Levee      Station=      17      Elevation=   82.14
Right Levee     Station=     676      Elevation=   81.44

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             77.63    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.13    Wt. n-Val.                0.088      0.045     0.080
  W.S. Elev (ft)             77.49    Reach Len. (ft)            2.00       2.00      2.00
  Crit W.S. (ft)             58.15    Flow Area (sq ft)        345.90    6683.46    226.87
  E.G. Slope (ft/ft)      0.000159    Area (sq ft)             345.90    6683.46    226.87
  Q Total (cfs)           20000.00    Flow (cfs)               114.94   19790.49     94.57
  Top Width (ft)            612.56    Top Width (ft)           180.01     337.00     95.55
  Vel Total (ft/s)            2.76    Avg. Vel. (ft/s)           0.33       2.96      0.42
  Max Chl Dpth (ft)          30.95    Hydr. Depth (ft)           1.92      19.83      2.37
  Conv. Total (cfs)       1584613.0    Conv. (cfs)              9106.8   1568014.0    7493.2
  Length Wtd. (ft)            2.00    Wetted Per. (ft)         180.32     348.38     95.68
  Min Ch El (ft)             46.54    Shear (lb/sq ft)           0.02       0.19      0.02
  Alpha                       1.14    Stream Power (lb/ft s)     0.01       0.56      0.01
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)   10239.91    7339.54   2480.64
  C & E Loss (ft)             0.00    Cum SA (acres)          2734.13     407.28    829.73


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was used.

BRIDGE


RIVER: Rio Grande
REACH: Lower Reach        RS: 120.605

INPUT
Description: Progreso

MARCH 2007 PROGRESO BRIDGE UPDATED TO
           REFLECT FIELD CONDITIONS

Distance from Upstream XS =       2
Deck/Roadway Width        =     106
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      27
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   81.98   81.98      24   82.54   79.54    53.4   83.52   80.52
    54.7   83.57   80.57    83.4   84.53   81.53    84.7   84.58   81.58
   113.4   85.54   82.54   114.7   85.58   82.58   143.4   86.54   83.54
   144.7   86.59   83.59   173.4   87.55   84.55   174.7    87.6    84.6
     194   88.24   85.24     194   88.24   83.29     207   88.61   83.29
     376   90.11   84.76     380   90.11   84.76     549   88.61   83.33
     562   88.02   83.33     562   88.02   85.02   583.9    86.8    83.8
   585.2   86.73   83.73   617.4   84.93   81.93   618.7   84.86   81.86
     652      83      80     656   82.78   80.14     676   81.66   81.44

Upstream Bridge Cross Section Data
Station Elevation Data    num=      64
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.98    10.5   82.09      17   82.14      23   79.94      24   79.54
      38   75.44    53.4   75.37    54.7   75.36    83.4   75.22    84.7   75.21
     100   75.14   113.4   75.26   114.7   75.27   143.4   75.53   144.7   75.55
     166   75.74   173.4   75.86   174.7   75.88     184   76.04     200   76.04
     204   76.15     207   76.23     211   76.34     217   71.74     222   69.94
     230   63.54     238    57.8   239.3   56.66     240   56.04     250   51.44
     260   47.84     270   46.54     280   46.64     290   47.44     300   47.84
     320   49.44     330   50.84     340   51.04     350   50.24     360   50.24
     370   52.04     376   52.76     380   53.24     390   52.84     400   54.84
     420   56.84     430    57.8     457   60.94     476   63.54     478   66.34
     500   67.94     548   73.74     549   73.76     552   73.84     562   74.09
   583.9   74.64   585.2   74.67     600   75.04   617.4   75.78   618.7   75.83
     640   76.74     652   79.29     656   80.14     676   81.44

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .088     166    .088     211    .066     238    .025     430    .066
     548     .08

Bank Sta: Left   Right    Coeff Contr.   Expan.
          211     548             .2       .5
Left Levee      Station=      17      Elevation=   82.14
Right Levee     Station=     676      Elevation=   81.44

Downstream  Deck/Roadway Coordinates
    num=      27
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   81.98   81.98      24   82.54   79.54    53.4   83.52   80.52
    54.7   83.57   80.57    83.4   84.53   81.53    84.7   84.58   81.58
   113.4   85.54   82.54   114.7   85.58   82.58   143.4   86.54   83.54
   144.7   86.59   83.59   173.4   87.55   84.55   174.7    87.6    84.6
     194   88.24   85.24     194   88.24   83.29     207   88.61   83.29
     376   90.11   84.76     380   90.11   84.76     549   88.61   83.33
     562   88.02   83.33     562   88.02   85.02   583.9    86.8    83.8
   585.2   86.73   83.73   617.4   84.93   81.93   618.7   84.86   81.86
     652      83      80     656   82.78   80.14     676   81.66   81.44

Downstream Bridge Cross Section Data
Station Elevation Data    num=      64
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.98    10.5   82.09      17   82.14      23   79.94      24   79.54
      38   75.44    53.4   75.37    54.7   75.36    83.4   75.22    84.7   75.21
     100   75.14   113.4   75.26   114.7   75.27   143.4   75.53   144.7   75.55
     166   75.74   173.4   75.86   174.7   75.88     184   76.04     200   76.04
     204   76.15     207   76.23     211   76.34     217   71.74     222   69.94
     230   63.54     238    57.8   239.3   56.66     240   56.04     250   51.44
     260   47.84     270   46.54     280   46.64     290   47.44     300   47.84
     320   49.44     330   50.84     340   51.04     350   50.24     360   50.24
     370   52.04     376   52.76     380   53.24     390   52.84     400   54.84
     420   56.84     430    57.8     457   60.94     476   63.54     478   66.34
     500   67.94     548   73.74     549   73.76     552   73.84     562   74.09
```

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   583.9   74.64   585.2   74.67     600   75.04   617.4   75.78   618.7   75.83
     640   76.74     652   79.29     656   80.14     676   81.44

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .104     166    .104     211    .066     238    .025     430    .066
     548     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
           211     548             .2       .5
Left Levee      Station=      17      Elevation=   82.14
Right Levee     Station=     676      Elevation=   81.44

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  10

Pier Data
Pier Station     Upstream=      43    Downstream=      43
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   80.93
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   80.93

Pier Data
Pier Station     Upstream=      90    Downstream=      90
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   81.94
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   81.94

Pier Data
Pier Station     Upstream=     139    Downstream=     139
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3      84
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3      84

Pier Data
Pier Station     Upstream=     191    Downstream=     191
Upstream     num=       2
    Width   Elev    Width   Elev
       4      40       4      86
Downstream     num=       2
    Width   Elev    Width   Elev
       4      40       4      86

Pier Data
Pier Station     Upstream=     301    Downstream=     301
Upstream     num=       2
    Width   Elev    Width   Elev
       4      40       4   84.96
Downstream     num=       2
    Width   Elev    Width   Elev
       4      40       4   84.96

Pier Data
Pier Station     Upstream=     412    Downstream=     412
Upstream     num=       2
    Width   Elev    Width   Elev
       4      40       4      85
Downstream     num=       2
    Width   Elev    Width   Elev
       4      40       4      85

Pier Data
Pier Station     Upstream=     462    Downstream=     462
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   85.12
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   85.12

Pier Data
Pier Station     Upstream=     511    Downstream=     511
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   83.69
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   83.69

Pier Data
Pier Station     Upstream=     557    Downstream=     557
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   84.16
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3   84.16

Pier Data
Pier Station     Upstream=     598    Downstream=     598
Upstream     num=       2
    Width   Elev    Width   Elev
       3      40       3      84
Downstream     num=       2
    Width   Elev    Width   Elev
       3      40       3      84
```

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.59

INPUT
Description: RGV-02. Enforcement Zone not applied to section - urban/Progreso
International Bridge. Original IBWC Cross-section data applied to
this section.
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.98	10.5	82.09	17	82.14	23	79.94	24	79.54
38	75.44	53.4	75.37	54.7	75.36	83.4	75.22	84.7	75.21
100	75.14	113.4	75.26	114.7	75.27	143.4	75.53	144.7	75.55
166	75.74	173.4	75.86	174.7	75.88	184	76.04	200	76.04
204	76.15	207	76.23	211	76.34	217	71.74	222	69.94
230	63.54	238	57.8	239.3	56.66	240	56.04	250	51.44
260	47.84	270	46.54	280	46.64	290	47.44	300	47.84
320	49.44	330	50.84	340	51.04	350	50.24	360	50.24
370	52.04	376	52.76	380	53.24	390	52.84	400	54.84
420	56.84	430	57.8	457	60.94	476	63.54	478	66.34
500	67.94	548	73.74	549	73.76	552	73.84	562	74.09
583.9	74.64	585.2	74.67	600	75.04	617.4	75.78	618.7	75.83
640	76.74	652	79.29	656	80.14	676	81.44		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.104	166	.104	211	.066	238	.025	430	.066
548	.06								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
211	548	604.8	598 590.27	.2	.5

Left Levee Station= 17 Elevation= 82.14
Right Levee Station= 676 Elevation= 81.44

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.59	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.14	Wt. n-Val.	0.104	0.045	0.060	
W.S. Elev (ft)	77.46	Reach Len. (ft)	604.80	598.00	590.27	
Crit W.S. (ft)	58.15	Flow Area (sq ft)	339.18	6670.87	223.31	
E.G. Slope (ft/ft)	0.000160	Area (sq ft)	339.18	6670.87	223.31	
Q Total (cfs)	20000.00	Flow (cfs)	94.47	19782.22	123.30	
Top Width (ft)	612.25	Top Width (ft)	179.88	337.00	95.37	
Vel Total (ft/s)	2.76	Avg. Vel. (ft/s)	0.28	2.97	0.55	
Max Chl Dpth (ft)	30.92	Hydr. Depth (ft)	1.89	19.79	2.34	
Conv. Total (cfs)	1580303.0	Conv. (cfs)	7465.0	1563095.0	9742.8	
Length Wtd. (ft)	597.88	Wetted Per. (ft)	180.18	348.38	95.50	
Min Ch El (ft)	46.54	Shear (lb/sq ft)	0.02	0.19	0.02	
Alpha	1.14	Stream Power (lb/ft s)	0.01	0.57	0.01	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	10239.11	7323.37	2480.11	
C & E Loss (ft)	0.00	Cum SA (acres)	2733.71	406.46	829.51	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.5

INPUT
Description: RGV-02. 9-foot wall applied, Bathymetric elevations translated
from IBWC 2008 Cross-sections
Station Elevation Data num= 261

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	77.44	3.26	77.52	6.53	77.59	9.79	77.64	13.05	77.68
16.32	77.97	19.58	78.86	22.84	80.03	26.11	80.69	29.37	80.99
53.37	81.23	54.04	81.23	54.04	72.23	64.04	72.03	155.04	71.06
158.04	71.81	182.04	71.33	188.04	69.83	198.04	69.63	204.04	68.13
205.59	68.13	208.86	68.19	212.12	68.17	215.39	68.23	218.65	68.29
221.91	68.33	225.18	68.37	228.44	68.38	231.7	68.31	234.97	68.28
238.23	68.29	241.49	68.28	244.76	68.38	248.02	68.47	251.28	68.59
254.55	68.73	257.81	68.94	261.07	69.19	264.34	69.39	267.6	69.61
270.86	69.88	274.13	70.2	277.39	70.46	280.65	70.78	283.92	71.15
287.18	71.44	290.44	71.7	293.71	72.03	296.97	72.33	300.23	72.62
303.5	72.97	306.76	73.28	310.02	73.52	313.29	73.58	316.55	73.6
319.81	73.68	323.08	73.82	326.34	74.08	329.6	74.3	332.87	74.27
336.13	74.47	339.39	74.7	342.66	75.79	345.92	76.17	349.19	75.61
352.45	73.59	355.71	71.68	358.98	70.44	362.24	70.05	365.5	70.01
368.77	69.96	372.03	69.87	375.29	70.03	378.56	70.25	381.82	70.46
385.08	70.53	388.35	70.53	391.61	70.46	394.87	69.22	398.14	66.85
401.4	64.09	404.66	61.09	407.93	58.96	411.19	58.44	412.19	57.77
422.19	55.17	432.19	52.97	442.19	52.57	452.19	51.77	462.19	51.77
472.19	52.07	482.19	52.57	492.19	53.57	502.19	53.77	512.19	54.07
522.19	53.17	532.19	53.37	542.19	53.77	552.19	54.07	562.19	55.17
572.19	55.17	582.19	55.57	592.19	55.57	593.93	58.51	597.19	59.37
600.46	60.66	603.72	61.98	606.98	63.3	610.25	64.46	613.51	64.26
616.77	64.3	620.03	64.2	623.3	63.81	626.56	63.29	629.82	62.96
633.08	62.93	636.35	62.83	639.61	62.65	642.87	62.37	646.13	62.09
649.4	62.11	652.66	62.29	655.92	62.6	659.18	63.16	662.45	64.04
665.71	65.26	668.97	66.66	672.24	67.66	675.5	68.32	678.76	68.95

```
  682.02   69.29  685.29   69.44  688.55    69.6  691.81   69.69  695.07    69.7
  698.34   69.88   701.6   70.12  708.12   70.32  711.39   70.52  714.65   70.73
  717.91   71.12  721.18   71.62  724.44   71.95   727.7   72.15  730.96   72.71
  734.23    73.2  737.49   73.41  740.75   73.43  744.01   72.92  747.28   72.73
  750.54   72.64   753.8   72.63  757.06   72.69  760.33   72.71  763.59   72.65
  766.85   72.57  770.11   72.47  773.38   72.42  776.64   72.43   779.9   72.35
  783.17   72.24  786.43   72.24  789.69    72.3  792.95   72.33  796.22   72.35
  799.48   72.38  802.74   72.43     806   72.49  809.27   72.56  812.53   72.63
  815.79   72.68  819.05   72.77  822.32   72.84  825.58   72.87  828.84   72.94
   832.1   72.98  835.37   73.04  838.63    73.1  841.89   73.13  845.16   73.15
  848.42   73.21  851.68   73.23  854.94    73.3  858.21   73.36  861.47   73.43
  864.73   73.41  867.99   73.45  871.26   73.52  874.52   73.52  877.78   73.51
  881.04   73.52  884.31   73.55  887.57   73.63  890.83    73.6  894.09   73.61
  897.36   73.66  900.62   73.71  903.88   73.74  907.15   73.72  910.41   73.72
  913.67   73.73  916.93   73.74   920.2   73.74  923.46   73.77  926.72   73.83
  929.98   73.86  933.25   73.88  939.77   73.88  943.03   73.87   946.3   73.84
  949.56   73.84  952.82   73.91  956.08   73.88  959.35   73.88  962.61   73.86
  965.87   73.88  969.14   73.85   972.4   73.89  975.66   73.87  978.92   73.89
  982.19   73.89  985.45   73.86  988.71    73.9  991.97   73.91  995.24   73.95
   998.5   73.97 1001.76   73.95 1005.02   73.96 1008.29   73.96 1011.55   73.94
 1014.81   73.85 1018.07   73.78 1021.34   73.71  1024.6   73.61 1027.86   73.54
 1031.13   73.54 1034.39   73.58 1037.65   73.67 1040.91   73.77 1044.18   73.87
 1047.44   74.03 1053.96   74.67 1057.23      75 1060.49   75.39 1063.75    75.9
 1067.01   76.49 1070.28   76.99 1073.54    77.4  1076.8   78.01 1080.06   78.77
 1083.33   79.71 1086.59   80.41 1089.85   80.95 1093.11    81.3 1096.38   81.42
 1099.64   81.47  1102.9   81.54 1106.17   81.62 1109.43   81.69 1112.69   81.72
 1115.95   81.72

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .159  345.92    .066  394.87    .025  593.93    .066   701.6    .076

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        391.61   701.6             318.1  268.58  237.07             .1       .3
Left Levee      Station=   54.04      Elevation=   81.23
Right Levee     Station= 1093.11      Elevation=    81.3
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   31.14  345.08   76.11  741.09  1167.3   73.43

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             77.49    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                0.080      0.042      0.076
  W.S. Elev (ft)             77.34    Reach Len. (ft)          318.10     268.58     237.07
  Crit W.S. (ft)             61.05    Flow Area (sq ft)        642.08    5913.24    1407.41
  E.G. Slope (ft/ft)      0.000164    Area (sq ft)             642.08    5913.24    1407.41
  Q Total (cfs)           20000.00    Flow (cfs)               317.89   18826.17     855.94
  Top Width (ft)           1019.05    Top Width (ft)           337.57     309.99     371.49
  Vel Total (ft/s)            2.51    Avg. Vel. (ft/s)           0.50       3.18       0.61
  Max Chl Dpth (ft)          25.57    Hydr. Depth (ft)           1.90      19.08       3.79
  Conv. Total (cfs)       1561191.0    Conv. (cfs)              24814.5   1469562.0    66814.4
  Length Wtd. (ft)           267.69    Wetted Per. (ft)         340.26     318.73     371.98
  Min Ch El (ft)              51.77    Shear (lb/sq ft)           0.02       0.19       0.04
  Alpha                        1.52    Stream Power (lb/ft s)     0.01       0.61       0.02
  Frctn Loss (ft)              0.05    Cum Volume (acre-ft)    10232.30    7236.99    2469.06
  C & E Loss (ft)              0.00    Cum SA (acres)           2730.12     402.02     826.34


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 120.4

INPUT
Description: RGV-02.  End Wall, Bathymetric elevations translated from IBWC
             2008 120.5 Cross-section
Station Elevation Data    num=     326
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.02    3.28   81.09   27.28   81.33   27.95   81.33   27.95   71.33
   37.95   71.13  128.95   69.92  131.95   70.67  155.95   70.19  161.95   68.69
  171.95   68.49  177.95   66.99  180.28    66.9  183.56   66.87  186.83   66.86
  190.11   66.88  193.39   66.83  196.67   66.83  199.95   66.88  203.22   66.88
   206.5   66.91  209.78   66.98  213.06   66.99  216.34   66.95  219.61   66.91
  222.89   66.95  226.17   66.92  229.45   66.94  232.72   66.95     236   66.95
  239.28   66.93  242.56   66.99  245.84   67.05  249.11   67.11  252.39   67.12
  255.67    67.1  258.95   67.07  262.22   67.03   265.5   66.97  268.78   66.98
  272.06   67.02  275.34   67.04  278.61   67.05  281.89   67.03  285.17   67.01
  288.45   67.03  291.72   67.08     295    67.1  298.28   67.15  301.56   67.25
  304.84   67.34  308.11   67.36  311.39   67.38  314.67   67.38  317.95   67.43
  321.22   67.55   324.5   67.67  327.78   67.69  331.06   67.73  334.34   67.68
  337.61   67.64  340.89   67.59  344.17   67.65  347.45   67.72  350.73   67.81
     354   67.92  357.28   68.02  360.56   67.98  363.84   67.92  367.11   67.95
  370.39   67.99  373.67   68.03  376.95   68.04  380.23   68.02   383.5   68.02
  386.78   68.08  390.06   68.18  393.34   68.35  396.61   68.47  399.89   68.56
  403.17   68.72  406.45   68.82  409.73   68.88     413   69.05  416.28   69.27
  419.56    69.6  422.84   70.09  426.11   70.99  429.39   71.92  432.67   72.77
  435.95   73.42  439.23   73.54   442.5   73.54  445.78   73.65  449.06   73.86
  452.34   74.28  455.61   74.92  458.89   75.58  462.17   75.89  465.45   75.95
  468.73   75.77     472   75.11  475.28   74.13  478.56   73.15  481.84   72.26
  485.11   71.42  488.39    70.7  491.67      70  494.95   69.43  498.23   69.08
   501.5   68.92  504.78   69.26  508.06   69.45  511.34   69.23  514.62   68.77
  517.89   68.96  521.17   68.68  524.45   66.53  527.73   62.65     531   59.33
  534.28    58.4  535.28   57.55  545.28   54.95  555.28   52.75  565.28   52.35
  575.28   51.55  585.28   51.55  595.28   51.85  605.28   52.35  615.28   53.35
  625.28   53.55  635.28   53.85  645.28   52.95  655.28   53.15  665.28   53.55
  675.28   53.85  685.28   54.95  691.62   54.95  691.62   55.35  691.62   55.55
  691.62   55.85  691.62   58.05  691.62    58.4  694.89   58.71  698.17   59.48
  701.45   60.46  704.73   61.58  708.01   62.56  711.28   63.51  714.56   64.34
  717.84   64.61  721.12    64.1  724.39   63.59  727.67   63.16  730.95   62.73
  734.23   62.58  737.51    62.8  740.78      63  744.06   62.96  747.34   62.63
  750.62    62.2  753.89   61.65  757.17   61.13  760.45   61.19  763.73   61.79
  767.01   62.92  770.28   64.52  773.56   65.56  776.84   66.29  780.12    66.8
   783.4   67.27  786.67   67.58  789.95   67.83  793.23   68.71  796.51   69.54
  799.78   70.16  803.06    70.6  806.34    71.1  809.62   71.67   812.9   72.04
  816.17   72.16  819.45   72.32  822.73   72.73  826.01   73.17  829.28   73.29
  832.56   73.13  835.84   73.11  839.12   72.77   842.4   72.36  845.67   72.13
  848.95   72.15  852.23    72.1  855.51      72  858.78   71.86  862.06   71.78
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865.34	71.78	868.62	71.77	871.9	71.7	875.17	71.74	878.45	71.74
881.73	71.72	885.01	71.75	888.29	71.78	891.56	71.84	894.84	71.89
898.12	71.87	901.4	71.8	904.67	71.76	907.95	71.78	911.23	71.75
914.51	71.77	917.79	71.82	921.06	71.85	924.34	71.85	927.62	71.81
930.9	71.85	934.17	71.88	937.45	71.89	940.73	71.95	944.01	71.96
947.29	72	950.56	72.11	953.84	72.09	957.12	72.1	960.4	72.13
963.67	72.15	966.95	72.18	970.23	72.17	973.51	72.15	976.79	72.21
980.06	72.22	983.34	72.21	986.62	72.28	989.9	72.31	993.17	72.3
996.45	72.28	1003.01	72.28	1006.29	72.33	1009.56	72.3	1012.84	72.33
1016.12	72.36	1019.4	72.34	1022.68	72.35	1025.95	72.38	1029.23	72.4
1032.51	72.44	1035.79	72.45	1039.06	72.43	1042.34	72.39	1045.62	72.43
1048.9	72.44	1052.18	72.41	1055.45	72.42	1058.73	72.46	1062.01	72.44
1075.12	72.44	1078.4	72.46	1081.68	72.48	1084.95	72.48	1088.23	72.47
1091.51	72.47	1094.79	72.44	1098.06	72.44	1101.34	72.48	1104.62	72.49
1107.9	72.44	1111.18	72.45	1114.45	72.47	1117.73	72.5	1121.01	72.55
1124.29	72.54	1127.56	72.51	1130.84	72.55	1134.12	72.56	1137.4	72.54
1143.95	72.54	1147.23	72.57	1150.51	72.56	1153.79	72.55	1157.06	72.64
1160.34	72.67	1163.62	72.67	1166.9	72.73	1170.18	72.8	1173.45	72.81
1176.73	72.81	1180.01	72.85	1183.29	72.9	1186.56	72.95	1189.84	73
1196.4	73.08	1199.68	73.1	1202.95	73.14	1206.23	73.21	1212.79	73.29
1216.06	73.41	1219.34	73.6	1222.62	73.91	1225.9	74.18	1229.18	74.56
1232.45	75.09	1235.73	75.77	1239.01	76.53	1242.29	77.27	1245.57	77.93
1248.84	78.54	1252.12	79.33	1255.4	79.58	1258.68	79.6	1261.95	79.73
1265.23	79.78	1268.51	79.87	1271.79	79.99	1275.07	80.01	1278.34	80.08
1281.62	80.15	1284.9	80.17	1288.18	80.15	1291.45	80.18	1294.73	80
1298.01	79.11	1301.29	77.62	1304.57	76.12	1307.84	74.86	1311.12	74.07
1314.4	73.78								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.159	462.17	.066	535.28	.025	691.62	.066	793.23	.076

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
508.06	793.23	1776.6	1865.74 1849.12	.1	.3

Left Levee Station= 27.95 Elevation= 81.33
Right Levee Station= 1291.45 Elevation= 80.18
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
3.37	462.48	75.88	829.92	1233.28	73.31

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.094	0.046	0.076
W.S. Elev (ft)	77.28	Reach Len. (ft)	1776.60	1865.74	1849.12
Crit W.S. (ft)	61.40	Flow Area (sq ft)	850.94	5487.93	1807.18
E.G. Slope (ft/ft)	0.000219	Area (sq ft)	850.94	5487.93	1807.18
Q Total (cfs)	20000.00	Flow (cfs)	347.66	18331.49	1320.86
Top Width (ft)	1214.39	Top Width (ft)	480.11	285.17	449.11
Vel Total (ft/s)	2.46	Avg. Vel. (ft/s)	0.41	3.34	0.73
Max Chl Dpth (ft)	25.73	Hydr. Depth (ft)	1.77	19.24	4.02
Conv. Total (cfs)	1351987.0	Conv. (cfs)	23501.5	1239197.0	89289.0
Length Wtd. (ft)	1859.24	Wetted Per. (ft)	482.34	295.93	449.86
Min Ch El (ft)	51.55	Shear (lb/sq ft)	0.02	0.25	0.05
Alpha	1.70	Stream Power (lb/ft s)	0.01	0.85	0.04
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	10226.85	7201.84	2460.32
C & E Loss (ft)	0.02	Cum SA (acres)	2727.13	400.18	824.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.39*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.42	7.29	76.54	9.11	76.77	14.58	77.88	23.69	80.16
27.33	80.78	32.79	81.04	40.11	80.95	41.94	79.41	43.77	76.63
45.6	75.79	58.4	75.34	67.54	74.65	69.37	74.69	74.86	75.54
80.34	76.74	82.16	76.97	96.79	76.81	105.94	76.4	113.25	76.22
126.05	75.75	138.85	75.39	159.84	74.85	168.11	74.62	173.59	74.41
180.91	74.25	184.56	74.1	191.58	73.93	197.36	73.87	206.5	73.65
210.16	73.61	215.65	73.45	222.96	73.44	226.62	73.3	235.76	73.15
237.59	73.17	255.11	73.02	274.16	72.9	283.3	72.94	307.07	72.92
310.73	73.03	314.39	73	332.67	73.14	345.47	73.07	350.96	73.12
361.93	73.08	367.41	73.01	372.9	73.06	380.21	73.04	387.53	72.93
402.15	72.81	409.47	72.67	411.3	72.71	422.27	72.55	431.41	72.52
438.73	72.41	458.84	72.38	466.15	72.31	471.64	72.33	475.3	72.25
482.61	72.19	486.27	72.24	495.41	72.07	502.73	72.02	521.01	71.76
522.84	71.71	537.47	71.55	548.44	71.4	553.92	71.42	564.89	71.3
568.55	71.32	574.04	71.24	586.84	71.3	597.81	71.17	610.6	71.18
616.09	71.09	627.06	71.11	630.72	71.03	639.86	70.99	643.52	71.04
647.18	70.93	652.66	70.93	665.46	70.81	672.77	70.86	676.43	70.76
681.92	70.81	689.23	70.72	698.38	70.71	703.86	70.62	709.34	70.65
718.49	70.83	720.31	71	727.63	71.37	731.29	71.77	736.77	71.89
738.6	71.84	740.43	71.53	744.09	69.93	745.92	69.58	753.23	69.17
758.71	69.01	762.37	68.82	769.68	69.02	773.34	69.19	782.48	69.13
787.97	69.22	795.29	69.12	808.08	69.23	811.74	69.16	822.71	69.15
828.2	69.18	833.68	69.13	837.34	69.19	842.76	69.11	846.48	69.14
853.79	69.06	868.42	69.08	870.25	69.12	875.74	69.04	879.39	69.09
884.88	69.01	897.68	69.04	904.99	69.02	908.65	69.08	914.13	68.96
922.18	69	932.42	68.98	936.08	69.06	941.57	69.01	956.19	68.95
970.82	69.13	979.96	69.01	987.28	69.07	990.93	69.04	1001.6	69.1
1003.73	69.16	1011.04	69.11	1022.02	69.13	1031.16	69.22	1043.96	69.11
1054.93	69.22	1060.41	69.23	1064.07	69.16	1087.84	69.23	1102.47	69.18
1122.58	69.3	1129.9	69.24	1151.84	69.28	1160.43	69.27	1171.95	69.35
1175.61	69.31	1179.27	69.44	1182.93	69.32	1192.22	69.33	1195.73	69.4
1201.21	69.34	1212.18	69.43	1217.67	69.4	1223.15	69.44	1228.64	69.41
1234.12	69.46	1254.24	69.39	1257.9	69.48	1263.38	69.41	1276.18	69.39
1278.01	69.43	1287.48	69.38	1303.61	69.42	1314.58	69.4	1318.24	69.45
1325.55	69.42	1329.21	69.49	1334.69	69.44	1340.18	69.49	1356.64	69.5
1360.29	69.44	1369.44	69.52	1373.09	69.46	1384.06	69.5	1391.38	69.47
1406.01	69.52	1407.83	69.49	1415.15	69.57	1420.64	69.52	1426.12	69.6
1433.44	69.54	1437.09	69.65	1440.75	69.6	1453.55	69.64	1457.2	69.68

1462.69	69.63	1470	69.75	1473.66	69.69	1484.63	69.7	1493.95	69.84
1502.92	69.74	1506.58	69.82	1512.06	69.74	1519.37	69.73	1523.03	69.79
1530.35	69.78	1543.15	69.82	1546.8	69.92	1550.46	69.87	1557.78	69.94
1561.43	69.86	1565.09	69.95	1572.4	69.93	1576.06	70.06	1583.37	69.97
1590.69	69.98	1594.34	70.04	1601.66	70	1607.15	70.07	1610.8	70.03
1614.46	70.14	1621.78	70.02	1629.09	70.01	1636.4	70.12	1640.06	69.98
1649.2	69.99	1651.03	69.94	1660.17	70.01	1663.83	69.97	1671.14	70.09
1674.8	69.98	1680.29	70.07	1685.77	70.04	1689.43	70.12	1698.57	70.08
1707.71	70.2	1711.37	70.16	1731.49	70.31	1736.97	70.24	1744.29	70.28
1751.6	70.22	1755.25	70.25	1758.91	70.18	1762.57	70.23	1775.37	70.24
1780.86	70.28	1799.14	70.33	1806.46	70.31	1821.08	70.4	1830.23	70.39
1833.88	70.34	1844.85	70.37	1848.51	70.34	1859.25	70.41	1863.14	70.48
1866.8	70.41	1877.77	70.39	1881.42	70.49	1886.91	70.54	1891.03	70.49
1903.37	70.56	1907.03	70.69	1912.51	70.6	1919.83	70.62	1925.31	70.73
1938.67	70.69	1947.25	70.76	1952.74	70.87	1965.54	70.85	1972.85	70.92
1976.51	70.88	1998.45	70.99	2007.59	71.09	2018.08	71.11	2029.54	71.27
2033.19	71.38	2044.17	71.45	2053.31	71.65	2058.8	71.86	2067.93	72.06
2082.56	72.6	2086.22	72.64	2089.88	72.79	2097.5	73	2102.68	73.06
2113.39	73.27	2124.62	73.29	2128.28	73.37	2135.59	73.4	2139.25	73.47
2148.39	73.43	2153.88	73.5	2161.19	73.43	2166.68	73.51	2181.31	73.64
2186.79	73.81	2199.59	73.93	2203.25	74.05	2214.22	74.28	2221.53	74.38
2228.85	74.64	2232.51	74.62	2240.44	74.8	2258.1	74.83	2265.42	74.95
2269.07	74.76	2276.39	74.69	2280.05	74.53	2288.07	74.38	2294.68	74.19
2307.47	73.65	2312.96	73.49	2316.62	73.46	2325.76	73.18	2331.25	73.07
2340.39	72.7	2364.16	72.21	2373.3	71.94	2383.35	71.75	2389.76	71.56
2400.73	71.47	2404.39	71.38	2422.67	71.24	2428.16	71.34	2431.81	71.25
2440.94	71.28	2444.59	71.43	2450.05	71.38	2462.8	71.64	2471.01	71.35
2477.16	70.67	2481.26	70.39	2486.91	70.23	2494.96	69.62	2499.35	68.74
2503	68.35	2507.94	67.51	2512.04	67.01	2518.2	65.85	2519.07	65.61
2527.12	64.64	2529.57	64.11	2534.61	63.73	2542.81	63.44	2546.92	63.22
2553.08	62.6	2557.18	62.48	2561.28	62.64	2563.33	62.61	2567.44	62.01
2569.49	61.36	2573.59	59.06	2575.65	58.3	2579.75	57.06	2585.9	55.7
2587.96	55.45	2590.01	55.4	2596.29	54.9	2602.57	53.4	2608.85	53.1
2615.13	53	2618.97	52.84	2627.69	52.49	2637.69	52.49	2647.69	52.72
2657.69	53.04	2667.69	53.57	2677.68	53.69	2687.7	53.94	2697.68	53.4
2709.25	53.71	2717.7	53.85	2727.7	54.19	2737.68	54.74	2744.05	56.66
2747.32	56.91	2750.6	57.52	2757.16	59.05	2763.71	60.49	2766.99	61.14
2770.27	61.35	2780.27	60.7	2783.38	61.02	2786.81	61.53	2796.49	61.37
2798.77	61.22	2809.6	60.5	2812.89	60.75	2816.17	61.26	2819.5	62.06
2826	64.31	2832.56	66.21	2835.84	67.3	2842.39	69.29	2845.67	70.59
2849.12	71.4	2856.02	72.5	2859.46	72.72	2862.92	73.23	2864.64	73.33
2868.09	73.32	2873.26	72.95	2876.71	73.02	2881.88	72.98	2887.06	73.06
2899.13	73.44	2904.3	73.5	2916.37	73.81	2926.72	74.15	2928.44	74.25
2940.51	74.55	2949.14	74.84	2952.58	74.9	2964.66	75.22	2973.28	75.48
2976.72	75.53	2997.42	76.1	3018.11	76.6	3035.36	76.9	3047.43	77.24
3066.4	77.81	3069.84	78.02	3075.02	78.6	3078.47	79.25	3081.92	80.04
3087.09	81.12	3088.81	81.27	3102.61	81.71	3107.78	81.78	3111.25	81.52
3114.73	80.48	3118.21	78.7	3119.96	77.95	3121.7	77.48	3125.18	76.92
3132.15	76.75	3135.64	76.72	3139.12	76.35	3144.35	76.12	3153.06	75.9
3163.51	75.47	3167	75.45	3182.67	74.87	3184.42	74.72	3191.39	74.83
3194.87	74.7	3203.58	74.17	3205.32	73.84	3208.81	72.44	3210.56	72.16
3217.52	71.55	3221.01	71.57	3222.75	71.87	3224.49	72.4	3226.23	73.16
3227.97	73.69	3233.2	74.47	3238.43	75.85	3240.17	75.94	3241.91	75.73
3245.4	75.55	3250.62	75.4	3255.85	75.09	3261.08	74.46	3269.79	73.79

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.164	2462.8	.066	2569.49	.025	2757.16	.066	2845.67	.073

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

2462.8	2845.67		1776.6	1865.74	1849.12	.1	.3

Left Levee Station= 32.795 Elevation= 81.035
Right Levee Station=3107.865 Elevation= 81.8
Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	2462.8	71.64

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.38

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.82	6.56	71.85	13.12	72.04	16.4	72.49	26.24	74.7
42.64	79.25	49.19	80.49	52.47	80.78	59.03	80.98	72.15	80.85
75.43	77.77	78.71	72.21	81.99	70.54	95.11	70.12	104.95	69.7
121.35	68.39	124.63	68.48	134.47	70.25	144.3	72.69	147.58	73.22
173.82	73.45	190.22	73.11	203.34	73.16	226.3	72.96	232.86	73.03
249.25	73.03	262.37	73.1	301.73	73.15	311.57	73.04	324.69	73.13
331.24	73.01	350.92	73.06	354.2	73.16	370.6	73.11	377.16	73.16
387	73.04	400.12	73.29	406.68	73.1	423.07	73.03	426.35	73.11
442.75	73.16	491.95	73.13	508.35	73.26	521.46	73.29	550.98	73.2
557.54	73.39	564.1	73.31	596.9	73.39	606.74	73.26	619.85	73.23
629.69	73.33	642.81	73.25	649.37	73.3	659.21	73.18	669.05	73.33
678.89	73.26	682.17	73.35	695.29	73.28	714.96	73.31	721.52	73.39
734.64	73.3	737.92	73.44	757.6	73.35	774	73.44	787.12	73.33
806.79	73.42	816.63	73.37	823.19	73.44	836.31	73.37	846.15	73.48
852.71	73.37	865.83	73.4	872.39	73.58	888.79	73.43	901.91	73.52
908.46	73.46	934.7	73.47	937.98	73.41	964.22	73.49	983.9	73.44
993.74	73.6	1013.41	73.52	1019.97	73.59	1029.81	73.48	1052.77	73.69
1072.45	73.54	1095.4	73.7	1105.24	73.56	1115.08	73.71	1124.92	73.74
1131.48	73.62	1138.04	73.72	1147.88	73.67	1154.44	73.83	1161	73.67
1170.84	73.76	1193.79	73.69	1206.91	73.88	1213.47	73.73	1223.31	73.88
1236.43	73.75	1252.83	73.77	1262.67	73.61	1272.5	73.66	1288.9	74
1292.18	74.34	1305.3	75.06	1311.86	75.84	1321.7	76.11	1324.98	76.01
1328.26	75.4	1334.82	72.23	1338.1	71.54	1341.38	71.26	1351.21	70.79
1361.05	70.5	1367.61	70.17	1380.73	70.61	1387.29	70.97	1403.69	70.88
1413.53	71.07	1426.65	70.88	1436.48	70.93	1449.6	71.12	1456.16	70.99
1475.84	71.02	1479.12	70.95	1485.68	71.12	1495.52	71.06	1502.08	71.21
1511.92	71.09	1518.48	71.19	1531.59	71.07	1557.83	71.2	1561.11	71.31
1570.95	71.18	1577.51	71.28	1587.35	71.14	1600.47	71.14	1610.3	71.22
1623.42	71.18	1629.98	71.3	1639.82	71.06	1646.38	71.11	1672.62	71.12
1679.18	71.29	1689.02	71.19	1715.25	71.07	1741.49	71.39	1757.89	71.14
1771.01	71.26	1777.57	71.19	1797.24	71.3	1800.52	71.4	1813.64	71.27
1833.32	71.27	1849.72	71.45	1872.67	71.26	1879.23	71.28	1892.35	71.5
1902.19	71.54	1908.75	71.41	1925.15	71.44	1951.39	71.52	1977.62	71.44
1994.02	71.5	2013.7	71.66	2026.82	71.52	2066.17	71.61	2076.01	71.59
2102.25	71.72	2108.81	71.63	2115.37	71.87	2121.93	71.63	2138.33	71.61

2144.89	71.73	2154.72	71.59	2174.4	71.74	2184.24	71.68	2194.08	71.76
2203.92	71.71	2213.76	71.81	2236.72	71.71	2249.84	71.7	2256.4	71.89
2266.23	71.76	2289.19	71.77	2292.47	71.85	2315.43	71.78	2328.55	71.85
2335.11	71.75	2338.39	71.86	2358.07	71.79	2364.63	71.88	2377.74	71.82
2384.3	71.95	2394.14	71.85	2403.98	71.94	2417.1	71.91	2433.5	71.96
2440.06	71.85	2456.46	72.02	2463.02	71.9	2482.69	71.98	2495.81	71.92
2522.05	71.98	2525.33	71.93	2538.45	72.05	2548.29	71.95	2558.13	72.1
2571.25	71.98	2577.81	72.17	2584.37	72.07	2607.32	72.09	2613.88	72.15
2623.72	72.01	2636.84	72.2	2643.4	72.06	2663.08	72.05	2672.92	72.15
2679.48	72.33	2695.88	72.1	2702.44	72.27	2712.27	72.11	2718.83	72.18
2725.39	72.08	2731.95	72.19	2745.07	72.16	2758.19	72.24	2768.03	72.2
2774.59	72.37	2781.15	72.24	2794.27	72.32	2800.83	72.15	2807.39	72.29
2820.5	72.2	2827.06	72.44	2840.18	72.26	2853.3	72.26	2859.86	72.38
2872.98	72.27	2882.82	72.41	2889.38	72.34	2895.94	72.58	2909.06	72.36
2922.18	72.36	2935.29	72.6	2941.85	72.33	2958.25	72.38	2961.53	72.29
2977.93	72.41	2984.49	72.31	2997.61	72.51	3004.17	72.29	3014.01	72.43
3023.85	72.36	3030.41	72.49	3040.24	72.49	3046.8	72.36	3063.2	72.54
3069.76	72.44	3105.84	72.61	3115.68	72.47	3128.8	72.58	3141.92	72.48
3148.47	72.54	3155.03	72.43	3161.59	72.54	3184.55	72.53	3194.39	72.6
3227.19	72.66	3240.31	72.61	3266.54	72.77	3273.1	72.69	3282.94	72.74
3289.5	72.65	3309.18	72.72	3315.74	72.66	3335.42	72.8	3341.98	72.92
3348.54	72.78	3368.21	72.68	3374.77	72.87	3384.61	72.93	3391.17	72.8
3401.01	72.85	3414.13	72.81	3420.69	73.02	3430.53	72.8	3443.65	72.8
3453.49	72.97	3476.44	72.82	3492.84	72.87	3502.68	73.03	3505.96	72.95
3525.64	72.91	3538.76	73.01	3545.32	72.92	3558.44	72.98	3584.68	72.97
3601.07	73.05	3617.47	72.95	3640.43	73.03	3646.99	73.18	3666.67	72.99
3673.23	73.1	3683.07	73.02	3692.91	73.13	3709.3	73	3735.54	73.22
3742.1	73.12	3748.66	73.21	3765.06	73.23	3771.62	73.13	3781.46	73.18
3797.86	73.06	3810.97	73.08	3817.53	73.21	3830.65	73.26	3837.21	73.4
3853.61	73.29	3863.45	73.4	3876.57	73.21	3886.41	73.3	3912.65	73.3
3922.48	73.5	3932.32	73.48	3945.44	73.3	3952	73.39	3971.68	73.41
3984.8	73.31	3997.92	73.61	4004.48	73.5	4017.6	73.71	4024.16	73.68
4050.39	73.73	4063.51	74.05	4070.07	73.72	4076.63	73.62	4083.19	73.78
4089.75	73.62	4115.99	73.68	4138.94	73.39	4148.78	73.41	4155.34	73.57
4171.74	73.55	4181.58	73.62	4197.98	73.38	4211.1	73.52	4240.62	73.56
4257.01	73.43	4263.57	73.51	4279.97	73.49	4286.53	73.35	4306.21	73.55
4312.77	73.44	4322.61	73.5	4345.57	73.47	4355.41	73.74	4361.96	73.56
4378.34	73.43	4384.87	73.64	4394.67	73.47	4417.54	73.84	4430.61	73.47
4440.41	72.48	4446.94	71.96	4453.48	71.66	4463.28	71.02	4476.35	69.94
4479.61	70	4489.42	70.87	4495.95	71.78	4505.75	72	4522.08	70.71
4531.89	70.45	4544.95	70.73	4551.49	70.72	4561.29	70.14	4567.82	70.28
4574.36	70.98	4577.62	71.09	4580.89	70.85	4584.16	70.26	4587.42	69.15
4593.96	64.92	4597.23	63.59	4603.76	61.38	4613.56	58.76	4616.83	58.3
4620.1	58.24	4630.1	57.34	4640.1	54.44	4650.1	54.04	4660.1	54.04
4680.1	53.44	4690.1	53.44	4710.1	53.74	4730.1	53.84	4740.1	54.04
4750.1	53.84	4760.1	54.24	4770.1	54.14	4780.1	54.54	4790.1	54.54
4800.1	55.14	4820.1	58.04	4832.7	58.26	4839.24	60.47	4845.78	59.88
4852.32	59.68	4862.13	59.88	4871.94	61.18	4875.22	61.9	4881.76	64.28
4885.03	65.63	4898.11	72.47	4911.19	78.71	4914.46	80.38	4921	82.68
4924.28	83.42	4927.55	83.1	4934.09	81.14	4940.63	77.7	4943.9	76.24
4947.17	75.36	4953.71	74.36	4966.79	74.25	4973.34	74.31	4979.88	73.76
4989.69	73.59	5006.04	73.63	5025.67	73.35	5032.21	73.5	5061.64	73.22
5064.92	73.03	5071.46	73.24	5078	73.62	5084.54	73.52	5100.89	72.88
5104.16	72.29	5107.43	70.79	5110.7	69.66	5113.98	69.19	5127.06	68.28
5133.6	68.42	5136.87	69.06	5140.14	70.18	5143.41	71.75	5146.68	72.87
5156.49	74.58	5166.31	77.5	5169.58	77.72	5172.85	77.35	5179.39	77.06
5189.2	76.82	5199.01	76.24	5208.83	75.04	5218.64	74.23	5225.18	73.8

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.164	4417.54	.066	4574.36	.025	4839.24	.066	4898.11	.073

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4417.54 4898.11 821.82 1653.32 845.1 .1 .3

Left Levee Station= 59.03 Elevation= 80.98
Right Levee Station= 4924.28 Elevation= 83.42
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
52.34	1320.73	76.11	1320.73	4417.79	73.81	4928.9	5166.32	77.54

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	77.07	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.08	Wt. n-Val.	0.164	0.046	0.073	
W.S. Elev (ft)	76.98	Reach Len. (ft)	821.82	1653.32	845.10	
Crit W.S. (ft)	61.37	Flow Area (sq ft)	10888.18	7142.87	21.34	
E.G. Slope (ft/ft)	0.000162	Area (sq ft)	10888.18	7142.87	21.34	
Q Total (cfs)	20000.00	Flow (cfs)	2315.89	17675.24	8.87	
Top Width (ft)	4831.67	Top Width (ft)	4341.65	480.57	9.46	
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)	0.21	2.47	0.42	
Max Chl Dpth (ft)	23.54	Hydr. Depth (ft)	2.51	14.86	2.26	
Conv. Total (cfs)	1572375.0	Conv. (cfs)	182072.3	1389605.0	697.7	
Length Wtd. (ft)	1573.75	Wetted Per. (ft)	4342.60	487.08	10.48	
Min Ch El (ft)	53.44	Shear (lb/sq ft)	0.03	0.15	0.02	
Alpha	4.41	Stream Power (lb/ft s)	0.01	0.37	0.01	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	9508.52	6643.88	2400.69	
C & E Loss (ft)	0.00	Cum SA (acres)	2530.13	367.39	805.96	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 120.07*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.51	10.5	73.69	13.12	74.05	20.99	75.82	34.11	79.46
39.35	80.45	47.22	80.84	58.25	80.64	61	78.14	63.76	73.54
66.51	72.05	74.65	71.34	85.81	70.01	88.36	69.61	99.58	68.74
102.34	68.81	110.61	70.22	118.87	72.17	121.62	72.6	143.67	72.78
157.45	72.51	168.47	72.55	187.76	72.35	193.27	72.39	218.07	72.36
251.14	72.28	259.41	72.2	270.43	72.3	275.93	72.22	292.47	72.37
295.22	72.48	314.51	72.65	322.78	72.62	333.8	72.92	339.32	72.8
353.09	72.78	369.62	72.89	410.96	72.87	435.75	72.97	460.56	72.84

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  466.07   72.98  471.58    72.9  499.14   72.93  518.42   72.78  526.69   72.85
  543.22   72.84  551.49   72.76  559.76   72.87   581.8   72.81  603.84   72.88
  614.87    72.8  617.62   72.91  634.16   72.84  647.94   72.91  658.96   72.81
  689.26   72.87  700.29   72.81  708.56    72.9  714.07   72.81  725.09   72.83
   730.6   72.97  744.38   72.85  782.95   72.86  785.71   72.81  807.76   72.87
  824.29   72.83  832.56   72.96  862.87   72.85  882.16   73.01  898.69   72.88
  917.97      73  926.24   72.89  942.78   73.03  948.29   72.93   953.8   73.01
  962.07   72.96  967.58   73.09  973.09   72.96  981.36   73.03 1000.64   72.97
 1011.66   73.13 1017.17      73 1025.44   73.12 1036.47   73.02 1050.24   73.03
 1058.51    72.9 1066.77   72.94 1080.55   73.21 1083.31   73.48 1094.33   74.05
 1099.84   74.67 1108.11   74.89 1110.86    74.8 1113.62   74.32 1119.13   71.78
 1121.89   71.22  1132.9   70.62 1146.68   70.13 1157.71   70.48 1163.22   70.77
    1177   70.71  1185.6   70.86 1196.29    70.7 1215.57   70.88 1221.08   70.78
 1237.62   70.81 1245.88   70.89 1254.17   70.85 1259.66   70.97 1267.93   70.87
 1273.44   70.95 1284.46   70.85  1306.5   70.94 1309.26   71.02 1317.53   70.91
 1323.04   70.98 1331.31   70.87 1350.59   70.93 1361.61    70.9 1367.12   70.99
 1375.39    70.8 1402.95   70.85 1408.46   70.98 1438.77    70.8 1460.81   71.06
 1474.59   70.86 1485.62   70.96 1491.13   70.91 1507.65      71 1510.41   71.09
 1521.43   70.98 1537.97   70.96 1551.75   71.11 1571.03   70.98 1587.56   71.19
 1595.83   71.23 1601.34   71.13 1637.17    71.3 1659.21   71.32 1689.52   71.66
 1700.54   71.57 1733.61   71.65 1741.87   71.64 1763.92   71.75 1769.43   71.67
 1774.94   71.86 1780.46   71.67 1794.23   71.65 1799.75   71.75 1808.01   71.63
 1824.54   71.75 1832.81    71.7 1849.34   71.73 1857.61   71.81 1887.92   71.72
 1893.44   71.88  1901.7   71.77 1920.99   71.77 1923.74   71.83 1943.03   71.77
 1962.32   71.85 1978.86    71.8 1984.37   71.88 1995.38   71.84  2000.9   71.94
 2009.16   71.86 2017.43   71.93 2042.23   71.93 2047.75   71.84 2061.52   71.97
 2067.04   71.87 2083.56   71.95 2094.59   71.91 2130.41      72 2138.68   71.92
 2146.95   72.04 2157.97   71.94 2163.48   72.09 2168.99   72.01 2186.81   72.01
 2193.79   72.07 2202.06   71.97 2213.08   72.13 2218.59   72.02 2235.13   72.01
  2248.9   72.24 2262.68   72.05  2268.2   72.19 2276.45   72.06 2287.48   72.04
 2292.99   72.13  2323.3   72.12 2328.82   72.26 2334.33   72.16 2345.35   72.22
 2350.86   72.09 2356.37    72.2 2367.39   72.13  2372.9   72.32 2383.92   72.18
 2394.95   72.18 2400.46   72.28 2411.48   72.19 2419.75   72.31 2425.26   72.25
 2430.77   72.45  2441.8   72.26 2452.82   72.25 2463.83   72.44 2469.35   72.23
 2483.12   72.28 2485.88   72.21 2499.66   72.31 2505.17   72.23 2516.19    72.4
 2521.71   72.23 2529.97   72.35 2538.24   72.29 2552.01    72.4 2557.52   72.29
  2571.3   72.44 2576.81   72.36 2607.13   72.49  2615.4   72.38 2626.42   72.47
 2648.46   72.35 2653.97   72.44 2673.26   72.42 2681.53   72.47    2708    72.5
 2720.11   72.47 2742.15   72.61 2761.44   72.52 2776.57   72.58 2783.48   72.53
 2800.02   72.62 2805.53   72.72 2811.04   72.61 2827.57   72.54 2833.08    72.7
 2841.35   72.75 2846.86   72.64 2866.15   72.65 2871.66   72.81 2879.93   72.64
 2890.95   72.64 2899.22   72.78  2918.5   72.66 2932.28   72.71 2940.55   72.84
 2943.31   72.77 2959.84   72.75 2970.86   72.83 2976.38   72.76 3009.45    72.8
 3023.22   72.86    3037   72.78 3056.29   72.84  3061.8   72.96 3078.31   72.81
 3083.84    72.9 3092.11   72.83 3100.38   72.91 3114.15   72.81  3136.2   72.99
    3161   73.01 3166.51   72.92 3174.78   72.96 3188.56   72.85 3199.57   72.87
 3205.08   72.98 3216.11   73.02 3221.62   73.13  3235.4   73.05 3243.67   73.14
 3254.69   72.99 3262.96   73.06    3285   73.06 3293.26   73.21 3301.53    73.2
 3312.55   73.05 3318.07   73.12  3334.6   73.14 3345.62   73.06 3356.65    73.3
 3362.16   73.22 3373.18   73.39 3400.73    73.4 3411.75   73.66 3417.27   73.39
 3422.78   73.31 3428.29   73.44  3433.8   73.31 3455.85   73.35 3475.13   73.12
  3483.4   73.14 3488.91   73.27 3510.96   73.32 3524.74   73.14 3535.76   73.25
 3560.56   73.27 3574.33   73.16 3593.62   73.22 3599.13   73.11 3615.67   73.27
 3621.18   73.18 3629.45   73.23 3648.74   73.19 3657.01   73.41 3662.51   73.27
 3676.27   73.19 3681.76   73.36 3689.99   73.24 3709.21   73.65 3720.56   73.29
3731.3672.18997 3740.42   71.54 3750.84    70.6 3760.28   69.36 3763.11   69.22
 3771.63   69.34  3777.3    69.7 3785.81   69.41 3792.51   67.93 3799.99   67.32
 3808.51   67.03 3819.85   67.16 3825.53    67.1 3834.04   66.42 3839.71   66.39
 3848.22   66.94  3853.9   66.27 3856.73   65.37 3862.41   61.98 3865.25   60.91
 3870.92   59.14 3879.43   57.05  3893.8   55.89 3902.48   53.55 3903.0253.53011
 3911.17   53.23 3914.7253.22591 3919.85   53.22 3937.22   52.73  3950.5    52.8
 3970.97   53.32 3976.38   53.37 3989.05   53.69 3994.81   54.67 4000.01   55.29
  4005.2   55.68  4015.6   55.59 4022.52   55.27 4034.66   56.01 4038.12   55.94
 4041.58   55.56 4048.51   55.48 4053.71   56.01 4065.84   56.39 4086.86    57.3
 4103.95   59.33 4107.42   59.64 4112.61   59.75 4116.08   59.63 4121.28   60.21
 4128.83   60.52 4137.25   62.19 4145.67   61.67 4151.3361.57626  4154.1   61.56
 4166.73   61.95 4179.36   63.18 4183.58   63.78 4190.55   65.36 4196.21   66.89
 4213.06   72.65 4219.78   72.67 4229.86   72.87 4237.93   72.51 4246.66   72.71
  4255.4    72.5 4271.53   73.11  4284.3   72.73  4308.5   73.03 4315.22    73.3
 4321.27   73.89  4332.7   73.97 4345.47    74.2  4349.5   74.19 4384.2374.70435
 4437.55   75.24 4462.42   75.55 4486.62   75.81 4494.68   75.95 4550.47   76.48
 4573.99   76.77 4625.08   77.25 4634.49   77.38 4640.53   77.35 4660.03   77.53
 4686.24   77.83 4721.19   78.41 4744.04   78.72 4787.06   79.02 4838.81   79.21
 4848.22   79.36 4855.62   79.34  4882.5    79.5  4894.6   79.41 4918.12    79.6
 4940.98   79.98 4955.76   80.27 4970.55   80.34 4980.63   80.54 4984.66   80.51
 5008.19   80.87 5010.87   81.52 5018.27   80.93 5035.07   81.17 5052.55   81.18
 5055.23    80.2 5059.27   80.29 5061.96   81.24 5065.32   81.89 5071.37   82.02
    5074   81.76 5079.28   80.19 5084.55   77.43 5087.19   76.26 5089.83   75.55
  5095.1   74.74 5105.65   74.64 5110.93   74.68 5116.21   74.23 5124.12   74.09
 5137.31    74.1 5153.14   73.86 5158.42   73.96 5182.15   73.67  5184.8   73.51
 5195.35   73.95 5200.62   73.86 5213.81   73.31 5216.45   72.83 5221.72   70.71
 5224.37   70.33 5234.92   69.57 5240.19   69.67 5242.83   70.17 5245.46   71.06
  5248.1   72.31 5250.74    73.2 5258.65   74.54 5266.57   76.86 5269.21   77.03
 5271.85   76.72 5285.03   76.26 5292.94   75.78 5300.87   74.79 5314.05   73.76

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .164 3709.21    .066 3862.41    .025 4137.25    .066 4213.06    .073

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3709.21 4213.06           821.82 1653.32   845.1             .1       .3
Left Levee      Station=  47.224      Elevation=  80.842
Right Levee     Station=5071.366      Elevation=   82.02
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   41.31  1104.5   74.71 1104.99  3707.4   73.58

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 119.75*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.21    7.87   75.34    9.84   75.61   15.74   76.94   25.58   79.67
   29.51   80.41   35.42    80.7   44.34   80.42   46.58   78.52   48.81   74.87
   51.04   73.55   57.63   72.44   68.73   69.75   77.82   69.08   80.05   69.13
   86.75   70.19   93.43   71.66   95.67   71.97  113.52   72.11  124.68    71.9
  135.36   71.92  149.23   71.73  153.69   71.75  207.24   71.36  216.17   71.47
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  224.24   71.45  236.25    71.8  251.87   72.14  258.56   72.21  267.49   72.55
  271.95   72.49  296.49   72.62  341.13   72.66   357.5   72.61  370.13   72.48
  401.38   72.47  416.99   72.34  437.08   72.39  443.77   72.33  450.47   72.42
  468.32   72.34  497.32   72.38  510.71   72.33  521.87   72.38   530.8   72.29
  570.96   72.32  584.35   72.26  588.81   72.36  599.97   72.26  631.21   72.24
  633.44    72.2  671.38   72.31  695.92   72.22  711.54   72.33  724.93   72.23
  740.55   72.31  747.24   72.22  760.63   72.31   765.1   72.24  791.88   72.31
  807.49   72.26  816.42   72.37  820.88   72.28  827.57   72.37   836.5   72.29
  861.04   72.22   872.2   72.42  883.36   73.04  887.82   73.51  894.52   73.66
  898.98   73.23  903.44   71.32  905.68   70.91   914.6   70.45  925.75   70.09
  939.14   70.58   950.3   70.53  957.27   70.65  965.92   70.53  981.54   70.65
     986   70.56  999.39   70.59 1017.25   70.73 1037.32   70.63 1068.57   70.68
 1075.26   70.59 1104.27   70.69 1110.96   70.54 1133.28   70.57 1137.74   70.67
 1162.28   70.54 1180.14   70.73 1191.29   70.58 1204.68   70.62  1220.3   70.77
 1242.62   70.65 1253.77   70.77 1269.39    70.7 1282.78   70.88 1301.56   70.89
 1322.95   71.07 1334.88   71.11 1365.34   71.67 1374.27   71.61 1425.59   71.77
 1434.52   71.86 1438.98   71.71 1461.29   71.68 1474.68   71.76 1481.38   71.72
 1501.46   71.81 1526.01   71.75 1530.47   71.86 1537.16   71.78 1555.01   71.82
 1570.64   71.76 1586.26   71.84 1599.65   71.82 1617.49   71.93 1650.97    71.9
 1655.43   71.83 1666.59   71.92 1671.05   71.85 1684.44   71.92 1693.36   71.89
 1722.37   71.95 1729.07   71.89 1735.76   71.97 1744.69   71.89 1753.62   71.94
 1780.39   71.92 1789.32   72.05 1793.78   71.97 1807.17   71.97 1818.33   72.14
 1829.49   72.01 1833.95   72.11 1849.57      72 1854.03   72.07 1878.58   72.04
 1896.43   72.12 1914.28   72.06 1918.74   72.21 1927.67    72.1 1941.06   72.18
 1949.98   72.12 1961.14   72.16  1965.6   72.31 1974.53   72.17 1983.46   72.15
 1992.38   72.28 1996.84   72.13 2010.23   72.12 2021.39   72.21 2025.85   72.16
 2034.78   72.29 2039.24   72.17 2063.78    72.3 2068.25   72.22 2079.41   72.33
 2083.87   72.27 2108.42   72.38 2115.11   72.29 2124.04   72.36 2141.89   72.27
 2146.35   72.34 2199.91   72.33 2217.75   72.45 2233.38   72.39 2251.23   72.39
 2269.08   72.51 2286.93   72.41 2291.39   72.53 2318.17   72.48 2322.64    72.6
 2329.33   72.48 2338.26   72.48 2344.95   72.59 2360.57   72.51 2380.65    72.6
 2394.04   72.58 2402.97   72.65 2434.21   72.62 2445.36   72.67 2456.52   72.61
 2472.14   72.66 2476.61   72.75 2489.98   72.63 2507.85   72.69    2519   72.61
 2536.85   72.76 2541.32   72.71 2556.94   72.79 2579.26   72.64 2588.18   72.66
 2606.03   72.87 2617.19   72.81 2623.88   72.88 2632.81   72.77  2639.5   72.82
 2657.36   72.81 2664.05   72.93 2679.67    72.8 2697.52   72.87 2706.45   72.81
 2715.37   72.99 2719.84   72.93 2728.76   73.06 2751.07   73.08    2760   73.27
 2768.93      73 2795.71   73.02 2811.32   72.86 2822.48   72.98 2840.33   73.03
 2851.49    72.9 2860.42   72.98  2880.5   72.97 2891.65   72.88 2907.28   72.94
 2911.74   72.86 2925.13      73 2929.59   72.93 2951.91   72.92  2958.6   73.08
  2974.2   72.94 2978.65   73.08 2985.32      73 3000.88   73.46 3010.51    73.1
3024.0571.68469 3029.14   71.24  3036.2   70.36 3046.61   68.44 3053.84   67.82
 3058.65   67.62 3065.87   66.81 3071.55   64.47  3077.9   63.93 3085.13   63.62
 3099.57   63.47 3106.79    62.7 3111.61    62.5 3118.83   62.79 3123.65   62.27
 3126.05    61.6 3130.87   59.04 3138.09   56.91 3145.31   55.34 3157.49   54.43
 3164.86   52.66 3172.23   52.41  3179.6    52.4 3194.34   52.02 3203.6452.06086
3215.8952.45766  3230.7   52.88 3238.46   52.98 3246.21   53.31 3250.09   53.32
 3253.96   53.57    3261   55.52 3263.12   55.57 3267.36   56.68  3271.6    57.3
  3282.2   57.35 3286.43   57.22 3290.67   56.77 3294.91   56.69 3303.39   57.24
 3309.75   57.81 3313.99   57.67 3318.23   56.93 3322.47   56.66 3326.71   56.81
 3333.06    57.7 3341.54   57.94  3347.9   58.24 3360.62   59.12 3371.21   59.31
 3386.05   60.65 3394.53   61.59 3400.88   61.77 3407.25   61.21 3409.37   61.17
 3415.72   62.27 3422.08   62.83 3424.97   62.79 3435.27   63.91 3445.57   63.46
 3455.87   63.44 3463.4363.73187 3471.32   64.02 3477.17   64.42 3491.95   65.66
 3500.47   66.85  3507.4   68.14    3528   72.83 3534.62   72.74 3538.59   72.92
 3541.24   72.78  3561.1   73.03 3576.98   72.18 3582.28   72.32 3587.58   72.23
 3594.19   72.47  3611.4   71.91 3631.26   72.42 3637.88   72.78 3643.17    72.9
 3651.11   72.52 3663.03   72.19 3668.33   71.96 3678.92   72.04 3690.83   72.03
 3702.74   72.17 3708.04    72.1 3715.98    72.2 3729.22   72.65 3741.13   73.74
 3746.43   73.67 3751.72   73.79 3763.63   73.73 3791.44   74.09 3796.73   73.93
 3807.32   74.04 3812.62   74.19  3819.574.13801  3861.6   74.46  3878.8   74.46
 3903.96   74.53 3923.81   74.68 3929.11   74.62 3959.55   74.72 3975.44   74.83
 4008.54   74.94 4019.13   75.01 4029.72   74.99 4037.66   75.06 4066.78   75.17
 4082.67   75.33 4107.82   75.37 4113.11   75.48 4130.32   75.45 4150.18   75.58
 4158.12   75.52 4168.71   75.58 4192.54   75.59 4219.02   75.69 4238.87   75.82
 4275.94   75.86 4302.42   75.96 4306.39    75.9 4315.65      76 4328.89      76
 4358.02   76.15 4369.93   76.01 4380.52   76.07 4408.32   76.07 4418.91   76.15
 4453.33   76.23 4466.56   76.36  4485.1   76.46  4502.3   76.66 4516.87   76.73
 4523.48   76.84 4538.05   76.86 4549.96   77.01 4573.79   77.15 4605.56   77.17
 4612.18   77.11 4636.01   77.22 4643.95    77.1 4658.51   77.25 4692.93   77.27
 4707.49   77.18 4760.44   77.08 4778.97   77.28 4793.53   77.17  4797.5    77.3
 4806.77   77.32 4810.74   77.15 4826.62   77.24 4839.86   77.13 4846.48    77.2
 4850.45   77.06 4865.01   77.01 4870.31   76.87 4874.28      77 4879.57   76.87
 4884.87   77.02 4890.16   76.89 4900.75   76.93 4911.34   77.12 4916.64   77.01
 4927.23   77.17 4929.88   77.11 4939.14   77.34 4952.38    77.4 4961.65   77.52
 4966.94   77.74 4976.21   77.73  4981.5   77.91 4988.12   77.83 4990.77   77.95
 5001.36   77.85 5014.59   78.07 5019.89   77.95 5033.13   78.08 5039.74   78.29
 5047.69   78.19  5059.6    78.3 5067.55   78.47 5083.43   78.54 5094.02   78.75
 5099.31   80.03 5101.96   79.36 5105.93    79.5 5113.88    78.8 5121.82   79.11
 5127.11   79.01  5137.7   79.03 5146.97   79.18 5158.88   79.16 5164.18   79.03
 5181.39   79.08 5186.68   77.08 5190.65   76.81 5194.62   77.25 5199.92   79.12
 5206.54    80.4  5215.8    80.5 5220.46   80.42 5224.47   79.23 5230.48   76.27
 5236.49   75.12 5248.53   75.05 5252.54   74.71 5258.55   74.58 5268.58   74.57
 5280.61   74.36 5284.62   74.42 5302.66   74.12 5304.67   73.99 5312.69   74.29
  5316.7    74.2 5326.73   73.74 5328.73   73.37 5332.74   71.76 5334.75   71.47
 5342.77   70.86 5346.78   70.91 5348.78   71.28  5354.8   73.53 5360.81   74.51
 5366.83   76.21 5380.87    75.7 5386.88   75.31  5392.9   74.55 5402.92   73.73

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .164 3000.88    .066 3138.09    .025 3267.36    .066    3528    .073

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3000.88    3528           821.82 1653.32   845.1            .1       .3
Left Levee      Station=   35.42      Elevation=    80.7
Right Levee     Station=  5215.8      Elevation=    80.5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0 3000.88   73.46

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 119.44*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    76.9    5.25   76.99    10.5   78.05   17.06   79.87   19.68   80.37
   23.61   80.57   30.44   80.21   32.15   78.89   33.86    76.2   35.56   75.06
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   40.61   73.55    49.1    69.9   56.05   69.43   57.76   69.46   62.88   70.16
   69.71   71.35   83.37   71.44   91.91    71.3  100.08   71.31  129.47   70.88
  149.96   70.53  168.08   70.67  201.17   72.18  223.37   72.35  244.55   72.39
  270.04   72.28  287.04   72.06  303.61   72.01  315.56   71.89  341.17   71.96
  354.83   71.87  387.27   71.82  395.81   71.85     418   71.71  447.03   71.75
  490.98   71.58   510.2   71.67  528.98   71.59  540.93   71.65  551.17   71.57
  563.12   71.61  568.24   71.54  578.49    71.6  590.44   71.55  593.86   71.62
  614.34   71.54  621.17   71.62  655.31    71.5  663.85   71.63  672.39   72.04
   675.8   72.34  680.93   72.44  684.34   72.15  687.76   70.87  689.46   70.59
  696.29   70.28  704.83   70.05  715.07   70.38  728.73   70.45  735.56   70.35
  747.51   70.41  762.88   70.36  774.83   70.49  790.19   70.41  803.85   70.41
  819.22   70.32  841.41   70.38  846.53   70.28  863.61    70.3  867.02   70.37
   885.8   70.27  899.46    70.4   907.4    70.3  930.19   70.46  947.26   70.35
   955.8   70.44  967.75   70.42  983.12   70.62  992.37   70.62 1017.86   70.93
 1034.85   71.54 1047.99   71.66  1073.6   71.73 1094.09   71.85 1097.51   71.75
 1114.58   71.72 1145.31   71.81 1196.31   71.75 1220.44   71.83 1234.09   71.92
 1275.07   71.82 1285.31   71.89 1324.58   71.91 1331.41   71.85 1358.73   71.88
 1365.56   71.98 1379.22   71.93 1387.75   72.05 1434.25   71.97 1447.51   72.03
 1461.16   71.99 1497.02   72.08 1500.44   72.18  1514.1   72.04 1546.53   72.08
 1575.56   72.21 1578.97   72.15 1609.71   72.26 1635.31    72.2 1638.73   72.24
 1679.71   72.19 1693.36   72.28 1746.29   72.27  1749.7   72.36 1778.73   72.31
 1790.68    72.4 1802.63   72.35    1818   72.42 1876.05   72.44 1891.41   72.53
 1901.64   72.46 1923.85   72.42 1937.51   72.53 1952.88   72.56 1969.62   72.44
 1990.44    72.6  2004.1   72.62 2010.93   72.55 2029.71   72.57 2034.83   72.64
 2046.78   72.55 2067.27   72.56  2074.1   72.69 2101.42   72.75 2108.24   72.87
 2115.07   72.69 2135.56   72.69 2147.51   72.59 2169.71   72.73 2185.08   72.71
 2207.58   72.61 2233.07   72.72 2255.08   72.64  2260.2   72.75 2272.14    72.7
 2284.05   72.83 2292.54   73.26 2300.45   72.92 2304.15   72.58 2316.7470.94557
 2321.56   70.12 2330.11   67.66 2336.05   66.29 2345.93   64.22  2350.6   61.02
 2355.82   60.54 2361.75    60.2 2373.62   59.85 2379.55   58.98 2385.99   58.53
 2389.43   58.65 2393.39   58.28 2395.36   57.82 2399.32   56.09 2405.25   54.67
 2411.18   53.62 2421.19   52.98 2427.24   51.77 2451.45   51.32 2463.09    51.4
 2472.26   51.85 2481.43   52.06 2491.37   52.45 2500.53   52.58 2504.2752.77985
 2517.0553.29694 2518.87   53.44  2527.2   56.36 2529.71   56.43 2534.72   58.08
 2539.73   58.98 2542.24   59.09 2547.25   58.88 2552.26   59.02 2557.27   58.86
 2562.29   58.21  2567.3   58.11 2577.33   58.83 2584.85   59.61 2589.86   59.39
 2594.87   58.31 2599.88   57.91  2604.9   58.14 2612.42    59.4 2622.44   59.65
 2629.96   60.08 2634.97   60.62    2645   61.35 2657.53   61.43 2675.08   62.83
  2685.1   63.85 2690.11      64 2692.62   63.83 2700.15   62.78 2702.65   62.71
 2705.16   63.11 2710.17   64.32 2717.69   65.13  2721.1   65.05 2733.28   65.63
 2750.26   65.17 2762.79   65.47  2770.3   65.95 2775.5266.08003 2782.83   66.44
 2800.31   67.54 2810.38   68.33 2820.41   69.65 2842.95   73.01 2852.83   72.86
 2858.75   73.11  2862.7   72.89 2868.63   73.04 2872.58   72.95 2892.33   73.19
 2898.26   72.66 2902.22   72.59 2916.04   71.86 2923.94   72.04 2931.85   71.88
 2941.72   72.22 2955.55   71.76 2961.48   71.67  2967.4   71.32 2979.25   71.65
  2983.2   71.87 2987.16   71.81 2993.09   72.04 2997.03   72.01 3006.91   72.53
 3014.81    72.7 3020.74   72.49 3026.66   72.08 3044.44   71.55 3056.29   71.13
 3068.15   71.27 3081.98   71.28 3085.93   71.21 3095.81   71.34 3099.76   71.23
  3103.7   71.38 3111.61   71.25 3117.53   71.47 3123.46   71.37 3143.22   71.99
 3155.07   72.97    3161   73.59 3168.89   73.47  3176.8   73.63 3194.57    73.5
 3206.43   73.67 3220.26   73.78 3232.11    73.8 3236.06   73.92 3243.96   73.67
 3254.7773.80517 3259.76   73.79 3267.67   73.99 3279.52   73.89 3326.93   74.14
 3332.85   74.09 3340.76   74.22 3374.34   74.16 3392.12   74.19 3396.07   74.27
 3403.97   74.17  3433.6   74.32  3441.5   74.21 3469.16   74.21 3479.04   74.14
 3486.94   74.25 3502.74   74.26 3524.47   74.42  3530.4   74.37 3560.03   74.39
 3575.84   74.46 3591.64   74.39 3603.49   74.48 3627.19   74.48 3631.14   74.55
 3646.95   74.54 3670.65   74.71 3692.38   74.69 3696.34   74.78 3708.19   74.67
 3716.09   74.83 3741.77   74.71  3755.6   74.77 3759.55   74.87 3765.47   74.76
  3771.4   74.84 3783.25   74.72 3799.06   74.76 3816.84   74.71 3824.73   74.77
 3834.61    74.7 3864.25   74.76 3870.17   74.86 3887.95   74.81 3903.75   74.87
 3927.46   74.81 3947.21   74.85 3959.07   74.79 3980.79   74.85 3998.57   74.85
  4004.5   74.74 4018.33   74.86 4038.08   74.81 4053.88   74.83 4081.54   74.93
 4099.32   74.67 4111.17   74.78 4115.12   74.71 4156.61   74.62 4172.41   74.69
 4196.12   74.62 4198.09   74.67 4233.65    74.7 4243.53   74.82 4271.18   74.89
 4296.86   75.13 4318.59   75.18 4336.37   75.34  4350.2   75.28 4367.98   75.47
 4377.85   75.44 4385.76   75.55 4393.66    75.5 4403.53   75.58 4450.94    75.5
 4460.82    75.4 4496.38   75.49 4508.23    75.3 4529.96   75.48 4563.54   75.47
 4569.47   75.34 4581.32   75.41 4583.29   75.55 4589.22   75.34 4603.05   75.25
 4626.75   75.19 4632.67   75.06 4636.63   75.14 4644.53   75.03 4650.45   75.08
 4682.06   74.94 4697.87   75.15 4709.72   75.19 4715.65   74.95 4717.62   75.06
 4731.44   74.99 4737.37   75.17  4743.3   75.09  4751.2   75.18 4757.13   74.92
  4774.9   74.92 4780.83   75.01 4792.68   74.87 4796.63   74.97 4800.59    74.8
 4810.46   74.89 4816.38   74.68 4822.31   74.71 4834.16   74.52 4838.12   74.56
 4846.01   74.34 4851.94   74.51 4859.84   74.32 4867.75   74.52 4875.65   74.31
  4887.5   74.42 4891.45   74.34 4907.25   74.59 4915.15   74.41 4930.95   74.63
 4934.91   74.54 4948.73   74.85 4952.69   74.75 4968.49   74.91 4972.44   75.07
 4982.32   75.06 4990.22   75.38 4998.12   75.45 5004.04   75.34 5011.95   75.59
 5013.92   75.45 5021.82   75.45 5025.78   75.63 5037.63   75.58 5041.58   75.46
 5051.45   75.68 5055.41   75.61 5061.33   75.76 5069.23   75.56 5083.06   75.77
 5088.98   75.73 5098.86   76.03 5110.72   75.88 5120.59   76.04 5128.49   76.02
 5140.35   76.26 5144.29   76.22 5164.05   76.34 5169.97   76.53 5177.88   76.47
 5179.85   76.63 5187.75   78.54  5191.7   77.54 5193.68   77.41 5197.63   77.73
 5201.58   77.24 5209.48   76.67 5221.34   77.13 5229.23   76.97 5237.14   77.04
 5245.04   76.98 5258.87   77.18 5276.65   77.14 5284.54   76.94 5300.35   76.88
 5310.23   76.97 5318.13   73.97 5324.06   73.55    5328   73.74 5329.98   74.21
 5337.88      77 5347.76    78.9 5355.66   79.06 5361.59   79.04 5365.54   79.22
 5369.65   78.28 5373.77   76.29 5377.89    75.5 5386.12   75.42 5388.87   75.18
 5410.83   74.88 5423.17   74.57 5430.04   74.62 5439.64   74.17 5443.76   72.81
 5450.62   72.15 5453.37   72.16 5456.11   72.82 5458.86   73.85 5462.97   74.47
 5467.09   75.57  5476.7   75.14 5480.81   74.85 5484.94    74.3  5491.8   73.69

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2292.54     .07 2379.55    .025 2539.73     .07 2842.95    .085
    3161    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       2292.54 2842.95           821.82 1653.32   845.1             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2292.54   73.26       T
 2842.95  5491.8   73.01       T
Left Levee      Station=  23.612      Elevation=  80.566
Right Levee     Station=5365.538      Elevation=   79.22

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 119.12*

INPUT
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Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.6	2.62	78.64	8.53	80.08	11.81	80.43	16.54	80
17.72	79.27	20.09	76.57	23.58	74.65	29.47	70.05	35.47	69.78
43.75	70.73	53.22	70.77	64.8	70.7	76.58	70.42	100.15	69.63
111.93	69.88	134.86	71.82	141.37	72.01	164.92	72.14	182.59	71.96
194.36	71.65	217.93	71.43	231.88	71.5	255.54	71.3	269.74	71.32
285.12	71.16	305.24	71.15	335.7	70.96	349.02	71.03	398.71	70.85
425.92	70.86	446.04	70.78	455.5	70.84	463.79	71.17	468.52	71.19
472.07	70.42	474.44	70.21	483.9	70.01	491	70.19	500.61	70.24
518.28	70.12	532.41	70.25	553.71	70.16	563.17	70.05	582.1	70.02
596.3	70.06	624.7	70.01	641.95	70.14	653.73	70.03	683.17	70.35
700.83	70.76	712.61	71.53	721.72	71.71	753.67	71.84	767.86	71.77
808.09	71.8	824.51	71.74	850.69	71.91	879.09	71.8	889.3	71.88
930.52	71.79	941.79	71.91	957.18	71.95	989.4	71.89	1032.9	71.99
1035.27	72.04	1051.83	71.93	1083.78	72.11	1110.99	72.15	1154.31	72.04
1183.75	72.17	1198.55	72.1	1208.02	72.19	1228.13	72.15	1266.2	72.28
1295.57	72.27	1306.22	72.32	1328.7	72.23	1348.82	72.34	1360.42	72.23
1384.31	72.35	1413.89	72.3	1451.76	72.43	1483.7	72.33	1499.09	72.44
1509.74	72.44	1525.33	72.33	1542.99	72.45	1558.25	72.36	1578.32	72.59
1584.21	73.07	1593.3	72.49	1602.38	70.98	1606.92	69.88	1609.4368	1.81295
1618.26	64.76	1625.1	61.81	1625.99	61.62	1629.64	57.56	1638.37	56.79
1647.66	56.22	1652.3	55.26	1657.34	54.46	1660.03	54.5	1664.67	54.04
1667.77	53.15	1677.06	51.91	1684.89	51.52	1689.63	50.88	1708.57	50.61
1719.39	50.7	1729.98	51.28	1740.56	51.53	1752.03	52.03	1762.61	52.19
1773.2	52.84	1778.49	52.84	1783.78	53.32	1793.39	57.2	1796.29	57.3
1802.07	59.47	1804.8960	0.04959	1807.86	60.66	1810.75	60.8	1818.21	60.5539
1822.33	60.7	1828.11	60.5	1833.9	59.65	1839.68	59.54	1851.26	60.43
1859.94	61.4	1865.73	61.12	1871.52	59.68	1877.3	59.15	1883.09	59.47
1891.77	61.09	1894.66	61.3	1903.34	61.36	1912.02	61.93	1917.81	62.64
1929.39	63.59	1943.85	63.56	1964.1	65.02	1975.68	66.11	1981.46	66.19
1984.35	65.89	1993.04	64.35	1995.94	64.25	1998.83	64.78	2004.61	66.38
2013.29	67.43	2017.23	67.32	2031.3	67.35	2050.9	66.96	2065.36	67.39
2074.03	67.99	2087.6268	3.43692	2100.06	69.14	2114.52	69.69	2120.3	69.82
2126.09	70.42	2131.87	70.82	2157.89	73.19	2163.15	73.2	2171.03	72.97
2178.91	73.29	2184.17	72.99	2192.05	73.19	2197.3	73.07	2207.81	73.28
2210.44	73.17	2223.57	73.34	2231.46	72.63	2236.71	72.53	2255.1	71.53
2265.61	71.77	2276.12	71.54	2289.25	71.98	2307.64	71.34	2315.52	71.2
2323.4	70.74	2339.16	71.16	2344.42	71.43	2349.67	71.36	2357.56	71.65
2362.81	71.61	2375.95	72.28	2386.45	72.49	2394.33	72.21	2402.21	71.65
2412.72	71.38	2425.86	70.92	2436.37	70.41	2441.62	70.34	2457.39	70.49
2475.77	70.48	2481.03	70.39	2494.16	70.55	2499.42	70.39	2504.67	70.58
2515.18	70.4	2523.06	70.68	2530.94	70.54	2536.2	70.78	2544.07	70.89
2557.21	71.34	2572.97	72.62	2580.86	73.43	2591.36	73.26	2601.87	73.46
2612.38	73.43	2617.64	73.28	2625.51	73.26	2641.28	73.47	2659.67	73.6
2675.43	73.61	2680.69	73.76	2690.0473	3.43943	2699.07	73.59	2712.21	73.55
2722.72	73.8	2738.48	73.64	2748.98	73.75	2759.5	73.71	2791.02	73.86
2796.27	73.73	2801.53	73.9	2809.41	73.82	2819.92	73.98	2864.58	73.84
2888.23	73.86	2893.47	73.95	2903.99	73.82	2927.63	73.95	2932.88	73.85
2943.39	73.97	2953.9	73.81	2990.68	73.76	2993.3	73.84	3003.81	73.65
3014.32	73.79	3035.33	73.76	3045.85	73.88	3064.24	73.94	3072.12	73.87
3093.14	73.86	3098.39	73.92	3111.53	73.85	3132.54	73.92	3153.56	73.8
3169.32	73.89	3200.84	73.86	3206.1	73.95	3227.11	73.9	3242.87	74.02
3256.02	74	3258.64	74.09	3287.54	74.03	3292.79	74.15	3308.55	73.98
3319.06	74.17	3329.57	74.17	3334.83	74.04	3345.33	74.07	3353.21	73.98
3371.6	74.04	3376.86	74.15	3384.74	74.01	3392.62	74.1	3408.38	73.91
3429.4	73.95	3453.04	73.85	3463.55	73.91	3476.69	73.8	3484.56	73.86
3495.08	73.79	3500.33	73.88	3516.09	73.83	3523.97	73.96	3529.23	73.81
3534.48	73.89	3547.61	73.86	3552.87	73.96	3600.16	73.81	3626.43	73.83
3642.19	73.72	3671.09	73.76	3673.71	73.7	3694.73	73.73	3702.62	73.58
3707.86	73.7	3715.75	73.61	3721	73.71	3747.27	73.61	3752.53	73.69
3768.29	73.62	3791.93	73.7	3805.07	73.7	3828.71	73.33	3844.48	73.46
3849.73	73.36	3883.88	73.24	3899.64	73.23	3904.9	73.16	3925.92	73.23
3957.44	73.1	3960.07	73.16	3994.22	73.12	4007.36	73.14	4020.49	73.27
4033.62	73.24	4057.27	73.32	4062.52	73.44	4075.65	73.46	4091.41	73.59
4120.32	73.62	4133.45	73.78	4143.96	73.8	4162.35	73.71	4185.99	73.92
4199.13	73.87	4209.64	73.99	4220.14	73.91	4233.28	74	4249.04	73.9
4256.92	73.93	4296.33	73.84	4301.58	73.89	4309.47	73.68	4356.75	73.77
4367.25	73.67	4372.51	73.49	4401.41	73.71	4409.29	73.67	4446.06	73.65
4453.95	73.48	4469.71	73.56	4472.34	73.74	4480.21	73.45	4498.61	73.31
4517	73.25	4524.88	73.13	4530.13	73.2	4538.01	73.03	4543.26	73.13
4553.78	72.97	4561.65	73.04	4580.04	72.89	4585.3	72.95	4603.69	72.81
4619.45	72.93	4624.7	73.06	4640.46	73.11	4648.35	72.78	4650.97	72.93
4669.36	72.82	4677.24	73.05	4685.12	72.94	4695.63	73.05	4703.51	72.69
4719.27	72.73	4727.15	72.66	4735.04	72.78	4750.8	72.57	4756.05	72.7
4761.31	72.48	4774.44	72.59	4782.32	72.29	4790.2	72.33	4805.96	72.07
4811.22	72.11	4816.47	71.86	4821.72	71.81	4829.61	72.03	4840.11	71.76
4850.62	72.03	4861.13	71.73	4876.89	71.86	4882.14	71.76	4900.53	71.95
4903.16	72.07	4913.67	71.82	4924.18	72.01	4934.68	72.09	4939.94	71.96
4945.19	72.17	4958.33	72.37	4963.58	72.23	4968.83	72.33	4984.6	72.41
4989.85	72.63	4997.73	72.7	5002.99	72.61	5013.49	73.02	5018.75	72.9
5024.01	73.1	5031.88	72.94	5042.39	73.27	5045.01	73.08	5055.53	73.08
5060.78	73.3	5076.54	73.22	5081.8	73.06	5094.93	73.34	5100.19	73.24
5108.06	73.44	5118.58	73.17	5136.97	73.44	5144.84	73.39	5157.97	73.78
5163.23	73.62	5173.74	73.56	5186.88	73.78	5197.38	73.74	5213.15	74.04
5218.4	74	5244.67	74.13	5252.55	74.39	5263.06	74.3	5265.69	74.52
5276.19	77.05	5281.45	75.71	5284.08	75.54	5289.33	75.97	5294.58	75.3
5302.46	74.63	5305.09	74.54	5312.97	74.94	5320.85	75.14	5331.36	74.92
5341.87	75.02	5352.37	74.93	5370.76	75.19	5383.9	75.09	5394.41	75.11
5404.91	74.84	5425.93	74.75	5439.07	74.87	5444.32	72.7	5449.57	70.85
5457.46	70.29	5462.71	70.55	5465.33	71.16	5475.85	74.89	5488.98	77.41
5499.48	77.62	5507.37	77.59	5512.62	77.82	5514.84	77.32	5517.06	76.3
5519.28	75.88	5537.03	75.34	5547.39	74.95	5552.56	74.6	5554.78	73.86
5559.96	73.41	5562.92	74.18	5567.36	74.93	5574.75	74.38	5580.67	73.66

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	1584.21	.07	1625.99	.025	1810.75	.07	2157.89	.085
2690.04	.066								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1584.21 2157.89 821.82 1653.32 845.1 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1584.21	73.07	T
2157.89	5580.67	73.19	T

Left Levee Station= 11.806 Elevation= 80.428
Right Levee Station=5512.624 Elevation= 77.82

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 118.81

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 458

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.29	3.28	79.66	6.56	75.76	9.84	70.2	13.12	70.11
29.52	70.09	36.08	69.77	49.21	68.75	55.77	69.1	68.89	71.51
72.17	71.75	85.29	71.89	95.13	71.63	101.69	71.23	114.82	70.95
121.38	71.07	134.5	70.8	144.34	70.79	150.9	70.62	170.58	70.49
180.42	70.33	183.71	70.42	216.51	70.15	246.03	70.06	259.16	69.94
272.28	70.03	282.12	69.9	288.68	70.02	298.52	69.96	305.08	69.78
341.17	69.73	351.01	69.84	357.57	69.71	373.97	70.08	383.81	70.58
390.37	71.52	393.65	71.74	410.06	71.85	426.46	71.79	442.86	71.82
452.7	71.73	465.82	71.92	482.23	71.76	488.79	71.86	511.75	71.72
518.31	71.84	537.99	71.89	544.55	71.81	570.8	71.91	577.36	71.8
593.76	72.01	623.29	72.04	636.41	71.89	652.81	72.03	659.37	71.9
665.93	72.02	675.77	71.98	698.74	72.1	724.98	72.1	731.54	72.02
744.66	72.12	751.22	72.02	767.63	72.11	784.03	72.04	800.43	72.11
816.83	72.03	833.24	72.19	843.08	72.05	852.92	72.18	862.76	72.07
872.6	72.34	875.88	72.88	882.44	72.4	889	70.85	892.28	69.64
895.56	67.43	902.12	61.82	905.41	59.27	908.69	54.1	921.69	52.6
928.69	50.4	936.69	50.2	944.69	50.2	950.69	50	965.69	49.9
975.69	50	987.69	50.7	999.69	51	1012.69	51.6	1024.69	51.8
1036.69	52.6	1042.69	52.6	1048.69	53.2	1059.59	58.04	1062.87	58.16
1069.43	60.87	1075.99	62.34	1079.27	62.51	1085.83	62.11	1092.39	62.37
1098.95	62.14	1105.51	61.09	1112.07	60.96	1125.2	62.02	1135.04	63.2
1141.6	62.84	1148.16	61.05	1154.72	60.4	1161.28	60.8	1171.12	62.79
1174.4	63.03	1184.24	63.07	1194.08	63.78	1200.64	64.67	1213.77	65.82
1230.17	65.69	1243.29	66.62	1253.13	67.2	1266.25	68.37	1272.81	68.37
1276.09	67.95	1285.94	65.92	1289.22	65.79	1292.5	66.45	1299.06	68.43
1308.9	69.73	1328.58	69.08	1351.53	68.75	1367.93	69.3	1377.76	70.03
1394.16	70.49	1407.27	71.15	1423.66	71.39	1430.22	71.31	1436.78	71.79
1443.34	71.99	1463.01	72.96	1472.84	73.37	1479.4	73.38	1489.24	73.08
1499.07	73.48	1505.63	73.1	1515.47	73.34	1522.02	73.18	1535.14	73.44
1538.42	73.3	1554.81	73.5	1558.09	73.35	1564.65	72.6	1571.21	72.47
1581.04	71.86	1594.16	71.21	1607.27	71.49	1620.39	71.2	1636.78	71.73
1643.34	71.44	1653.17	71.22	1659.73	70.92	1669.57	70.74	1679.4	70.15
1685.96	70.25	1699.07	70.66	1705.63	71	1712.19	70.9	1722.03	71.26
1728.58	71.2	1744.98	72.03	1758.09	72.28	1767.93	71.92	1777.76	71.22
1790.88	70.87	1807.27	70.28	1820.39	69.64	1826.94	69.54	1840.06	69.59
1846.62	69.72	1869.57	69.69	1876.13	69.57	1892.52	69.76	1899.08	69.55
1905.63	69.79	1918.75	69.55	1928.58	69.89	1938.42	69.71	1944.98	70
1954.81	70.14	1964.65	70.56	1971.21	70.68	1990.88	72.27	1997.44	73.08
2000.72	73.28	2013.83	73.06	2026.95	73.3	2040.06	73.25	2046.62	73.06
2056.45	73.02	2076.13	73.27	2099.08	73.41	2105.64	73.33	2118.75	73.41
2125.31	73.59	2138.42	73.14	2148.26	73.37	2164.65	73.3	2177.77	73.61
2197.44	73.39	2210.55	73.52	2223.67	73.46	2243.34	73.56	2249.9	73.5
2263.01	73.62	2269.57	73.45	2276.13	73.66	2285.96	73.55	2299.08	73.74
2341.7	73.57	2344.98	73.67	2354.82	73.53	2384.33	73.53	2390.88	73.64
2404	73.46	2433.51	73.6	2440.06	73.47	2453.18	73.61	2466.29	73.4
2512.2	73.31	2515.47	73.4	2528.59	73.16	2541.7	73.32	2567.93	73.27
2581.05	73.41	2590.88	73.36	2604	73.47	2613.84	73.37	2640.07	73.34
2646.62	73.41	2663.02	73.31	2689.25	73.37	2715.48	73.2	2735.15	73.31
2774.49	73.24	2781.05	73.34	2807.28	73.26	2826.95	73.4	2843.35	73.36
2846.62	73.47	2882.69	73.37	2889.25	73.51	2908.92	73.29	2922.03	73.52
2935.15	73.5	2941.71	73.34	2954.82	73.37	2964.66	73.24	2971.21	73.32
2987.61	73.3	2994.17	73.44	3004	73.25	3013.84	73.36	3033.51	73.11
3046.63	73.15	3053.18	73.04	3059.74	73.14	3089.25	72.99	3102.36	73.06
3118.76	72.91	3128.59	72.97	3141.71	72.88	3148.27	72.98	3167.94	72.91
3177.77	73.06	3184.33	72.87	3190.89	72.97	3207.28	72.92	3213.84	73.04
3220.4	72.94	3233.51	72.97	3259.74	72.86	3263.02	72.95	3272.86	72.8
3305.64	72.8	3325.32	72.65	3331.87	72.7	3361.38	72.68	3364.66	72.6
3390.89	72.62	3400.73	72.42	3407.28	72.56	3417.12	72.44	3423.68	72.57
3456.46	72.42	3463.02	72.51	3482.69	72.41	3512.2	72.49	3528.6	72.48
3558.1	71.99	3577.78	72.14	3584.33	72.01	3626.96	71.82	3646.63	71.8
3653.19	71.7	3679.42	71.77	3718.76	71.57	3722.04	71.65	3764.66	71.56
3777.78	71.66	3781.06	71.57	3797.45	71.73	3810.56	71.6	3813.84	71.68
3843.35	71.75	3849.91	71.89	3866.3	71.91	3885.97	72.06	3912.2	72.1
3922.04	72.06	3938.43	72.25	3951.55	72.27	3974.5	72.13	4004.01	72.37
4020.4	72.3	4033.52	72.44	4046.63	72.33	4063.02	72.43	4082.7	72.28
4092.53	72.32	4141.71	72.17	4148.27	72.23	4158.11	71.97	4194.17	72.03
4207.28	71.98	4217.12	72.05	4230.23	71.92	4236.79	71.69	4272.86	71.94
4282.69	71.89	4328.59	71.84	4338.43	71.62	4358.1	71.71	4361.38	71.93
4371.21	71.56	4394.17	71.38	4417.12	71.29	4426.95	71.13	4433.51	71.22
4443.34	71	4449.9	71.12	4463.02	70.91	4472.85	70.99	4495.8	70.8
4502.36	70.86	4525.31	70.68	4544.98	70.82	4551.54	70.98	4571.21	71.03
4581.05	70.61	4584.32	70.79	4607.27	70.64	4617.11	70.93	4626.95	70.78
4640.06	70.91	4649.9	70.46	4669.57	70.5	4679.4	70.41	4689.24	70.55
4708.91	70.28	4715.47	70.44	4722.03	70.16	4738.42	70.28	4748.25	69.91
4758.09	69.95	4777.76	69.61	4784.32	69.66	4790.88	69.35	4797.43	69.28
4807.27	69.55	4820.38	69.2	4833.5	69.53	4846.61	69.15	4866.28	69.3
4872.84	69.17	4895.79	69.4	4899.07	69.55	4912.18	69.23	4925.3	69.46
4938.41	69.55	4944.97	69.39	4951.53	69.64	4967.92	69.88	4974.48	69.7
4981.03	69.83	5000.71	69.92	5007.26	70.19	5017.1	70.27	5023.66	70.15
5036.77	70.66	5043.33	70.51	5049.89	70.75	5059.72	70.55	5072.84	70.95
5076.11	70.71	5089.23	70.7	5095.79	70.98	5115.46	70.87	5122.02	70.66
5128.57	70.71	5138.41	71.01	5144.97	70.88	5154.8	71.12	5167.92	70.78
5190.87	71.11	5200.7	71.04	5217.09	71.52	5223.65	71.32	5236.77	71.25
5253.16	71.51	5266.27	71.46	5285.95	71.83	5292.5	71.77	5325.29	71.93
5335.12	72.25	5348.24	72.13	5351.52	72.4	5364.63	75.56	5371.19	73.89
5374.47	73.67	5381.03	74.2	5387.58	73.37	5397.42	72.52	5400.7	72.41
5410.53	72.91	5420.37	73.16	5433.48	72.88	5446.6	72.99	5459.71	72.88
5482.66	73.19	5499.06	73.07	5512.17	73.09	5525.28	72.74	5538.4	72.66
5541.68	72.76	5551.51	72.62	5561.35	72.76	5564.63	72.98	5567.91	72.76
5574.46	70.05	5581.02	67.74	5584.3	67.35	5590.86	67.03	5597.41	67.35
5600.69	68.12	5613.81	72.77	5630.2	75.92	5643.31	76.17	5653.15	76.13
5659.71	76.42	5662.99	75.89	5669.54	73.62				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.066	875.88	.07	902.12	.025	1105.51	.07	1472.84	.085
2125.31	.066								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
875.88	1472.84	1046.54	1661.33 748.7	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	875.88	72.88	T
1472.84	5669.54	73.37	T

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Left Levee      Station=       0      Elevation=   80.29
Right Levee     Station= 5659.71      Elevation=   76.42

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             76.54    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.066      0.057      0.068
  W.S. Elev (ft)             76.52    Reach Len. (ft)          1046.54    1661.33     748.70
  Crit W.S. (ft)             59.77    Flow Area (sq ft)        3158.11    8147.96   12980.62
  E.G. Slope (ft/ft)      0.000103    Area (sq ft)             4586.76    8147.96   18662.14
  Q Total (cfs)           20000.00    Flow (cfs)               1699.77   12232.92    6067.31
  Top Width (ft)           5663.62    Top Width (ft)            869.96     596.96    4196.70
  Vel Total (ft/s)            0.82    Avg. Vel. (ft/s)            0.54       1.50       0.47
  Max Chl Dpth (ft)          26.62    Hydr. Depth (ft)            3.63      13.65       3.09
  Conv. Total (cfs)       1970044.0     Conv. (cfs)             167430.8   1204970.0   597643.5
  Length Wtd. (ft)         1353.24    Wetted Per. (ft)          873.96     607.86    4203.73
  Min Ch El (ft)             49.90    Shear (lb/sq ft)            0.02       0.09       0.02
  Alpha                       2.17    Stream Power (lb/ft s)      0.01       0.13       0.01
  Frctn Loss (ft)             0.12    Cum Volume (acre-ft)     8611.67    5079.30    1843.99
  C & E Loss (ft)             0.00    Cum SA (acres)           2284.31     265.14     628.31


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 118.50*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   80.24    3.01   77.56    4.51   76.63    8.02    76.4   16.53   73.49
   21.04   70.78   24.07   69.73   28.55   70.63   34.56   70.54   40.57    69.5
   43.57   69.34   46.58   69.58    55.6    69.2   72.22   69.11   96.17   68.76
  103.68   68.53  120.39   68.21  136.44   68.51  157.78   69.52   168.3   70.07
  178.81   70.26  187.83   70.24  208.86   70.33  232.73    70.1  248.77   69.83
  274.98   69.69  296.94   69.73  312.54    69.7  318.56   69.88  321.56    71.1
  333.58   70.85  353.11   70.93  369.16   70.83  387.68   70.83  405.71   70.74
  431.25   70.71  435.76   70.62  449.43    70.7  510.89    70.6  519.91   70.53
  531.93   70.57  548.46   70.47   569.5   70.46  584.52   70.54  605.56   70.52
   626.6   70.43  652.14   70.49  662.66   70.55  688.21   70.41  707.74   70.54
  733.28    70.5  737.79    70.4  761.83   70.36  772.35    70.4  779.87   70.33
  817.43   70.38  830.96   70.35  861.01   70.46  873.03   70.26  888.06   70.35
  903.08   70.57  916.61   70.67  925.62   70.83  937.64   70.93     955   71.57
  981.22   71.76  999.25   71.82 1002.26   71.88 1021.79   71.76 1051.84   71.79
 1057.85   71.72 1066.87   71.78 1071.38   71.67 1090.91    71.7 1098.43   71.64
 1122.47   71.66 1126.97   71.75    1139   71.78 1157.03   71.73 1172.06   71.63
 1195.78   71.73 1220.14   71.69  1256.2   71.67 1268.23   71.76 1275.74   71.72
 1289.26    71.8 1293.77   71.71 1314.81   71.79 1332.19   71.68 1352.37   71.74
 1359.88    71.7 1386.93   71.81 1412.48    71.7 1433.52   71.82 1486.11   71.92
 1492.12   71.88 1532.69    71.9  1538.7   71.81 1556.92   71.76 1583.78    71.8
 1597.04   71.89 1613.09   71.76 1627.36   71.87 1688.96   71.83 1699.48   71.92
 1719.02   71.94 1722.02   71.89 1737.05   71.95 1761.09    71.9 1773.11   71.97
 1788.14   71.86 1807.67   71.86 1819.69   71.94 1843.73   71.82 1903.84   71.91
 1906.85   71.85 1947.41   71.94 1972.96   71.85 1975.96   71.96 2004.51    71.9
 2009.02   71.97 2022.54   71.97 2039.08   72.09 2072.13   71.88 2082.65   72.21
 2090.17   72.11 2097.67   71.55  2108.2   71.33 2127.73   71.46 2130.73   71.57
 2139.75   71.82 2142.76    72.2 2149.22   71.75 2155.68   70.59 2158.91   69.71
2164.0766.99921 2171.84   62.24 2175.07   58.43 2187.88   55.56 2194.77   53.17
 2196.88   52.89 2200.27   51.82 2210.58   50.28  2220.9   49.29 2231.21   49.18
2240.2649.40343 2248.41   49.89  2257.8   50.18 2267.96   50.65 2277.34   50.85
 2286.72   51.43 2291.41   51.45  2299.1       52 2304.63    55.1 2307.19   55.17
 2312.32   56.97 2317.45   57.95 2320.01   58.06 2325.14   57.79 2329.3157.92819
  2335.4   57.81 2340.53   57.11 2345.66   57.02 2355.92   57.73 2363.62   58.51
 2368.75   58.27 2373.88   57.08    2379   56.65 2384.13   56.91 2391.83   58.22
 2394.39   58.35 2402.08    58.3 2409.78   58.69 2414.91   59.27 2425.17   60.06
 2437.99   60.02 2455.95   61.11  2466.2   61.92 2471.33   61.93  2473.9   61.66
  2481.6   60.33 2484.16   60.26 2486.73   60.71 2491.86   62.05 2499.55   62.95
 2514.94    62.5 2525.38   62.34 2532.88   62.35  2545.7   62.88 2553.39   63.54
 2566.21   64.19 2570.63    64.5 2576.11   66.69 2583.49   66.89 2585.3467.06605
  2594.4   67.86 2612.97   70.93 2627.72   73.52  2632.2   73.57 2638.92   73.42
 2645.62   73.74  2650.1   73.53 2656.82   73.74 2661.29   73.67 2670.24   73.92
 2672.48   73.85 2683.67      74 2690.38   73.41 2694.86   73.33 2710.52    72.5
 2719.47    72.7 2728.42   72.48 2739.61   72.79 2755.27    72.2 2761.99   72.06
  2768.7   71.64 2782.12   71.93  2786.6   72.14 2791.08   72.06 2797.79   72.28
 2802.26   72.22 2813.46   72.74  2822.4   72.88 2829.12   72.62 2835.83   72.14
 2855.97   71.46 2864.92   71.01 2869.39   70.93 2882.82   71.01 2898.49   70.95
 2902.96   70.86 2914.15   70.97 2918.63   70.82  2923.1   70.98 2932.05   70.81
 2938.76   71.03 2945.48   70.91 2967.85   71.53 2981.28   72.58 2987.99   73.25
 2996.94   73.09  3005.9   73.25 3014.84   73.21 3026.03   73.04 3039.46    73.2
 3055.12   73.28  3059.6   73.22 3073.6873.35818 3081.97   73.08 3088.69   73.22
 3099.87   73.17 3108.83   73.38 3122.25   73.24  3131.2   73.33 3140.16    73.3
    3167   73.39 3171.48   73.27 3175.96   73.41 3182.67   73.33 3191.62   73.45
 3229.66   73.29  3249.8   73.28 3254.27   73.36 3263.23   73.24 3283.37   73.33
 3287.84   73.25 3296.79   73.34 3305.74    73.2 3337.07   73.15 3348.26   73.05
 3357.21   73.15 3375.11   73.12 3384.06   73.22 3399.73   73.26 3406.44   73.19
 3440.01   73.15 3457.91    73.2 3475.81   73.08 3489.23   73.16 3516.08   73.12
 3520.56   73.19 3538.46   73.14 3551.89   73.24 3563.08   73.21 3565.31   73.29
 3589.93   73.23  3594.4   73.32 3607.83   73.18 3616.78   73.34 3625.73   73.33
 3630.21   73.22 3645.87   73.16 3661.53    73.2 3666.01    73.3 3672.72   73.17
 3679.44   73.25 3692.86   73.08 3710.76    73.1  3730.9   72.99 3739.85   73.04
 3751.04   72.93 3766.71    72.9 3771.18   72.97 3784.61   72.91 3791.32   73.01
 3811.46    72.9 3829.36   72.93 3856.21   72.81 3878.59   72.81 3892.02    72.7
 3916.63   72.72 3918.87   72.67 3936.77   72.68 3943.48   72.55 3947.95   72.64
 3954.67   72.56 3959.15   72.65 3981.52   72.55 3986.21   72.61 3999.42   72.55
 4030.75    72.6 4050.89   72.29 4064.32   72.39 4068.79   72.31 4115.78   72.08
 4133.69   72.11 4160.53   71.95 4162.77   72.01 4191.86   71.94 4203.05   71.95
 4214.24   72.06 4225.42   72.03 4245.56   72.09 4250.04   72.18 4274.65   72.29
 4299.27   72.27 4310.46   72.39 4319.41   72.38 4335.07   72.25 4355.21   72.36
  4366.4   72.29 4375.35   72.36  4384.3   72.26 4395.49    72.3 4408.92   72.17
 4415.63   72.18 4449.19   72.03 4453.67   72.06 4460.38   71.88 4501.46   71.86
 4509.61   71.76 4514.08   71.59  4538.7   71.69 4576.73   71.53 4583.45   71.36
 4596.88   71.38 4599.11   71.52 4605.82   71.23 4621.49   71.03 4648.34    70.8
 4655.05   70.64 4659.53   70.71 4668.48   70.54 4675.19   70.58 4690.85   70.41
 4695.33   70.44 4710.99    70.3 4724.42   70.38  4728.9   70.48 4742.32   70.49
 4749.04    70.2 4751.27   70.32 4766.93    70.2 4773.65   70.38 4780.36   70.27
 4789.31   70.34 4796.02   70.03 4809.45   70.04 4816.16   69.97 4822.87   70.06
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  4836.3   69.87 4840.78   69.97 4845.25   69.78 4856.44   69.86 4863.15   69.62
 4869.86   69.64 4883.29   69.42 4887.76   69.45 4896.71   69.21 4903.43   69.39
 4912.38   69.16 4921.33   69.39 4930.28   69.14  4943.7   69.25 4948.18   69.17
 4963.84   69.33 4966.08   69.43 4975.03   69.23 4992.93   69.45 4997.41   69.35
 5001.88   69.52 5013.07   69.68 5035.45   69.72 5039.92   69.91 5051.11   69.89
 5060.06   70.23 5064.54   70.14 5069.01   70.32 5075.72   70.21 5084.68   70.51
 5086.91   70.35 5095.86   70.38 5100.34   70.58 5113.76   70.56 5118.24   70.45
 5129.43   70.74  5133.9   70.68 5140.61   70.88 5149.57    70.7 5165.23   71.01
 5171.94      71 5183.12   71.39  5187.6   71.28 5196.56   71.28 5207.74   71.52
 5216.69   71.54 5230.12   71.86 5234.59   71.84 5256.97   72.06 5263.68   72.29
 5272.63   72.24 5274.87   72.43 5283.82   74.56  5288.3   73.46 5290.53   73.32
 5295.01   73.69 5299.48   73.15 5308.44   72.54 5315.14   72.89 5321.86   73.08
 5330.81   72.92 5339.76   73.02 5348.71   72.99 5364.37   73.35 5384.51   73.47
 5393.46   73.33 5411.36   73.47 5422.55    73.7 5427.02   71.95  5431.5   70.46
 5438.22   70.07 5442.69   70.29 5444.93   70.81 5453.88   73.92 5465.07   76.03
 5474.01   76.21 5480.73   76.19 5485.21   76.39 5488.84   76.02  5496.1   74.46

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .066 2142.76     .07 2175.07    .025 2317.45     .07 2627.72    .085
 3073.68    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      2142.76 2627.72          1046.54 1661.33   748.7             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 2142.76    72.2       T
 2627.72  5496.1   73.52       T
Left Levee      Station=       0      Elevation=   80.24
Right Levee     Station=5485.207      Elevation=76.39333

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 118.18*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   80.19    2.39   78.19    4.78   75.06    7.17   73.33   12.77   73.14
   19.13   72.51    26.3   71.55   33.47   69.26   35.86   69.03   38.31   69.25
   43.04   70.64   45.43    71.1   50.21   71.25      55   70.97   59.78   70.16
   64.55   68.89   69.34   68.58   74.12   69.05   83.69   68.46   88.47    68.3
  114.92   68.12  121.94      68   133.9   68.03  145.86   67.93  153.02      68
  164.98   67.79  179.33   67.76  191.57   67.66  205.63   67.84  210.41   67.82
  222.37   67.96   239.1   68.24  251.06   68.34   267.8   68.65  284.53   68.75
  298.88   68.69   320.4   68.78  332.35   68.76  341.92   68.65   346.7   68.72
  351.48    68.6  382.56   68.55  384.96    68.5  408.86   68.38  437.56   68.39
  447.13   68.28   451.9    68.4  463.86   68.34  497.33   68.46  504.51   68.61
   506.9   68.87  511.68   71.34  514.07   71.46  521.25   71.04  530.81   70.89
  537.98   71.03  542.76   70.99  561.89   71.07  590.58   71.04  597.76    71.1
  612.11   71.05  616.89    71.1  631.23   71.02  633.62   71.08  645.58   70.97
  686.23   71.02   693.4   70.88  712.53   70.99   719.7   70.94  729.27   71.04
  738.83   70.99  755.56   71.03  765.13   70.97   798.6      71  803.39    70.9
  812.95   70.98   827.3   70.87  839.25    70.9  846.42      71  872.73   70.81
  877.51    70.9  899.03   70.88   906.2   70.81  913.38   70.91  930.11      71
  949.24   70.94  963.59      71  980.32   70.89  994.67   70.97  997.06   70.88
 1008.86   70.95 1037.71   70.98 1054.45   71.08 1064.01   70.96 1071.18      71
  1095.1   70.91 1102.27   71.01 1116.61   70.96 1126.18   71.07 1145.31   71.01
 1152.48   71.11 1166.83   71.08    1174   70.93 1190.74   71.03 1195.52   70.97
 1212.26   70.96    1229   71.04 1240.95    70.9 1248.12   70.96 1264.86   70.92
 1300.73   71.02 1305.51   70.95 1317.47   71.03 1343.76   71.07 1348.55   70.98
 1365.29   70.97 1370.07   71.09 1377.24   70.89 1389.19   70.79 1393.98   70.87
 1413.11   70.87 1417.89   70.99 1432.23   71.07 1437.02   71.17 1477.66   71.29
 1496.79   71.39 1520.71   71.62 1530.27   71.64 1537.44   71.56  1549.4   71.67
 1590.05    71.8 1594.83   71.91 1613.95   71.79 1621.13   71.84 1625.91   71.69
 1630.69   71.81 1640.26   71.75 1661.77   71.74 1673.73   71.79  1683.3   71.64
 1697.65   71.74 1704.81   71.52 1723.97   71.59 1731.12   71.51  1735.9   71.62
 1747.86   71.52 1766.98   71.58 1786.11    71.5 1793.28   71.65 1805.24   71.56
 1812.41   71.64 1833.94   71.56  1841.1   71.62 1865.02   71.48 1874.58   71.62
 1891.32   71.53 1908.06   71.62  1924.8   71.62 1939.14   71.51 1941.53   71.57
 1989.35   71.62  2003.7   71.66 2013.27   71.58 2018.05   71.67    2030   71.58
 2051.52   71.73  2058.7   71.56 2063.48   71.71 2068.25   71.62 2101.73   71.67
 2123.25   71.54 2130.42   71.62 2151.95   71.64  2163.9   71.55 2175.85   71.66
 2185.42   71.63  2190.2   71.71 2197.38   71.63 2206.94   71.73 2218.89   71.61
 2223.68    71.7 2230.85    71.6 2238.02   71.69 2247.58   71.59 2264.32   71.69
  2271.5   71.61 2281.06   71.72  2297.8   71.64 2302.58   71.71 2314.54   71.69
 2326.49   71.76 2333.67    71.7  2350.4   71.78 2357.57   71.71 2364.75   71.81
 2374.31   71.73 2383.87   71.83 2391.05   71.72 2438.87    71.8 2448.43   71.65
 2460.39   71.61 2465.17   71.68 2477.42   71.63 2486.69    71.7 2520.16   71.61
 2527.34   71.71  2536.9   71.65 2560.82   71.69 2587.12   71.65 2611.02   71.66
 2615.81   71.78 2620.59    71.7 2637.33   71.74  2644.5   71.69 2666.02   71.68
 2675.58   71.75 2687.54   71.61 2704.28   71.75  2725.8   71.69 2735.36   71.79
 2740.15   71.69 2764.05    71.8 2773.62   71.69 2785.58    71.7 2797.53   71.79
 2802.31    71.7 2821.44   71.83 2845.35    71.7 2850.13   71.77  2859.7   71.69
 2869.26   71.73 2876.44   71.65 2895.56   71.77 2917.08   71.72 2929.03   71.74
 2933.82   71.61 2943.38   71.72 2945.77   71.58 2962.51   71.61 2974.46   71.75
 2981.64   71.63 2998.38   71.75 3003.16   71.67 3019.89   71.69 3029.46   71.76
 3034.24   71.65 3058.15   71.74 3065.32   71.67 3074.89   71.73 3094.01   71.67
  3098.8    71.8 3110.75   71.63 3117.93   71.69  3125.1   71.57 3129.89   71.68
 3139.44   71.63 3144.23   71.85 3160.97   71.76 3170.53   71.81 3189.66   71.75
 3196.83   71.86 3218.35   71.82 3244.65      72 3266.17   71.87 3270.95   71.91
 3282.91   71.78 3287.69   71.86 3297.25   71.67 3302.03   71.98 3313.99   72.25
 3321.16   72.25 3325.95   72.06  3337.9   70.98 3342.68   70.93 3354.64   70.57
 3361.81   70.54 3371.38   70.68 3385.72   70.65  3390.5   70.84 3404.85   70.97
 3409.63   71.52    3416   71.11 3422.36   70.33 3426.03 69.6444 3428.72    68.9
 3436.28   66.18 3438.27    65.2 3441.45   62.77 3442.94   62.37  3449.6   59.93
 3454.06   58.52  3459.6   56.38 3462.93   55.43 3466.26   53.38 3476.42   50.36
 3484.62 48.9459 3486.58   48.62 3496.74   48.46 3502.37   48.65 3509.14   49.08
 3523.23    49.7 3529.99    49.9 3536.76   50.25 3545.68   50.62 3549.67   52.16
 3553.152.57249 3558.91   53.55 3571.85   53.47 3575.55   53.12 3579.25   53.08
 3586.65   53.43  3592.2   53.83 3595.89   53.71 3599.59   53.11 3603.29   52.89
 3606.99   53.03 3612.53   53.64 3619.93   53.53 3625.48    53.6 3636.57   54.31
 3645.82   54.35 3658.76   55.01 3666.16   55.47 3669.85    55.5 3677.26   54.75
  3679.1   54.73 3684.65   55.67  3690.2   56.18 3708.82   55.79 3714.23   55.94
 3723.47   56.47 3729.01   57.06 3741.45   58.22 3745.39   62.25 3750.01 62.4768
 3756.03   63.74 3761.35    65.3 3771.97   69.34 3782.61   73.68 3788.59   73.76
 3805.34    74.4 3812.52   74.51 3826.89   73.79 3831.67    73.9 3836.46   73.76
 3842.44   73.86 3854.41   73.37    3858   73.13 3867.57   73.29 3875.95   73.25
 3886.72   73.48 3893.89   73.06 3904.67   72.64 3909.45   72.37  3929.8   72.15
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 3940.56   72.17 3952.53    72.1  3964.5   72.39 3975.27   73.22 3995.61   73.07
 4011.17   73.15 4022.0473.13386 4025.53   73.01  4035.1   73.04 4039.89   73.16
 4084.16   73.17 4099.72   73.07 4122.46   73.02 4140.41   73.07 4161.95   72.98
 4187.07   73.02 4269.64   73.02    4284   73.11 4306.74   73.07 4311.52   73.15
 4327.08   73.07 4345.03   73.13 4383.32   72.95 4401.27   72.91 4404.86   72.96
 4439.57   72.81 4458.71   72.76 4494.61   72.73 4506.58   72.67  4532.9   72.73
 4543.67   72.58 4550.85   72.64 4578.38   72.45 4587.95   72.45 4602.31   72.34
 4625.05   72.34 4647.78   72.42 4663.34   72.53 4687.27    72.5 4695.65   72.37
 4717.19   72.28 4756.67   71.89 4762.66   71.78  4784.2   71.68 4791.38   71.49
 4804.54   71.44 4824.88   71.21 4828.47    71.1 4836.85    71.1 4840.44   70.91
 4866.76   70.28 4884.82   70.03 4896.68   69.92 4913.43   69.95 4926.59   69.75
 4938.56   69.78 4942.15   69.61 4956.51   69.56 4968.48   69.41 4974.46   69.45
 4978.04   69.32 4991.21   69.25 4995.99   69.13 5004.37   69.13 5009.16   69.25
 5013.94   69.13 5023.52   69.16 5033.09   69.31 5037.88   69.22 5049.84    69.3
 5058.22   69.49 5060.61   69.43 5078.56   69.63 5083.35   69.81 5091.72   69.86
 5096.51   70.06 5114.46   70.23 5126.42   70.64 5131.21   70.63 5143.18   70.97
 5149.16   71.25 5156.34   71.32 5167.11   71.61 5174.29   71.89 5188.65   72.19
 5198.22   72.46 5203.01   73.56  5205.4   73.03 5208.99   73.18 5216.17   72.66
 5223.35   72.99 5228.14   72.95 5237.71   73.11 5246.08   73.51 5256.85   73.86
 5261.64   73.92  5277.2   74.64 5281.98   73.19 5285.58   73.11 5289.16    73.5
 5293.95   75.07 5299.93   76.15  5310.7   76.37  5314.7   76.15 5322.67    75.3

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .163 3409.63    .066  3459.6    .025 3723.47    .066 3782.61    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3409.63 3782.61          1046.54 1661.33   748.7             .1       .3
Left Levee      Station=       0      Elevation=   80.19
Right Levee     Station=5310.704      Elevation=76.36666
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   10.33  509.47   71.52 3817.56 5335.63   73.82

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 117.87

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     459
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   80.14    3.28    77.2    6.56   72.57    9.84   70.02   19.68   69.85
   26.24   69.91   36.07   69.61   45.91   67.74   49.19   67.92   52.47   68.76
   59.03   70.87   62.31   71.58   68.87   71.82   75.43    71.4   81.99   70.18
   88.54   68.28   91.82    67.8    95.1   67.82  101.66   68.53  108.22   68.21
  114.78   67.64  121.34    67.4  141.02   67.25  150.85   67.11  157.41   67.14
  167.25      67  183.65   67.12  200.05   67.06  209.88   67.24  226.28   67.04
  245.96   67.15  252.52   67.09  272.19   67.14  282.03   67.29  288.59   67.23
  298.43   67.33  304.99   67.26  327.94   67.29  344.34   67.16   367.3   67.23
  370.58   67.15  380.42   67.25  390.25   67.25  409.93   67.13  416.49    67.2
  429.61   67.16  439.45   67.24  449.28   67.15  455.84    67.2  468.96   67.06
  475.52   67.18  482.08   67.02  511.59   67.04  524.71   67.11  527.99   67.05
  560.78   66.99  600.14   67.08  613.26   66.94  619.81   67.12  636.21       67
  662.45   67.12  672.29   67.23  682.12   67.22  691.96   67.46  695.24   67.86
   701.8   71.58  705.08   71.77  714.92   71.16  728.04   70.94  737.87   71.14
  744.43   71.08  770.67   71.21  793.62   71.27  810.02   71.25  819.86   71.35
  839.54   71.28   846.1   71.36  865.77   71.26  869.05   71.35  885.45   71.19
   908.4   71.21   941.2   71.33  951.04   71.14  977.27   71.28  987.11   71.21
 1000.23   71.36 1013.35    71.3  1036.3   71.38 1049.42    71.3 1065.82   71.37
 1072.38   71.31 1095.33   71.38 1101.89   71.24 1115.01   71.36 1134.69   71.21
 1144.53   71.34 1151.08   71.27 1160.92   71.42 1177.32   71.26 1187.16   71.29
    1197   71.15 1203.56   71.29 1233.07   71.26 1242.91   71.17 1252.75   71.32
  1275.7   71.46 1288.82   71.37 1295.38   71.46 1301.94   71.38 1315.06   71.39
 1321.62   71.48 1344.57   71.33 1364.25   71.47 1367.53   71.34 1383.93   71.45
 1423.28   71.48 1433.12   71.57 1439.68   71.48 1446.24   71.61 1459.35   71.43
 1469.19   71.51 1482.31   71.42 1485.59   71.47 1501.99   71.41 1511.83   71.56
  1531.5   71.45 1544.62   71.59 1570.86   71.52  1580.7   71.68 1593.81   71.59
 1600.37   71.65 1610.21   71.46 1633.17   71.66 1639.73   71.56 1662.68   71.55
 1672.52   71.66 1679.08   71.59 1685.64   71.68  1692.2   71.53 1702.04   71.47
 1711.87   71.56 1734.83    71.5 1761.07   71.58 1770.91   71.55 1784.02   71.66
 1790.58   71.56 1806.98   71.68 1813.54    71.6  1820.1   71.67 1843.05   71.72
 1849.61   71.58 1862.73    71.6 1872.57   71.53 1879.13   71.73 1888.97   71.44
 1905.36   71.32 1911.92   71.44 1928.32   71.36 1938.16   71.39 1944.72   71.56
 1964.39   71.63 1970.95   71.77 1987.35   71.82 2000.47   71.79 2007.03   71.86
 2013.59   71.78 2020.15   71.89  2026.7   71.75 2039.82   71.77 2046.38   71.68
 2052.94   71.75 2069.34   71.67 2085.74   71.66 2092.29   71.55 2098.85   71.61
 2108.69   71.47 2125.09   71.62 2131.65   71.57 2141.49   71.69 2167.72   71.77
 2174.28   71.86 2180.84   71.78  2187.4   71.94 2193.96   71.81 2200.52   71.92
 2213.63   71.77 2223.47   71.85 2230.03   71.63 2236.59   71.81 2246.43   71.63
 2249.71   71.72 2279.22   71.72 2295.62   71.78 2308.74   71.56 2328.42   71.71
 2338.25   71.38 2348.09   71.47 2354.65    71.4 2364.49   71.47 2374.33   71.37
 2380.89   71.53 2397.29    71.4 2423.52    71.5 2436.64    71.4  2443.2   71.46
 2449.76   71.34 2459.59   71.55 2475.99   71.39 2485.83    71.5 2495.67   71.44
 2505.51   71.48 2515.35    71.4 2525.18    71.5 2551.42   71.41 2557.98   71.32
  2571.1   71.55 2594.05   71.39 2617.01    71.5 2633.41   71.45 2639.97   71.52
 2659.64   71.36 2662.92   71.46 2708.83   71.53 2718.67   71.47 2728.51   71.57
 2741.63   71.51 2748.19   71.61 2761.31   71.46 2767.87   71.59 2784.26   71.45
 2797.38   71.57 2807.22   71.54 2813.78   71.67 2823.62   71.41 2830.18   71.63
 2836.73    71.5 2869.53   71.58 2876.09   71.48 2882.65   71.57 2912.16    71.4
    2922   71.52 2935.12   71.47 2951.52   71.54 2958.07    71.4 2964.63    71.5
 2967.91    71.4 2984.31   71.56 2997.43   71.51 3003.99   71.63 3013.83    71.5
 3026.94   71.64 3036.78    71.6 3043.34   71.46  3049.9    71.6 3059.74   71.46
 3069.58   71.62 3082.69   71.49 3105.65   71.61 3115.49   71.47 3128.61   71.63
 3151.56   71.48 3158.12   71.58 3174.52   71.53 3190.92   71.63 3200.76   71.54
 3207.31   71.62 3217.15   71.56 3223.71   71.66 3233.55   71.55 3243.39    71.7
 3256.51   71.58 3269.62   71.73 3279.46   71.57  3289.3   71.66 3299.14   71.61
 3312.26   71.66  3322.1    71.6 3328.65   71.66 3338.49   71.59 3345.05    71.7
 3358.17   71.49 3364.73   71.57 3374.57   71.44 3381.13   71.55 3397.52    71.5
 3410.64   71.59 3456.55   71.43 3466.39   71.57 3479.51   71.47 3486.07   71.61
 3492.63   71.54 3512.31   71.57 3518.86   71.47  3528.7   71.56 3548.38   71.48
 3551.66    71.6  3561.5   71.49 3568.06   71.56 3581.17   71.49 3587.73   71.67
 3594.29   71.56 3617.25   71.61 3627.09   71.54  3656.6   71.51 3669.72   71.61
 3686.12   71.38 3692.68   71.51 3709.07   71.59 3725.47   71.47 3738.59   71.49
 3751.71   71.63 3758.27   71.48  3784.5   71.58 3791.06   71.65 3804.18   71.49
 3807.46   71.57 3820.58    71.5 3827.13   71.62 3836.97   71.64 3843.53    71.5
 3853.37   71.64 3856.65   71.56 3869.77    71.7 3882.89    71.6 3902.56   71.53
 3909.12   71.64 3922.24   71.51 3935.36   71.56  3945.2   71.43 3948.47   71.52
 3961.59    71.5 3964.87   71.39 3971.43    71.6 3977.99   71.54 4000.95   71.55
 4004.23   71.48 4017.34    71.6  4023.9    71.4 4037.02   71.56  4040.3   71.34
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 4053.42   71.45 4063.26   71.38 4079.65   71.58 4089.49   71.39 4102.61   71.44
 4112.45   71.58 4119.01   71.46 4132.12   71.55 4141.96   71.49 4155.08   71.61
 4161.64   71.44 4171.48   71.57 4178.04   71.49 4194.43   71.59 4204.27   71.48
 4217.39   71.56 4223.95   71.47 4233.79   71.54 4243.62   71.46 4250.18   71.65
 4266.58    71.4 4276.42   71.48 4286.26   71.31 4292.82   71.47 4305.93    71.4
 4312.49   71.74 4335.45   71.62 4348.57   71.69  4358.4   71.62  4374.8    71.6
 4384.64   71.75 4414.15   71.67 4433.83   71.83 4450.23    71.9 4479.74   71.75
  4486.3   71.82  4502.7   71.65 4509.26   71.75 4522.37   71.45 4528.93   71.91
 4535.49      72 4545.33    72.3 4555.17   72.29 4561.73   72.01 4568.29   71.44
 4571.57   70.96 4578.12    70.4 4584.68   70.34 4601.08   69.82 4610.92   69.77
 4624.04   69.94 4627.32   69.83 4633.88   69.93 4643.71   69.85 4650.27   70.11
 4656.83   70.19 4669.95   70.11 4676.51   70.84 4686.35   70.25 4699.46   69.34
 4702.74   68.84  4709.3    66.6 4715.86   63.33  4725.7   59.17 4728.98   57.97
 4732.26   54.94 4742.26   50.44 4752.26   47.94 4762.26   47.74 4772.26   48.44
 4782.26   48.94 4792.26   49.24 4802.26   49.14 4832.26   49.14 4842.26   48.44
 4852.26   48.64 4862.26   48.94 4872.26   49.14 4882.26   49.44 4892.26   49.24
 4902.26   50.14 4912.26   51.94 4914.68   54.94 4914.68   57.81 4917.94   58.12
  4921.2   59.92 4924.46   62.11 4930.97   67.75 4937.49   73.83 4940.75   74.99
    4944   75.11 4950.52   74.14 4957.03   73.39 4970.06   72.91 4973.32   72.98
 4979.84   72.79 4996.12   72.85 5012.41   73.04 5022.19   72.82 5031.96    72.8
 5038.47   72.91 5044.99   72.69  5051.5   72.78 5054.76   72.65 5061.28   71.95
 5067.79   71.49 5074.31   70.75 5077.57   70.02 5080.82   69.64  5090.6   69.04
 5093.85   69.02 5106.88   69.39 5110.14   69.89 5119.91   72.27 5126.43   73.11
 5129.69   74.44 5132.94   76.16  5136.2   76.34 5149.23   76.14

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .163 4676.51    .066 4728.98    .025 4914.68    .066 4937.49    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4676.51 4937.49          2169.02    1775 1720.13             .1       .3
Left Levee      Station=       0      Elevation=   80.14
Right Levee     Station=  5136.2      Elevation=   76.34
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 -175.77 4546.48   72.35 4948.73 5225.92   75.03

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)              76.19    Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.10    Wt. n-Val.                 0.163      0.040      0.071
  W.S. Elev (ft)              76.09    Reach Len. (ft)          2169.02    1775.00    1720.13
  Crit W.S. (ft)              56.53    Flow Area (sq ft)       17739.86    5711.94     210.12
  E.G. Slope (ft/ft)       0.000099    Area (sq ft)            17739.86    5711.94     210.12
  Q Total (cfs)            20000.00    Flow (cfs)               3905.79   16048.56      45.65
  Top Width (ft)            5128.75    Top Width (ft)           4672.45     260.98     195.33
  Vel Total (ft/s)             0.85    Avg. Vel. (ft/s)            0.22       2.81       0.22
  Max Chl Dpth (ft)           28.35    Hydr. Depth (ft)            3.80      21.89       1.08
  Conv. Total (cfs)        2014744.0     Conv. (cfs)             393458.3   1616687.0     4598.9
  Length Wtd. (ft)          1847.48    Wetted Per. (ft)         4674.55     275.96     196.47
  Min Ch El (ft)              47.74    Shear (lb/sq ft)            0.02       0.13       0.01
  Alpha                        8.88    Stream Power (lb/ft s)      0.01       0.36       0.00
  Frctn Loss (ft)              0.21    Cum Volume (acre-ft)     7680.93    4216.61    1409.93
  C & E Loss (ft)              0.00    Cum SA (acres)           2084.62     216.06     515.09


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 117.54*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.24    9.84   81.33    16.4   81.29   22.95   81.34   29.51   81.21
   42.63   81.42   45.48   79.87   48.32   77.48   51.16   76.11   65.36   75.26
   73.87   74.56    82.4   73.06   85.24   72.97   88.08   73.21   93.76   73.98
    96.6   74.25  102.28    74.2  107.96   73.68  112.46   72.91  116.34   71.81
  119.32   70.58  122.16   69.58     125   68.88  135.74   67.55  142.04    67.4
  147.38   67.53   162.9   69.11  166.78   69.22  178.42   68.41  190.06   68.14
  197.82   68.16   201.7   67.89  217.21   67.72  224.97   67.85  238.61   67.69
  248.25   67.74  267.65   67.66  286.89   67.81   301.1   67.83  318.08   67.78
  329.72   67.84  337.48   67.73  345.24   67.82  363.58   67.71  372.11   67.79
  407.32   67.75  423.23   67.88  431.74   67.74  454.47   67.82  460.15    67.7
  469.39    67.8  473.27    67.7  481.03   67.78  484.91   67.71  496.55   67.82
  512.07   67.75  523.69   67.81  531.45   67.74  539.21   67.83  546.97   67.74
   562.4   67.85  573.76   67.74  589.65   67.84  601.29   67.78  609.05   67.82
  616.81   67.79  632.32   67.92  640.08   67.93  644.76   68.19  650.45    70.1
  653.29   70.17  661.81   69.85  673.17   69.73  681.69   69.85  686.64   69.77
   694.4   69.91  710.09   69.85  717.68   69.95  733.19   69.87  744.83   69.95
  756.47   69.89  764.23   69.94  768.11   69.89  783.63   69.94  792.46   69.91
   795.3   69.96  806.91   69.85  822.43    69.9  837.94   69.86  857.78   69.93
  866.31   69.81  880.62    69.8  892.26   69.93  897.55    69.9  908.91   69.98
  931.06   69.98  940.15   70.02  950.44   69.92  965.96   69.97  969.84   69.89
  981.48   70.02  996.95   69.91 1008.32   70.01 1025.36    69.9 1033.88   70.03
 1048.08   70.09 1062.28   69.99  1070.8   70.03 1078.47   69.94 1085.01   70.01
 1101.75   70.09 1119.09   69.98 1132.79   70.19 1144.43   70.13 1156.06   70.23
 1164.53    70.2 1171.58   70.11 1181.57   70.11 1194.86   70.18 1210.38   70.13
 1218.14   70.21 1227.02   70.14 1260.81   70.24  1275.3   70.25 1283.82   70.33
 1295.19   70.31 1306.54   70.19 1322.89   70.27 1334.52   70.21  1357.8    70.3
 1369.03   70.21 1392.72   70.35 1403.12    70.3 1411.64   70.38  1431.5   70.31
 1447.02   70.33 1457.08   70.44 1462.54   70.36 1474.18   70.39 1482.64   70.32
 1491.16   70.39 1502.52   70.42 1516.73   70.33 1525.24   70.37 1532.37   70.33
 1540.13   70.37 1547.89   70.33 1563.41   70.42 1571.17   70.37 1582.81   70.46
 1593.41    70.4 1606.08    70.5  1613.3   70.44 1638.85   70.52 1644.53   70.44
 1664.42   70.38  1670.1   70.51 1678.62   70.36 1687.56   70.28  1698.5   70.36
 1710.83   70.32 1726.91   70.46 1734.11   70.44 1749.62   70.55 1757.39   70.54
 1769.03   70.62 1780.87   70.63 1786.55   70.59 1792.23   70.65 1803.93   70.58
 1811.69   70.64 1831.09   70.55 1842.73   70.64 1854.71   70.52  1860.4   70.56
 1868.92   70.49  1885.4   70.54  1904.8   70.67 1912.56   70.65 1925.72    70.7
  1931.4   70.64 1937.09   70.69 1942.77   70.58 1951.36   70.64 1955.24   70.81
 1968.33   70.73 1974.01    70.6 1979.69   70.72 1988.21    70.6 1997.91   70.59
 2009.55   70.65 2021.19   70.66 2030.81   70.75 2042.18   70.58 2052.23   70.67
 2059.22   70.66 2067.73    70.5  2075.5   70.59 2081.94   70.55 2098.98   70.53
 2104.66   70.57 2118.87   70.48 2125.94   70.53 2145.34   70.59 2152.95   70.54
 2172.82   70.57 2176.37   70.52 2195.55   70.62 2204.07   70.58 2221.11   70.56
 2242.31   70.63 2258.04   70.55  2269.4   70.68 2292.75    70.6 2308.27    70.7
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2319.91	70.68	2346.08	70.54	2350.94	70.63	2362.58	70.68	2370.34	70.65
2381.98	70.69	2397.21	70.66	2405.73	70.71	2417.09	70.64	2428.53	70.7
2434.13	70.6	2451.81	70.69	2463.45	70.63	2479.58	70.81	2488.1	70.68
2493.78	70.8	2513.89	70.74	2525.52	70.88	2533.54	70.78	2539.22	70.83
2564.78	70.71	2579.84	70.73	2587.6	70.79	2598.87	70.78	2604.54	70.71
2610.22	70.77	2627.27	70.78	2634.14	70.73	2644.31	70.86	2653.54	70.76
2664.19	70.9	2678.39	70.78	2684.07	70.9	2692.6	70.79	2701.12	70.87
2715.61	70.81	2731.13	70.92	2740.88	70.84	2758.29	70.94	2772.12	70.88
2777.8	70.95	2785.45	70.88	2792.01	70.89	2808.72	71.01	2814.73	70.92
2834.61	71.02	2843.64	70.92	2851.65	71.03	2866.92	70.99	2874.37	71.06
2890.19	70.97	2901.83	71.03	2913.47	70.93	2925.49	70.98	2932.87	70.91
2940.63	71.07	2951.06	70.91	2956.74	70.96	2965.26	70.9	2970.94	70.96
2985.14	70.9	2996.5	70.94	3014.33	70.95	3022.09	70.91	3045.37	70.95
3056.15	70.92	3061.83	71	3080.28	70.98	3084.56	71.02	3091.92	70.92
3115.8	70.98	3118.64	71.05	3132.84	71.07	3144.19	71.01	3149.88	71.08
3155.56	71.05	3175.44	71.09	3209.52	71.08	3220.89	71.14	3231.59	70.93
3240.77	71.02	3254.97	71.1	3278.14	71.02	3291.89	71.16	3309.18	71.05
3325.97	71.09	3337.34	71.03	3347.98	71.07	3351.54	71.03	3365.74	71.1
3371.42	71.02	3382.78	71.09	3390.65	71.19	3406.17	71.19	3422.54	71.09
3433.33	71.19	3448.85	71.14	3464.35	71.21	3476.51	71.1	3482.19	71.23
3495.39	71.19	3507.75	71.23	3521.95	71.22	3527.63	71.13	3538.07	71.18
3541.83	71.11	3553.2	71.18	3561.72	71.12	3575.92	71.25	3584.44	71.15
3604.32	71.31	3610	71.25	3621.36	71.3	3629.88	71.27	3641.24	71.31
3646.92	71.22	3655.45	71.29	3666.09	71.23	3675.32	71.28	3689.37	71.21
3695.21	71.26	3717.93	71.23	3723.61	71.35	3737.81	71.25	3754.85	71.22
3760.54	71.33	3771.89	71.22	3777.57	71.4	3782.48	71.43	3794.12	71.35
3805.76	71.46	3817.33	71.39	3831.54	71.37	3844.54	71.48	3856.18	71.47
3865.62	71.41	3879.46	71.4	3896.86	71.52	3910.5	71.54	3922.42	71.49
3929.89	71.58	3942.31	71.47	3947.99	71.52	3959.34	71.4	3964.81	71.59
3970.71	71.63	3979.23	71.78	3987.75	71.81	3993.43	71.7	3999.11	71.42
4001.95	71.18	4007.63	70.96	4013.31	70.97	4023	70.7	4042.4	70.53
4047.4	70.63	4064.43	70.71	4069.8870.92108		4077.32	71.08	4087.16	71.66
4092.84	72.25	4095.5	71.85	4098.15	71.24	4103.46	70.47	4108.77	70.25
4114.08	70.36	4116.74	70.21	4122.83	69.4	4127.36	68.55	4132.67	66.68
4137.96	65.1	4140.61	64.19	4146.0262.09328		4148.55	61.32	4153.83	60.16
4159.12	58.86	4161.42	58.18	4164.42	57.57	4165.7	55.68	4172.52	52.22
4178.77	49.79	4180.0749.38251		4180.62	49.21	4188.71	48.19	4191.84	47.89
4196.81	47.85	4204.91	47.29	4213.61	47.82	4222.31	48.26	4231.01	48.54
4239.71	48.49	4251.94	48.49	4263.7	48.74	4265.81	48.65	4275.46	47.9
4287.21	48.06	4298.97	48.72	4309.3	49.11	4318	49.1	4326.7	49.54
4330.47	54.32	4334.2354.85997		4334.79	55.0126	4335.4	55.19	4337.51	58.53
4340.34	59.47	4343.18	61.34	4345.83	63.4	4349.67	67.61	4353.52	71.22
4357.35	73.37	4360.45	73.91	4363.55	73.76	4367.67	73.11	4371.11	72.84
4375.95	72.69	4381.43	72.66	4388.36	72.52	4391.46	72.58	4402.07	72.48
4405.5	72.54	4419.27	72.61	4426.14	72.55	4433.02	72.66	4446.78	72.44
4453.66	72.5	4459.7	72.35	4465.9	72.32	4470.87	72.07	4481.4	71.68
4487.61	71.25	4490.72	70.84	4493.81	70.6	4501.81	70.31	4508.7	70.46
4515.58	71	4518.62	71.09	4521.72	71.38	4525.9	71.97	4529.34	72.85
4531.03	73.55	4536.22	75.38	4543.43	77.18	4556.32	77.3	4559.58	77.29

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.167	4092.84	.066	4165.7	.025	4334.79	.066	4357.35	.068

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4092.84	4357.35	2169.02	1775 1720.13	.1	.3

Left Levee Station= 42.63 Elevation= 81.42
Right Levee Station= 4556.32 Elevation= 77.3
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
88.93	4093.52	72.29	4360.454	583.665	73.91

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 117.2

INPUT
Description: RGV-02. Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 442

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.35	6.56	82.48	19.68	82.52	32.8	82.45	45.91	82.54
59.03	82.28	65.59	82.46	78.71	82.57	81.99	82.73	105.99	82.97
106.66	82.97	106.66	72.97	116.66	72.77	207.66	71.24	210.66	71.99
234.66	71.51	240.66	70.01	250.66	69.81	256.66	68.31	259.09	68.38
275.49	68.21	285.33	68.37	288.61	68.3	298.45	68.41	305.01	68.32
318.12	68.29	327.96	68.42	334.52	68.26	341.08	68.46	354.2	68.25
364.04	68.34	370.6	68.3	380.44	68.35	383.72	68.43	393.56	68.32
400.11	68.48	406.67	68.52	413.23	68.34	419.79	68.34	426.35	68.47
432.91	68.47	439.47	68.37	446.03	68.57	449.31	68.37	455.87	68.53
459.15	68.39	468.99	68.53	482.11	68.48	491.94	68.62	498.5	68.48
505.06	68.65	511.62	68.45	524.74	68.62	531.3	68.62	537.86	68.46
547.7	68.65	557.54	68.52	564.1	68.56	570.66	68.45	580.49	68.49
583.77	68.62	590.33	68.46	600.17	68.63	603.45	68.47	610.01	68.56
616.57	68.51	626.41	68.57	629.69	68.45	636.25	68.7	642.81	68.57
646.09	68.63	649.37	68.49	655.93	68.66	662.49	68.63	669.04	68.48
675.6	68.52	678.88	68.64	688.72	68.44	695.28	68.57	698.56	68.5
708.4	68.49	711.68	68.57	724.8	68.56	731.36	68.49	734.64	68.57
744.48	68.6	757.59	68.48	777.27	68.53	793.67	68.37	803.51	68.61
813.35	68.55	823.19	68.66	836.31	68.61	842.86	68.67	852.7	68.54
865.82	68.58	869.1	68.46	878.94	68.7	888.78	68.55	898.62	68.66
908.46	68.67	915.02	68.58	928.14	68.8	951.09	68.7	954.37	68.78
960.93	68.72	970.77	68.75	980.61	68.91	987.17	68.82	997.01	68.79
1006.85	69.02	1016.69	68.82	1026.52	69.07	1039.64	68.83	1052.76	68.83
1059.32	68.93	1069.16	68.96	1072.44	68.9	1079	68.99	1095.4	68.88
1115.07	69.01	1128.19	69.03	1138.03	69.13	1144.59	69	1157.71	68.93
1167.55	69.1	1177.38	68.98	1183.94	69.05	1190.5	69	1197.06	69.08
1210.18	68.93	1220.02	69.01	1226.58	69.14	1229.86	69.08	1256.09	69.1
1259.37	69.04	1265.93	69.15	1272.49	69.1	1282.33	69.25	1285.61	69.15
1295.45	69.23	1302.01	69.09	1334.8	69.21	1344.64	69.13	1351.2	69.22
1357.76	69.16	1370.88	69.27	1377.44	69.17	1387.28	69.3	1393.84	69.21
1406.95	69.34	1420.07	69.23	1426.63	69.32	1436.47	69.32	1452.87	69.17
1459.43	69.28	1469.27	69.29	1475.83	69.2	1479.1	69.28	1495.5	69.27
1505.34	69.4	1515.18	69.3	1521.74	69.38	1534.86	69.28	1544.7	69.44
1551.26	69.39	1564.37	69.42	1570.93	69.5	1574.21	69.39	1580.77	69.54
1597.17	69.4	1607.01	69.61	1610.29	69.47	1626.69	69.54	1633.25	69.48
1643.08	69.49	1646.36	69.56	1656.2	69.52	1659.48	69.63	1666.04	69.55
1672.6	69.59	1685.72	69.46	1692.28	69.33	1698.84	69.4	1702.12	69.78
1705.4	69.82	1715.23	69.55	1725.07	69.65	1738.19	69.46	1748.03	69.58
1757.87	69.58	1764.43	69.73	1777.55	69.57	1784.11	69.69	1793.94	69.56

1803.78	69.72	1820.18	69.64	1823.46	69.69	1830.02	69.59	1843.14	69.56		
1846.42	69.62	1856.26	69.61	1862.82	69.72	1872.65	69.66	1879.21	69.74		
1889.05	69.53	1895.61	69.72	1908.73	69.74	1918.57	69.67	1921.85	69.72		
1934.97	69.7	1944.8	69.81	1951.36	69.72	1961.2	69.8	1987.44	69.8		
2000.56	69.9	2010.4	69.9	2016.96	69.76	2033.35	69.71	2036.63	69.8		
2046.47	69.87	2053.03	69.81	2062.87	69.86	2066.15	69.8	2079.27	69.88		
2092.39	69.76	2102.22	69.87	2108.78	69.68	2112.06	69.68	2121.9	69.9		
2131.74	69.71	2138.3	69.94	2154.7	69.94	2164.54	70.04	2174.38	69.94		
2184.21	70.18	2190.77	70.09	2207.17	70.08	2230.13	69.96	2236.69	70.09		
2243.25	70.02	2253.08	70.01	2262.92	70.1	2276.04	69.93	2282.6	70.12		
2292.44	70.02	2302.28	70.17	2312.12	70.08	2318.68	70.21	2328.52	70.09		
2341.63	70.18	2344.91	70.12	2358.03	70.24	2371.15	70.18	2380.99	70.29		
2387.55	70.23	2397.39	70.33	2403.95	70.2	2417.06	70.3	2423.62	70.41		
2426.9	70.29	2433.46	70.3	2440.02	70.46	2453.14	70.28	2466.26	70.44		
2472.82	70.34	2485.94	70.44	2492.49	70.29	2502.33	70.45	2512.17	70.22		
2518.73	70.35	2528.57	70.22	2535.13	70.45	2541.69	70.32	2561.37	70.38		
2567.93	70.3	2587.6	70.3	2597.44	70.38	2604	70.34	2617.12	70.44		
2623.68	70.34	2640.08	70.41	2653.19	70.39	2656.47	70.48	2663.03	70.36		
2672.87	70.36	2692.55	70.57	2702.39	70.58	2712.23	70.49	2722.07	70.59		
2728.62	70.52	2738.46	70.62	2774.54	70.67	2781.1	70.43	2790.94	70.56		
2800.78	70.61	2807.34	70.55	2810.61	70.62	2820.45	70.56	2836.85	70.75		
2846.69	70.56	2863.09	70.52	2879.49	70.62	2886.05	70.51	2895.88	70.56		
2902.44	70.51	2915.56	70.72	2922.12	70.69	2928.68	70.78	2945.08	70.62		
2951.64	70.79	2964.76	70.72	2971.31	70.89	2977.87	70.91	2987.71	70.8		
2997.55	70.9	3004.11	70.83	3017.23	70.94	3023.79	70.82	3030.35	70.86		
3040.19	70.82	3046.74	70.96	3059.86	70.85	3069.7	70.93	3082.82	70.91		
3089.38	71.02	3105.78	71.06	3122.18	71.05	3128.73	71	3141.85	71.01		
3148.41	70.93	3161.53	70.99	3168.09	70.91	3177.93	71.02	3187.77	70.91		
3194.33	71.03	3210.72	71.1	3217.28	71.03	3227.12	71.2	3240.24	71		
3246.8	71.15	3256.64	71.05	3266.48	71.25	3273.04	71.17	3292.71	71.12		
3299.27	71.23	3309.11	71.24	3328.79	71	3355.03	71.26	3364.86	71.22		
3371.42	71.36	3377.98	71.28	3387.82	71.29	3394.38	71.37	3400.94	71.28		
3414.06	71.25	3423.9	71.39	3433.74	71.41	3440.29	71.63	3450.13	71.42		
3459.97	71.45	3466.53	71.2	3473.09	71.38	3482.93	71.48	3496.05	71.98		
3499.33	72.39	3505.89	73.47	3509.17	73.67	3512.45	72.99	3515.73	71.89		
3522.28	70.59	3525.56	70.36	3528.84	70.41	3535.4	70.91	3538.68	70.75		
3548.52	69.06	3551.8	68.32	3558.36	65.97	3561.63	65.07	3564.89	64.47		
3568.16	63.65	3574.69	61.45	3577.96	60.69	3581.23	60.26	3584.49	60.09		
3587.76	59.7	3591.02	59.11	3594.29	58.28	3597.56	57.71	3597.56	57.29		
3607.56	51.84	3617.56	48.34	3627.56	47.84	3637.56	47.84	3647.56	46.84		
3667.56	47.84	3687.56	47.84	3697.56	48.34	3707.56	47.34	3717.56	47.34		
3727.56	48.34	3737.56	48.84	3747.56	49.04	3754.35	48.84	3754.35	57.71		
3757.61	58.02	3760.88	59.49	3764.15	61.83	3767.41	64.84	3770.68	69.47		
3773.95	72.71	3777.21	72.91	3780.48	72.83	3787.01	71.76	3790.28	71.7		
3793.54	71.94	3800.08	72.15	3803.34	72.07	3813.14	72.25	3819.68	72.16		
3822.94	72.25	3836.01	72.29	3842.54	72.1	3849.07	72.38	3855.61	72.29		
3862.14	72.07	3868.67	72.09	3875.21	72.01	3885.01	71.71	3891.54	71.91		
3898.07	71.85	3907.87	71.53	3914.4	71.49	3920.94	71.82	3927.47	72.71		
3937.27	72.98	3940.54	73.87	3947.07	77.78	3950.33	78.45	3956.87	78.01		
3966.67	78.42	3969.93	78.43								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.167	3509.17	.066	3597.56	.025	3754.35	.066	3777.21	.068

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3509.17	3777.21	2233.4	2575 2667.55	.1	.3

Left Levee Station= 106.66 Elevation= 82.97
Right Levee Station= 3950.33 Elevation= 78.45
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
54.08	3508.73	73.67	3777.21	3941.41	72.95

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	75.66	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.18	Wt. n-Val.	0.167	0.044	0.068	
W.S. Elev (ft)	75.48	Reach Len. (ft)	2233.40	2575.00	2667.55	
Crit W.S. (ft)	56.42	Flow Area (sq ft)	6155.90	5290.57	413.69	
E.G. Slope (ft/ft)	0.000225	Area (sq ft)	6155.90	5290.57	413.69	
Q Total (cfs)	20000.00	Flow (cfs)	1220.27	18530.90	248.83	
Top Width (ft)	3836.57	Top Width (ft)	3402.51	268.04	166.02	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)	0.20	3.50	0.60	
Max Chl Dpth (ft)	28.64	Hydr. Depth (ft)	1.81	19.74	2.49	
Conv. Total (cfs)	1332449.0	Conv. (cfs)	81297.1	1234574.0	16577.8	
Length Wtd. (ft)	2554.31	Wetted Per. (ft)	3404.35	287.60	166.58	
Min Ch El (ft)	46.84	Shear (lb/sq ft)	0.03	0.26	0.03	
Alpha	4.00	Stream Power (lb/ft s)	0.01	0.91	0.02	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	6372.67	3767.83	1383.87	
C & E Loss (ft)	0.01	Cum SA (acres)	1682.53	194.50	500.82	

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 116.5

INPUT
Description: RGV-02. Bathymetric elevations translated from IBWC 2008
Cross-sections
Station Elevation Data num= 437

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.86	3.28	81.16	9.83	81.99	16.38	82.52	19.66	82.72
22.94	82.83	29.49	82.79	36.05	83.09	39.32	83.2	63.32	83.44
63.99	83.44	63.99	73.44	73.99	73.24	164.99	67.46	167.99	68.21
191.99	67.73	197.99	66.23	207.99	66.03	213.99	64.53	216.28	64.45
219.56	64.4	222.84	64.5	226.11	64.69	232.67	67.08	235.95	68.21
239.23	68.98	242.51	68.88	245.79	68.68	249.07	68.6	255.63	68.59
258.91	68.39	265.46	68.41	268.74	68.35	275.3	68.42	281.86	68.33
288.42	68.38	301.54	68.4	308.1	68.3	314.66	68.37	317.94	68.35
324.5	68.2	327.78	68.23	334.34	68.36	337.62	68.31	344.18	68.34
347.46	68.28	354.02	68.35	360.58	68.36	363.86	68.28	370.42	68.4
380.26	68.41	386.82	68.38	390.1	68.48	396.66	68.37	399.94	68.35
406.5	68.46	413.06	68.36	422.9	68.43	432.74	68.35	436.02	68.4
442.58	68.39	445.86	68.32	452.42	68.37	455.7	68.32	465.54	68.37
468.82	68.41	475.38	68.41	478.66	68.36	481.94	68.46	485.22	68.38
491.78	68.37	498.34	68.43	504.9	68.43	511.46	68.38	524.58	68.47
527.86	68.45	534.42	68.53	537.7	68.45	544.26	68.53	560.65	68.54

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  563.93    68.6  570.49   68.51  580.33   68.63  586.89   68.56  590.17   68.59
  596.73   68.57  600.01   68.62  606.57   68.59  613.13   68.62  619.69   68.52
  629.53   68.59  642.65   68.58  649.21   68.74  659.05   68.72  665.61   68.68
  672.17   68.68  675.45   68.63  685.29   68.65  688.57   68.58  695.13   68.64
  701.69   68.59  708.25   68.65  711.53   68.72  727.93   68.67  731.21   68.74
  734.49   68.55  737.77   68.56  744.33   68.77  747.61   68.76  750.89   68.84
  754.17   68.74  757.45   68.77  764.01   68.76  767.29    68.8  770.57   68.73
  777.13   68.78  780.41   68.67  783.69   68.83  790.25   68.71  800.09   68.82
  803.37   68.76  806.65   68.82  819.77   68.75  823.05   68.79  832.88   68.74
  839.44   68.79  842.72   68.78  849.28   68.84  855.84   68.76   862.4   68.81
  865.68   68.75  872.24   68.79   878.8   68.74  882.08   68.78  888.64   68.96
  891.92   68.96   895.2   68.89  901.76   68.89  908.32   68.94  914.88   68.81
  924.72   68.78     928    68.8  934.56   68.95  941.12   68.88  947.68   68.92
  954.24   68.87   960.8   68.93  973.92   68.97   977.2   68.95  983.76   69.03
  990.32   69.04   993.6   69.01 1000.16   69.03 1006.72   69.12    1010   69.21
 1016.56      69 1019.84   69.02  1026.4   69.48 1032.96   69.77 1039.52   70.36
  1042.8   70.79 1046.08   71.11 1055.92   71.66  1059.2    71.7 1065.76   71.38
 1069.04   71.51 1072.32   71.56  1075.6   71.31 1085.44   71.16    1092   71.33
 1098.56   71.19 1105.12   71.13  1108.4   71.26 1111.68   71.26 1121.51   71.03
 1128.07   71.24 1131.35   71.25 1134.63   71.12 1141.19   70.99 1144.47   70.99
 1147.75   71.11 1151.03   71.16 1154.31   71.08 1157.59    71.1 1167.43   70.82
 1170.71   70.87 1173.99   70.85 1177.27   70.75 1187.11   70.87 1190.39   70.87
 1193.67   70.76 1200.23   70.76 1203.51   70.69 1210.07   70.47 1213.35   70.46
 1216.63   70.57 1219.91    70.6 1226.47   70.46 1233.03   70.53 1242.87   70.58
 1249.43    70.5 1255.99   70.34 1269.11   70.56 1275.67   70.43 1278.95   70.43
 1288.79   70.78 1301.91   70.96 1305.19   71.15 1311.75   71.97    1315   72.07
 1318.26   71.88 1321.51   70.75 1328.03   68.79 1331.28   68.22 1334.54   67.95
 1337.79   68.02  1344.3   67.46 1347.56   67.36 1357.32   67.16 1363.83   66.89
 1367.09   66.58 1370.34   66.52 1380.11   66.43 1383.36   66.14 1386.62   66.01
 1393.13   66.54 1399.64   66.86  1402.9   67.12 1406.15   67.45 1409.41   67.59
 1412.66   67.96 1415.92   68.41 1419.17   68.78 1425.68    69.4 1432.19    70.2
 1435.45   69.75  1438.7   68.06 1441.96   66.29 1448.47   63.08 1451.72   62.19
 1454.98   61.41 1458.23   60.85 1461.49   60.21    1468   58.45 1471.26   57.69
 1474.51   57.55 1474.51    55.7 1480.51    54.7 1490.51    52.7 1500.51    49.7
 1510.51    48.9 1520.51    47.7 1530.51    45.9 1540.51    47.7 1550.51      47
 1560.51    45.7 1570.51    45.7 1580.51    45.9 1590.51      46 1600.51    46.2
 1610.51    46.5 1620.51    46.5 1630.51    46.7 1640.51    47.4 1650.51    49.2
 1650.74    50.2 1650.74   57.55 1654.01   57.76 1657.28   58.51 1660.54   59.59
 1663.81   60.42 1670.35   61.58 1673.61   62.72 1680.15   64.85 1686.68   67.48
 1689.95   68.43 1693.22   69.15 1696.48   70.38 1699.75   72.22 1703.02   74.26
 1706.29   75.19 1709.55   75.24 1712.82   74.59 1716.09   74.28 1719.36   74.39
 1722.62   74.64 1725.89   74.59 1735.69   73.34 1742.23   72.63 1745.49   72.37
 1752.03   72.67  1755.3   72.66  1765.1   72.35 1768.37    72.3  1778.2   72.35
 1781.47   72.44  1791.3   72.48 1797.85   72.59 1801.12   72.55 1807.67   72.55
 1814.22   72.62 1827.32   72.65 1833.87   72.55 1840.42    72.5 1850.25   72.64
 1863.35   72.63 1866.62   72.56 1873.17   72.51 1876.45   72.56    1883   72.58
 1886.27   72.47 1892.82    72.5  1896.1   72.57 1902.65    72.5 1905.93   72.57
 1915.75   72.53 1919.03   72.41 1925.58   72.41  1935.4   72.36 1941.95   72.48
 1945.23   72.41 1951.78   72.38  1961.6   72.44 1968.15   72.33 1977.98   72.31
 1981.25   72.38 1984.53   72.33 1991.08   72.44 1997.63   72.37 2004.18    72.4
 2007.45    72.5    2014   72.34 2017.28   72.33 2023.83   72.19  2027.1   72.27
  2040.2   72.25 2043.48   72.33 2046.75   72.33 2050.03   72.21 2056.58   72.18
 2059.85   72.12  2066.4   72.19 2072.95   72.08 2076.23   72.14 2082.78   72.06
  2092.6   72.07 2095.87   72.02 2099.15   72.14 2102.42   72.05  2118.8   71.98
 2125.35   72.04 2128.62   71.98 2135.17   72.05 2138.45   71.98    2145   71.92
 2148.27   72.01 2151.55   72.02 2154.82   71.86  2158.1    71.9 2164.65   71.89
 2167.92   71.82 2177.75   71.85 2181.02    71.8 2187.57    71.8 2190.85   71.75
 2200.67   71.83  2210.5   71.74 2213.77   71.81 2226.87    71.7 2230.15   71.73
 2233.42   71.83 2243.25   71.69  2249.8   71.69 2253.07   71.61 2259.62    71.6
  2262.9   71.72 2266.17   71.67 2272.72   71.66 2275.99    71.5 2282.54   71.47
 2292.37   71.55 2298.92   71.44 2305.47   71.49 2312.02   71.43 2318.57   71.27
 2321.84   71.37 2325.12   71.36 2331.67   71.27 2334.94   71.18 2344.77   71.25
 2348.04   71.24 2354.59   71.12 2364.42   71.14 2367.69   71.07 2380.79   70.94
 2390.62   70.75 2397.17   70.82 2400.44    70.7 2416.82   70.43 2420.09   70.33
 2423.37   70.32 2433.19   70.17 2436.47   70.15 2443.01   70.21 2446.29   70.19
 2449.56   70.02 2452.84   69.93 2456.11   69.94 2465.94   69.88 2469.21   69.79
 2472.49   69.82 2479.04   69.78 2485.59    69.7 2492.14   69.68 2498.69   69.61
 2508.51   69.43 2511.79   69.54 2515.06   69.57 2518.34   69.46 2524.89   69.33
 2537.99   69.29 2541.26   69.25 2551.09   69.28 2567.46   69.16 2577.29   69.14
 2580.56   69.19 2587.11   69.42 2593.66   69.34 2596.94   69.55 2600.21   69.96
 2603.49   70.56 2606.76   71.41 2610.03   72.99 2613.31   75.44 2616.58   76.93
 2619.86   77.24 2629.68   77.29

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .13 1432.19    .066 1474.51    .025 1650.74    .066 1693.22    .068

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1432.19 1693.22          2319.56 2249.67 2048.62            .1       .3
Left Levee      Station=   63.99      Elevation=   83.44
Right Levee     Station= 2629.68      Elevation=   77.29
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  167.13    1315   72.07 1321.51 1432.19    70.2 1709.55 2613.31   75.24

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             75.22    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                 0.130      0.040     0.068
  W.S. Elev (ft)             75.07    Reach Len. (ft)          2319.56    2249.67   2048.62
  Crit W.S. (ft)             55.11    Flow Area (sq ft)        4468.41    5850.41     36.77
  E.G. Slope (ft/ft)      0.000129    Area (sq ft)             4468.41    5850.41     36.77
  Q Total (cfs)           20000.00    Flow (cfs)               1274.81   18707.84     17.35
  Top Width (ft)           1641.88    Top Width (ft)           1368.20     261.03     12.65
  Vel Total (ft/s)            1.93    Avg. Vel. (ft/s)            0.29       3.20      0.47
  Max Chl Dpth (ft)          29.37    Hydr. Depth (ft)            3.27      22.41      2.91
  Conv. Total (cfs)       1758507.0    Conv. (cfs)            112087.7   1644894.0    1525.7
  Length Wtd. (ft)         2234.88    Wetted Per. (ft)         1374.43     276.49     14.06
  Min Ch El (ft)             45.70    Shear (lb/sq ft)            0.03       0.17      0.02
  Alpha                       2.57    Stream Power (lb/ft s)      0.01       0.55      0.01
  Frctn Loss (ft)             0.31    Cum Volume (acre-ft)     6100.31    3438.54   1370.08
  C & E Loss (ft)             0.01    Cum SA (acres)           1560.23     178.87    495.35


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 116.1
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INPUT
Description: RGV-02. Enforcement Zone not applied to section - Waterway not
likely to be modified. Original IBWC Cross-section data applied to
this section.Bathymetric elevations translated from IBWC 2008
Cross-sections, Extended blocked obstruction
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.06	3.28	82.85	13.12	82.97	22.96	83.56	26.23	83.52
29.51	83.29	36.07	83.35	39.35	83.32	42.63	83.08	45.91	82.64
49.19	82.33	52.47	81.78	59.03	80.87	62.31	79.94	68.87	78.37
75.43	76.87	78.7	76.5	118.06	76.5	124.62	76.51	131.17	77.43
134.45	78.09	141.01	79.68	144.29	80.03	150.85	81.04	154.13	81.17
160.69	80.95	163.97	81	167.25	80.87	170.53	80.64	173.81	80.71
180.37	80.68	183.64	80.77	186.92	80.75	193.48	80.55	196.76	80.3
200.04	80.17	203.32	80.19	206.6	80.03	213.16	80.05	219.72	79.93
223	79.99	226.28	79.82	229.56	79.85	236.11	79.47	242.67	79.23
245.95	79.01	252.51	78.69	259.07	78.54	265.63	78.32	268.91	78
275.47	77.64	278.75	77.26	285.3	76.98	288.58	76.72	291.86	76.57
298.42	76.46	304.98	76.58	311.54	76.59	314.82	76.52	318.1	77.41
327.94	76.92	334.5	76.82	341.05	76.86	347.61	76.8	360.73	76.52
364.01	76.58	367.29	76.42	370.57	76.35	377.13	76.55	383.69	76.37
393.52	76.41	396.8	76.36	409.92	76.34	416.48	76.39	426.32	76.31
436.16	76.31	442.71	76.36	449.27	76.27	455.83	76.38	462.39	76.32
468.95	76.4	475.51	76.38	482.07	76.3	485.35	76.38	498.46	76.38
501.74	76.32	511.58	76.36	514.86	76.32	521.42	76.38	524.7	76.46
534.54	76.32	537.82	76.41	544.37	76.33	554.21	76.44	557.49	76.39
567.33	76.48	573.89	76.35	580.45	76.46	587.01	76.45	593.57	76.82
603.4	76.89	609.96	76.36	619.8	76.41	626.36	76.32	632.92	76.34
636.2	76.29	642.76	76.4	655.87	76.52	665.71	76.35	672.27	76.38
678.83	76.56	682.11	76.58	688.67	76.41	691.95	76.47	695.23	76.36
701.78	76.42	705.06	76.35	711.62	76.44	714.9	76.42	721.46	76.48
724.74	76.43	731.3	76.57	734.58	76.56	737.86	77.05	741.14	77.81
744.42	78.09	747.7	77.91	757.53	77.48	760.81	77.23	767.37	76.4
770.65	76.14	773.93	75.99	777.21	76.01	780.49	75.88	787.05	75.18
793.61	74.95	796.89	74.78	800.17	74.71	803.45	74.78	810	74.78
813.28	74.71	816.56	74.78	823.12	74.8	826.4	74.68	829.68	74.47
832.96	73.92	836.24	72.62	849.36	66.27	852.64	64.94	855.92	64.17
859.19	63.74	862.47	63.54	869.03	63.41	872.31	63.05	875.59	62.08
878.87	60.41	882.15	58.46	885.43	57.63	888.71	57.51	888.71	56.17
898.71	53.16	908.71	51.46	918.71	50.46	928.71	50.46	938.71	49.46
948.71	49.16	958.71	48.66	968.71	47.86	978.71	47.46	988.71	46.66
998.71	46.46	1008.71	46.46	1018.71	45.66	1028.71	45.46	1038.71	45.16
1048.71	44.66	1055.92	44.66	1055.92	57.48	1059.19	58.22	1062.46	59.34
1065.74	59.87	1072.29	60.49	1075.56	60.67	1078.84	60.95	1082.11	61.55
1085.38	62.7	1088.66	64.07	1091.93	65.33	1095.21	66.29	1098.48	66.92
1101.75	67.29	1111.58	68.08	1124.67	68.6	1127.95	68.85	1131.22	68.91
1137.77	68.87	1147.59	68.59	1154.14	68.55	1160.69	68.45	1163.96	68.3
1170.51	68.28	1173.79	68.2	1183.61	68.34	1186.88	68.61	1190.16	68.8
1196.7	68.49	1203.25	68.11	1206.53	68	1213.08	67.44	1216.35	67.45
1219.62	67.55	1226.17	67.65	1232.72	67.92	1235.99	67.99	1242.54	68.01
1249.09	67.92	1255.64	67.94	1262.19	68.12	1268.74	67.94	1281.83	68.38
1291.66	68.45	1298.2	68.65	1314.57	68.86	1321.12	68.83	1324.4	68.89
1337.49	68.91	1344.04	69.04	1353.86	69.05	1357.14	69.14	1363.69	69.4
1370.23	69.51	1376.78	69.73	1383.33	69.69	1386.6	69.72	1393.15	69.87
1399.7	69.73	1402.97	69.83	1412.8	69.98	1419.35	70.14	1429.17	70.21
1438.99	70.22	1448.81	70.36	1461.91	70.46	1468.46	70.62	1475.01	70.64
1481.55	70.75	1488.1	70.8	1497.92	70.78	1507.75	70.79	1514.3	70.9
1517.57	70.89	1524.12	70.96	1537.21	70.82	1543.76	70.84	1550.31	70.99
1560.13	71.13	1569.95	71.42	1576.5	71.5	1583.05	71.63	1589.6	71.62
1592.87	71.51	1602.7	71.5	1612.52	71.35	1615.79	71.35	1622.34	71.47
1628.89	71.4	1632.16	71.44	1638.71	71.8	1645.26	72.43	1648.54	72.66
1651.81	72.66	1655.08	72.45	1658.36	72.15	1661.63	72.02	1668.18	71.85
1671.45	71.84	1678	71.71	1687.82	71.72	1694.37	71.87	1697.65	71.89
1700.92	71.81	1707.47	71.96	1710.74	71.94	1714.02	72.11	1717.29	71.97
1723.84	71.94	1727.11	71.83	1733.66	71.88	1740.21	71.87	1743.49	71.8
1746.76	71.82	1750.03	71.93	1756.58	71.97	1759.86	72.05	1766.4	71.96
1769.68	72.06	1776.23	72.04	1779.5	71.91	1792.6	72.04	1795.87	72.13
1802.42	71.95	1805.69	71.95	1808.97	71.85	1812.24	71.88	1815.52	72.04
1822.07	72.17	1825.34	72.12	1831.89	72.11	1835.16	72.23	1841.71	72.32
1848.26	72.69	1854.81	73.25	1861.36	73.3	1864.63	73.77	1867.9	73.94
1877.73	73.82	1881	73.72	1890.82	73.89	1894.1	73.42	1900.64	73.08
1903.92	73.11	1910.47	72.12	1913.74	71.69	1917.02	71.62	1920.29	71.68
1923.56	71.27	1926.84	71.07	1930.11	71.09	1933.39	71	1939.93	71.36
1946.48	71.16	1949.76	70.9	1953.03	71.21	1956.31	70.53	1959.58	70.76
1962.85	70.62	1966.13	70.7	1969.4	70.37	1975.95	70.71	1979.22	70.83
1982.5	71.09	1985.77	71.62	1989.05	70.73	1992.32	70.73	1998.87	70.62
2002.14	70.11	2005.42	70.02	2008.69	70.41	2011.97	70.38	2018.51	70.48
2021.79	70.31	2025.06	69.81	2028.34	70.18	2034.89	69.98	2038.16	70.57
2041.43	70.4	2047.98	70.33	2051.26	70.7	2057.8	70.54	2061.08	70.6
2064.35	71	2067.63	70.86	2074.17	71.28	2077.45	70.99	2080.72	71.15
2084	71.05	2087.27	71.1	2090.55	70.81	2097.09	70.87	2100.37	71.32
2103.64	71.44	2106.92	73.62	2110.19	73.52	2113.46	73.28	2116.74	73.27
2120.01	72.92	2123.29	72.77	2126.56	72.71	2129.84	72.56	2133.11	72.17
2136.38	72.11	2139.66	72.37	2146.21	72.09	2149.48	72.17	2156.03	71.9
2162.58	72	2165.85	71.76	2169.13	71.61	2172.4	71.83	2182.22	71.66
2185.5	71.42	2188.77	71.79	2195.32	71.27	2198.59	71.88	2201.87	71.93
2205.14	71.85	2208.42	71.58	2211.69	71.64	2214.96	71.34	2218.24	71.41
2221.51	71.2	2224.79	71.36	2228.06	71.63	2231.34	71.74	2237.88	71.8
2241.16	71.94	2244.43	71.94	2247.71	71.71	2250.98	71.68	2257.53	71.95
2264.08	72.28	2270.63	72.77	2277.17	72.96	2283.72	72.96	2287	73.13
2293.54	72.98	2296.82	73.01	2306.64	72.75	2316.46	72.57	2319.74	72.46
2332.83	72.34	2339.38	72.45	2342.66	72.45	2345.93	72.36	2365.58	72.36
2368.85	72.33	2378.67	72.44	2381.95	72.36	2388.5	72.31	2398.32	72.17
2411.42	71.84	2421.24	71.79	2431.06	71.7	2437.61	71.67	2444.16	71.59
2453.98	71.58	2457.25	71.53	2467.08	71.51	2473.62	71.59	2480.17	71.56
2486.72	71.47	2493.27	71.44	2499.82	71.46	2506.37	71.36	2519.46	71.46
2529.29	71.45	2535.83	71.62	2545.66	71.73	2552.2	71.55	2555.48	71.54
2562.03	71.67	2565.31	71.93	2571.86	72.7	2575.14	73.37	2581.69	75.31
2584.97	75.97	2588.24	76.22	2604.62	76.68	2617.73	76.38	2621	76.42

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	741.14	.066	888.71	.025	1055.92	.066	1131.22	.067

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
836.24	1131.22	1908.51	1935 1844.83	.1	.3

Left Levee Station= 22.96 Elevation= 83.56
Right Levee Station= 2604.62 Elevation= 76.68
Blocked Obstructions num= 1

Sta L	Sta R	Elev
1131.22	2621	68.91

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	74.89	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.11	Wt. n-Val.	0.066	0.045	0.067	
W.S. Elev (ft)	74.78	Reach Len. (ft)	1908.51	1935.00	1844.83	
Crit W.S. (ft)	55.86	Flow Area (sq ft)	8.30	5778.74	5217.62	
E.G. Slope (ft/ft)	0.000154	Area (sq ft)	8.30	5778.74	5217.62	
Q Total (cfs)	20000.00	Flow (cfs)	1.54	16629.83	3368.62	
Top Width (ft)	1777.74	Top Width (ft)	34.06	294.98	1448.70	
Vel Total (ft/s)	1.82	Avg. Vel. (ft/s)	0.19	2.88	0.65	
Max Chl Dpth (ft)	30.12	Hydr. Depth (ft)	0.24	19.59	3.60	
Conv. Total (cfs)	1612474.0	Conv. (cfs)	124.4	1340758.0	271590.8	
Length Wtd. (ft)	1921.10	Wetted Per. (ft)	34.36	314.40	1451.07	
Min Ch El (ft)	44.66	Shear (lb/sq ft)	0.00	0.18	0.03	
Alpha	2.11	Stream Power (lb/ft s)	0.00	0.51	0.02	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	5981.12	3138.25	1246.52	
C & E Loss (ft)	0.01	Cum SA (acres)	1522.89	164.51	460.99	

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 115.7

INPUT
Description: RGV-02. 2-foot wall applied with 10:1 SS, Bathymetric elevations
translated from IBWC 2008 Cross-sections
Station Elevation Data num= 447

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.36	3.28	83.51	9.84	83.66	13.12	83.63	19.67	83.79
26.23	83.79	29.51	83.62	32.79	83.17	36.07	82.56	39.35	81.74
45.91	80.31	52.46	78.58	55.74	77.88	62.3	76.81	65.58	76.54
68.86	76.5	127.88	76.5	131.16	76.74	137.72	78.35	144.28	79.54
147.56	79.98	150.84	80.17	174.84	80.41	175.51	80.41	175.51	78.41
185.51	78.21	276.51	77.95	279.51	78.25	303.51	77.77	309.51	77.17
319.51	76.97	325.51	76.37	331.18	76.42	341.02	76.64	354.14	77.05
363.97	77.01	383.65	77.25	390.21	77.24	393.49	77.29	413.16	77.18
419.72	77.24	426.28	77.4	429.55	77.64	432.83	78.04	436.11	78.33
442.67	78.53	445.95	78.47	449.23	78.52	452.51	78.08	455.79	77.8
462.35	77.35	465.62	77.28	468.9	77.37	478.74	77.5	485.3	77.67
495.14	77.69	498.41	77.78	501.69	77.7	508.25	77.44	514.81	77.11
527.93	76.17	537.76	75.11	547.6	74.01	554.16	73.43	557.44	73.02
564	72.5	567.27	72.05	573.83	71.42	580.39	70.68	586.95	69.81
590.23	69.43	600.07	68.51	613.18	67.59	616.46	67.55	623.02	67.31
626.3	67.25	636.13	66.94	645.97	66.78	649.25	66.83	659.09	66.71
665.65	66.68	668.93	66.59	675.48	66.26	682.04	66.21	688.6	66.29
691.88	66.24	695.16	66.28	698.44	66.17	701.72	66.22	711.55	65.92
714.83	65.93	724.67	66.14	731.23	65.95	737.79	65.99	744.34	65.73
747.62	65.81	754.18	65.62	757.46	65.74	760.74	65.66	764.02	65.47
773.85	65.27	780.41	65.27	786.97	65.33	800.09	65.33	803.37	65.28
809.92	65.39	813.2	65.4	819.76	65.26	823.04	65.31	829.6	65.24
832.88	65.28	839.44	65.21	842.72	65.23	849.27	65.13	852.55	65.2
862.39	64.92	868.95	64.89	872.23	64.77	878.78	64.73	882.06	64.86
888.62	64.88	891.9	64.84	905.02	65.14	911.58	65.21	914.85	65.35
918.13	65.58	921.41	65.96	924.69	66.54	927.97	67.37	931.25	68.31
941.09	69.91	944.37	70.55	947.64	71.29	950.92	72.6	954.2	74.29
957.48	76.4	960.76	77.88	964.04	79.19	967.32	80.11	970.6	80.77
973.88	80.9	977.16	80.41	980.44	79.75	986.99	78.16	990.27	77.77
993.55	77.54	1003.39	77.37	1009.95	77.83	1013.23	78.4	1023.06	79.71
1026.34	80.28	1029.62	80.96	1032.9	81.5	1039.46	82.44	1042.74	83.01
1046.02	83.28	1052.57	83.09	1055.85	83.04	1062.41	83.13	1072.25	83.38
1078.81	83.58	1082.08	83.76	1091.92	83.84	1098.48	84.07	1105.04	84.36
1111.6	84.43	1118.15	84.39	1121.43	84.43	1127.99	84.75	1134.55	84.9
1137.83	84.93	1144.39	84.76	1150.94	84.7	1154.22	84.57	1160.78	84.43
1167.34	84.07	1170.62	83.93	1183.73	84.02	1190.29	84.27	1193.57	84.52
1196.85	84.64	1206.69	84.73	1213.24	84.55	1219.8	84.71	1223.08	84.62
1232.92	84.22	1239.48	84.21	1246.03	84.07	1252.59	84.1	1259.15	84.36
1265.71	84.29	1268.99	84.12	1275.55	84.25	1282.1	84.15	1288.66	83.96
1301.78	83.32	1305.06	82.98	1311.61	81.37	1314.89	79.9	1318.17	78.56
1321.45	76.84	1324.73	75.01	1328.01	73.32	1331.29	71.8	1334.57	70.87
1337.85	70.14	1341.13	69.3	1344.4	68.92	1350.96	68.44	1357.52	67.84
1360.8	67.74	1370.64	67.9	1377.19	67.9	1390.31	68.2	1396.87	68.44
1403.43	68.45	1413.26	68.35	1419.82	68.55	1439.5	68.63	1446.05	68.83
1452.61	69.25	1455.89	69.3	1462.45	69.5	1469.01	69.78	1475.56	70.21
1482.12	70.8	1495.12	71.38	1501.62	71.19	1504.87	71.26	1511.36	71.54
1514.61	71.54	1517.86	71.29	1524.36	71.18	1530.86	70.94	1534.11	70.95
1540.61	70.8	1543.85	70.81	1547.1	70.96	1550.35	70.94	1556.85	71.2
1566.6	71.09	1573.1	71.25	1576.35	71.2	1582.84	71.38	1589.34	71.3
1595.84	71.31	1602.34	70.93	1605.59	70.83	1612.08	70.73	1618.58	70.42
1625.08	70.32	1628.33	70.1	1631.58	69.31	1638.08	66.61	1641.33	65.01
1644.58	63.63	1647.82	62.5	1651.07	61.99	1654.32	61.72	1670.57	58.66
1677.07	57.52	1680.32	57.48	1680.32	56.84	1690.32	52.34	1700.32	50.34
1710.32	49.54	1720.32	49.34	1730.32	48.84	1740.32	49.14	1760.32	49.14
1770.32	48.84	1780.32	48.14	1790.32	48.54	1800.32	48.84	1810.32	49.34
1820.32	50.34	1830.32	50.34	1840.32	50.54	1850.2	50.84	1850.2	51.84
1850.2	52.17	1850.2	54.34	1850.2	56.54	1850.2	56.84	1850.2	57.48
1853.48	57.78	1856.76	59.28	1860.03	60.46	1863.31	60.55	1866.59	60.78
1869.87	61.17	1873.14	61.41	1879.7	60.57	1886.25	60.02	1889.53	60.02
1892.81	60.27	1896.08	60.67	1899.36	61.56	1902.64	62.76	1905.92	64.46
1912.47	68.11	1915.75	69.47	1919.03	70.12	1922.3	70.12	1925.58	69.78
1928.86	69.33	1932.14	69.05	1935.41	68.9	1941.97	69	1948.52	68.73
1951.8	68.66	1955.08	68.76	1961.63	69.08	1968.19	69.1	1974.74	69.26
1981.3	69.49	1987.85	69.54	1994.41	69.83	2000.96	69.85	2007.52	70.06
2014.07	70.08	2017.35	70.17	2020.62	70.14	2027.18	69.97	2030.46	69.97
2037.01	70.35	2040.29	70.49	2046.84	70.62	2053.4	70.87	2066.51	71.18
2069.78	71.19	2076.34	71.42	2079.62	71.4	2086.17	71.48	2089.45	71.57
2092.73	71.51	2099.28	71.26	2102.56	71.41	2105.84	72	2109.11	71.49
2112.39	71.72	2118.95	71.43	2122.22	71.1	2125.5	71.59	2128.78	71.64
2132.05	71.6	2135.33	71.68	2138.61	71.54	2141.89	71.55	2148.44	71.44
2155	71.38	2161.55	71.44	2164.83	71.4	2171.38	71.41	2177.94	71.3
2187.77	71.23	2194.32	71.26	2204.16	71.21	2207.43	71.32	2223.82	71.27
2230.38	71.17	2243.49	71.12	2250.04	71.03	2259.87	71.02	2266.43	71.18
2279.54	70.96	2282.81	70.95	2289.37	71.02	2299.2	70.9	2305.76	70.94
2312.31	71.04	2315.59	70.96	2328.7	70.82	2331.97	70.92	2338.53	70.74
2345.08	70.71	2351.64	70.79	2361.47	70.8	2371.3	70.65	2374.58	70.63
2377.86	70.7	2384.41	70.58	2390.97	70.59	2404.08	70.75	2410.63	70.59

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 2417.19    70.6 2423.74   70.47 2427.02   70.36 2430.29   70.35 2436.85   70.22
  2443.4   70.27 2446.68   70.38 2449.96    70.4 2456.51   70.23 2463.07   70.27
 2469.62   70.19 2476.18   70.24 2482.73   70.03 2492.56   70.08 2499.12   69.94
 2508.95   69.81 2515.51   69.79 2531.89   69.57 2538.45   69.62    2545   69.51
 2551.56   69.54 2558.11   69.41 2564.67   69.36 2567.94   69.25 2581.05   69.16
 2587.61   69.19 2594.16   69.12 2600.72   68.98 2607.27   68.98 2610.55    68.9
 2613.83   68.96 2620.38   68.79 2626.94   68.77 2633.49   68.96 2636.77   68.91
  2646.6   68.88 2649.88   68.83 2656.43   68.83 2669.54   68.94  2676.1   68.94
 2689.21   68.89 2699.04   68.98 2705.59   68.95 2712.15   68.87 2721.98   68.95
 2731.81   68.96 2744.92   68.94 2754.75   68.97 2761.31   68.83 2764.59   68.81
 2771.14   69.04  2777.7   69.01 2780.97   69.08 2784.25   69.57 2787.53   70.71
 2794.08   74.46 2797.36   75.77 2800.64   76.62 2803.91   76.95 2807.19   77.08
 2813.75    77.2  2820.3   77.14

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .052  1282.1    .066 1680.32    .025  1850.2    .066  2125.5    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1628.33 1915.75          1409.57 1801.21 1569.56            .1       .3
Left Levee      Station=  175.51      Elevation=   80.41
Right Levee     Station= 2813.75      Elevation=    77.2
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  2125.5  2820.3   71.59

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             74.64    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                0.055      0.044      0.067
  W.S. Elev (ft)             74.57    Reach Len. (ft)         1409.57    1801.21    1569.56
  Crit W.S. (ft)             57.36    Flow Area (sq ft)       4528.98    5697.04    2890.38
  E.G. Slope (ft/ft)      0.000106    Area (sq ft)            4528.98    5697.04    2890.38
  Q Total (cfs)           20000.00    Flow (cfs)              4447.55   14062.44    1490.01
  Top Width (ft)           1880.79    Top Width (ft)           714.77     287.42     878.60
  Vel Total (ft/s)            1.52    Avg. Vel. (ft/s)           0.98       2.47       0.52
  Max Chl Dpth (ft)          26.43    Hydr. Depth (ft)           6.34      19.82       3.29
  Conv. Total (cfs)       1944267.0     Conv. (cfs)            432361.3   1367057.0   144848.9
  Length Wtd. (ft)         1737.53    Wetted Per. (ft)         717.73     300.60     879.75
  Min Ch El (ft)             48.14    Shear (lb/sq ft)           0.04       0.13       0.02
  Alpha                       1.94    Stream Power (lb/ft s)     0.04       0.31       0.01
  Frctn Loss (ft)             0.22    Cum Volume (acre-ft)    5881.72    2883.36    1074.83
  C & E Loss (ft)             0.00    Cum SA (acres)          1506.49     151.57     411.70


Warning: Divided flow computed for this cross-section.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 115.45*

INPUT
Description: RGV-02, 2-foot wall applied with 5:1 SS.
Station Elevation Data    num=     441
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
        0   80.57    5.88   80.72   15.68   80.84   17.64   80.77   21.56   80.28
    27.44    79.2   33.32   78.01   37.24   77.48   41.16   77.33   76.44   77.36
     78.4   77.48   82.32   78.29   86.24   78.89   90.17   79.21  114.17   79.45
   114.84   79.45  114.84   77.45  124.84   77.25  215.84   76.94  218.84   77.54
   242.84   77.06  248.84   75.86  258.84   75.66  264.84   74.46  269.81   74.75
   281.04   75.59  286.65   75.87  295.07   75.54  297.88   75.52   303.5   75.85
   309.11   76.37  311.92   76.55  317.53   76.41  325.95   75.64  331.56   75.21
   339.99   75.02  346.07    74.7  356.83    74.4  362.44   74.42   369.7   74.52
   377.58   74.46   384.9   74.52  390.51   74.76  396.12   74.68  401.74   74.34
   405.13   74.22  413.01   74.23  420.89   74.15  424.81   74.23  428.75   74.43
   432.69   74.54  440.57    74.6  448.44   74.59  452.38   74.39   464.2   74.06
   469.11   73.97  480.34   74.03  485.95   73.98  491.75   74.06  497.18   74.05
   499.98    74.1   505.6   74.05  507.49    74.1  516.83   73.94  519.64   73.82
   528.06   73.66  533.67   73.44  542.94   73.23   547.7   73.03  553.32   72.73
   558.93   72.51  564.55   72.21  574.43   71.86  578.58   71.65  584.19   71.53
   590.17    71.2  598.05   70.91  617.88   69.87  634.72   69.22  643.14   69.03
   645.95   68.93  651.56   68.95  662.79   68.75  668.41   68.72  679.63   68.53
   684.67   68.52  696.48   68.57   708.3    68.5   720.1   68.32  735.86   68.23
   741.39   68.22     747   68.12  755.42   68.17  761.03   68.08  769.46   67.86
   772.27    67.9  775.07    68.2  779.17   68.26  787.04    68.1  794.92   68.12
   802.78   68.02  806.72   68.08   814.6   68.01  818.54   68.06  826.41   67.88
   836.83   67.77  839.64   67.78  848.05    67.7  853.67   67.79   867.7   67.73
   885.46   67.86  893.34   67.83     907   67.84  912.62   67.75  915.42    67.8
   928.77   67.72  940.69   67.79  951.91   67.72  954.72   67.63  964.21    67.6
   968.75   67.64  979.96   67.56   985.6    67.6  994.02   67.75  996.82   67.89
  1003.59   67.87 1007.52   67.95 1015.39   68.19 1019.33   68.48 1027.21   69.43
  1030.51   69.69 1039.02   70.18 1041.73   70.38 1046.89   70.88 1050.83   71.51
  1054.76   72.36  1058.7   73.43 1066.58   74.86 1070.52   75.37 1074.46    75.7
  1078.39   75.77 1082.33   75.51 1086.27   75.16 1094.13   74.33 1102.01   73.94
  1113.83   73.87  1121.7   74.19 1125.64   74.48 1137.17   75.08 1142.79   75.44
  1149.26   75.97 1161.07   76.73 1165.01   76.84 1170.86   76.72 1182.08   76.74
  1196.13   76.98 1204.54   77.03 1210.16   77.15 1215.77   77.13 1221.38   77.26
  1224.19   77.23 1229.81   77.29 1235.42   77.42 1241.04    77.4 1249.45   77.49
  1255.56   77.52 1263.43   77.68 1277.53   77.78 1283.13   77.67 1290.99   77.61
  1302.81   77.46 1308.41   77.33 1314.62   77.24 1330.36   77.34 1346.11   77.66
  1357.93   77.63 1365.79   77.55 1373.67   77.65 1378.58   77.61 1384.19   77.48
  1389.42   77.44  1397.3   77.44 1405.17   77.39 1420.92    77.5  1428.8   77.47
  1432.73   77.39 1443.14   77.53 1448.76    77.5 1467.8177.16077 1476.04   76.86
  1483.91   76.03 1487.85   75.27 1491.78    74.6 1499.66   72.84  1503.6   72.02
  1507.54   71.28 1511.48   70.82 1519.35   69.98 1523.28   69.81 1527.35   69.75
  1539.03   69.36 1544.19   69.27 1549.81   69.31 1552.62   69.26 1562.65   69.29
  1572.26   69.44 1580.69   69.54  1583.5   69.52 1589.11   69.67 1597.53   69.64
  1605.95   69.54 1611.56   69.68 1617.18   69.65  1625.6   69.76 1637.47   69.77
  1645.33   69.85 1662.09   70.14  1667.7    70.2 1680.76   70.49 1688.64   70.79
  1701.39    71.1 1704.25   71.14 1712.05   71.04 1723.75   71.21 1731.55   71.08
  1747.16   70.96 1751.06   70.99 1762.76   70.88 1770.56   71.01 1774.37   71.15
   1785.6   70.91 1790.08   70.77 1796.83    70.7 1801.78   70.72 1810.86   70.92
  1822.09   71.35 1825.18   71.54 1836.13   71.99 1841.74   72.73 1844.55   72.97
  1847.35   72.99 1852.49    72.9 1860.29   72.87  1864.2   72.77 1866.67   72.13
  1868.95   71.27 1871.63   69.84 1876.59   66.99 1879.07   65.67 1884.4963.05638
  1887.96   61.11 1892.71   59.12 1896.42   58.18 1897.47   57.62 1903.86   55.87
  1911.49   52.39 1919.12    50.1 1923.9849.08762 1926.75   48.56 1934.38   47.41
  1942.01    46.2 1951.15   45.24 1965.65   43.63 1972.53   43.19 1980.16   42.49
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 1985.16   42.49 1992.55   43.34 1999.93   44.44 2007.32   45.26 2014.71   46.58
 2020.7348.29727  2022.1   48.69 2029.48   49.31 2036.87   50.27 2044.26      52
 2049.43   53.58 2062.52   53.71 2077.99   53.95 2083.33   54.12 2088.17   54.89
 2093.02      55 2093.27   58.33 2098.35   58.69 2103.42   59.58 2108.48   60.25
 2119.3260.59125  2126.9   60.97 2129.33      61 2136.59   60.53 2141.43   60.53
 2143.85   60.67 2153.53   61.39 2155.96   61.67  2159.2    62.3 2170.48   64.72
 2174.41   65.46 2180.17    66.9 2187.43   68.46 2192.27   69.67 2194.69   70.05
 2198.77   70.35 2202.83   70.32 2211.14   69.88 2219.12   69.81 2227.59   69.89
 2235.41   69.82 2239.49   69.85  2251.7   70.27 2259.85   70.31 2265.97   70.39
 2276.14   70.58 2284.28   70.62 2292.43    70.8 2300.57   70.82 2308.72   70.97
 2316.86   70.97 2320.94   71.03 2326.29   71.03 2331.78   70.96 2337.26      71
 2349.44   71.28  2353.7   71.33 2361.93   71.27 2367.42   71.44 2375.64   71.57
 2386.09   71.63 2394.24    71.8 2405.79   71.77 2410.53   71.83 2422.75    71.7
 2426.82   71.78  2430.9   72.07 2434.96    71.8 2439.04   71.88 2447.19   71.76
 2451.25   71.59 2457.24 71.8673 2467.54   71.83 2471.62   71.74 2485.31    71.7
 2499.01   71.62 2507.24   71.79 2523.69   71.65 2553.07   71.61 2562.07   71.69
 2567.55   71.61 2573.04   71.63 2585.65   71.47 2601.94   71.44 2616.91   71.34
 2630.45   71.45 2644.32   71.32  2650.8   71.31 2658.03   71.36 2663.52   71.32
 2679.32   71.34 2687.46   71.39 2693.67   71.33 2704.64   71.31 2720.04   71.15
 2737.54   71.11 2748.54   71.13 2753.99   71.04 2764.83   70.98 2768.91   71.03
 2777.05   70.96 2797.86    70.9 2803.34   70.92 2809.63   70.82 2814.31   70.84
 2817.78   70.78    2830   70.67  2833.5   70.68 2841.72   70.56 2850.35   70.54
  2858.5    70.6 2866.64   70.49 2874.79   70.48 2885.59   70.38 2891.08   70.44
 2899.22   70.33 2902.04   70.34 2915.75   70.28 2921.23   70.21  2931.8   70.17
 2940.42    70.2 2948.65   70.15 2960.31   70.16 2968.46   70.22 2978.81   70.13
 2984.75   70.15 2989.77   70.06 2995.26    70.1  3005.1   69.99 3011.71   69.95
 3022.67   69.93 3029.55   69.99 3045.84   69.95 3050.09   69.97 3058.05   69.86
 3062.13   69.87 3078.42   69.65 3086.56   69.59 3107.66   69.21 3113.15   69.18
 3121.37   69.28 3126.85   69.19 3132.34   69.21 3137.82    69.1 3148.79   68.96
 3151.54   68.86  3162.5   68.69 3176.21   68.56 3187.18   68.41 3196.52   68.44
 3211.85   68.39 3217.33   68.43 3220.07   68.37 3222.82   68.42 3237.24   68.44
 3249.46   68.32  3261.2   68.47 3263.94   68.58 3266.68   68.89 3269.82   69.46
 3273.89   70.45 3277.97   71.89 3283.13   74.01 3285.88   75.36 3288.61   76.25
 3291.36   76.85 3294.26   77.11  3302.4   77.34 3307.81   77.44 3310.55    77.4
  3312.6   77.11 3314.64   76.55 3318.74   74.77 3322.84   73.87 3324.89   73.63
 3326.93   73.55

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .052 1467.81    .066 1884.49    .025 2049.43    .066 2194.69    .067

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1864.2 2194.69          1409.57 1801.21 1569.56             .1       .3
Left Levee      Station=  114.84      Elevation=   79.45
Right Levee     Station= 3308.91      Elevation=  77.465
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  114.84  307.23    76.5  313.25  313.25   76.56  315.26 1076.31   75.72
 1491.97 1845.38   72.97 2528.11 3279.12   71.66

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 115.2

INPUT
Description: RGV-02. End Wall, 6-foot wall applied with 10:1 SS, Bathymetric
             elevations translated from IBWC 2008 115 Cross-section
Station Elevation Data    num=     445
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   77.77    3.28    77.8    9.83   78.25   33.83   78.49    34.5   78.49
    34.5   72.49    44.5   72.29   135.5   71.99   138.5   72.29   162.5   71.81
   168.5   71.21   178.5   71.01   184.5   70.41  186.74   70.26  190.02   69.83
   193.3   69.74  196.57   69.88  199.85   69.74   206.4   70.04  212.95    70.8
  216.23   71.06  229.34   72.46  232.61   72.67  239.16   73.32  245.72   74.23
  252.27   74.88  258.82   75.41   262.1   75.27  268.65   74.74  271.93   74.69
  278.48   75.31  285.03   76.28  288.31   76.59  291.58    76.5  294.86    76.2
  304.69   74.44  311.24   73.45  314.52   73.21  321.07      73  324.35    72.8
  327.62   72.42  334.17    72.1  340.73   71.68  347.28   71.66  357.11    71.8
  363.66   71.69  370.21   71.67  373.49   71.76  380.04   72.28  383.32   72.12
  386.59   72.14  393.15   71.48  396.42   71.27  406.25   71.23   412.8   70.95
  419.36   70.82  422.63   70.85  435.74   70.66  448.84   70.67  461.95   70.79
   468.5   70.75  471.78   70.63  478.33   70.57  484.88    70.6  491.43   70.41
  494.71   70.47  504.54   70.43  507.81   70.52  514.37   70.37  517.64   70.44
  527.47   70.36  530.75   70.22  540.58   70.26  547.13   70.15   550.4   70.25
  563.51   70.32  570.06   70.22  576.61   70.29  583.17   70.22  586.44   70.31
  599.55   70.29   606.1   70.42  612.65   70.35  622.48   70.41  625.76   70.32
  635.59   70.37  645.41   70.32  655.24   70.35  665.07   70.24   674.9   70.34
  678.18   70.28  684.73   70.43  697.83   70.29  704.39   70.39  717.49   70.22
  733.87   70.31  737.15   70.38  753.53   70.32  756.81   70.26  763.36   70.39
  773.19   70.35  786.29    70.1  789.57   70.18  796.12   70.05  805.95   70.21
   812.5   70.17  822.33   69.76  825.61   69.79  828.88   70.33  832.16   70.41
  841.99   70.26  855.09   70.24   868.2   70.37  878.03    70.4  891.13   70.26
  900.96   70.24  904.24   70.29  914.06   70.12  920.62   70.26     937   70.12
  946.83   70.28  953.38   70.26  963.21   70.41  973.04   70.37  982.86   70.42
  989.42   70.26  992.69   70.38  995.97    70.3 1012.35   70.31 1022.18   70.56
 1035.28   70.54 1038.56   70.44 1045.11   70.52 1054.94   70.42 1061.49   70.29
  1074.6   70.25 1084.43    70.4  1087.7   70.63 1090.98   70.52 1104.08   70.55
 1110.64    70.4 1117.19   70.45 1127.02   70.62 1140.12    70.4  1143.4   70.52
 1149.95   70.42 1166.33   70.47 1172.89   70.62 1182.71   70.64 1202.37   70.49
 1208.92   70.36 1215.48   70.31 1218.75   70.39 1225.31   70.37 1235.13   70.58
 1251.51   70.48 1258.07   70.36 1264.62   70.44 1277.72   70.48 1290.83    70.3
 1297.38    70.4 1303.93   70.38 1320.32   70.58 1330.14   70.47  1336.7   70.52
 1343.25   70.45  1349.8   70.64 1353.08   70.51 1359.63   70.45 1366.18   70.49
 1372.74   70.39 1382.56   70.58 1395.67   70.62 1408.77   70.54 1415.33   70.68
 1428.43   70.49 1434.98   70.57 1444.81   70.48 1451.37   70.49 1471.02   70.64
 1484.13    70.7 1493.96    70.7 1507.06   70.53 1523.44   70.55 1533.27   70.63
 1539.82   70.57 1546.38   70.67  1556.2   70.66 1572.59   70.77 1585.69   70.61
 1602.07   70.69 1608.62   70.85 1615.18   70.85 1618.45   70.76 1638.11   70.82
 1641.39   70.75 1651.22   70.74 1661.04   70.64 1670.87   70.64 1687.25   70.78
 1693.81   70.67 1700.36   70.66 1706.91   70.83 1723.29   70.88 1726.57   70.79
 1733.12   70.78  1736.4   70.65 1752.78   70.68 1759.33   70.79 1769.16   70.81
 1772.44   70.68 1778.99   70.89 1788.82   70.86 1798.65   70.73  1805.2   70.87
 1811.75   70.74 1821.58   70.94 1831.41    70.9 1841.24   70.93 1854.34   70.72
 1864.17   70.86 1870.72   70.81 1877.28   70.85  1887.1   70.77 1900.21    70.8
 1910.04   70.93 1919.87   70.85 1926.42   70.93 1936.25   70.87 1939.52   70.74
 1946.08   70.89 1955.91   70.87 1959.18   70.94 1972.29   71.06 1982.12   70.95
 1988.67   71.01 1995.22   71.23 2001.77   70.85 2008.33   70.68 2014.88   70.38
 2021.43   70.17 2031.26    70.3 2037.81   70.47 2044.36   70.97 2050.92   71.39
  2067.3   73.13 2073.85    74.7 2077.13    75.2  2080.4   75.35 2100.06   75.45
 2103.34   74.48 2106.61      72 2109.89    69.3 2113.17   65.64 2116.44   61.48
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2119.72	58.66	2123	57.42	2123	56.83	2130	53.75	2140	48.85
2150	44.85	2160	41.35	2170	38.15	2180	36.85	2190	36.85
2200	38.35	2210	40.35	2220	41.85	2230	44.35	2240	48.35
2250	49.35	2260	50.85	2270	53.85	2277	56.83	2319.61	57.42
2322.89	57.6	2329.44	59.05	2332.72	59.21	2336	59.16	2339.27	59.31
2345.83	59.8	2355.66	59.98	2362.21	60.26	2378.6	60.43	2381.87	60.61
2385.15	60.63	2394.98	60.29	2401.54	60.63	2404.81	61.04	2411.37	62.04
2417.92	62.76	2421.2	63.23	2424.47	64.03	2431.03	65.8	2437.58	67.1
2440.86	67.61	2447.41	68.3	2453.97	69.1	2457.24	69.33	2463.8	69.59
2470.35	70.52	2473.63	70.63	2486.74	70.48	2493.29	70.45	2499.84	70.68
2506.4	70.78	2512.95	70.79	2522.78	70.92	2542.44	71.48	2558.83	71.55
2565.38	71.66	2585.04	71.71	2591.6	71.79	2594.88	71.74	2611.26	71.9
2621.09	71.85	2630.92	71.94	2637.48	71.92	2644.03	72.03	2653.86	72.03
2663.69	72.1	2673.52	71.79	2680.08	71.97	2689.91	72.09	2699.74	72.03
2709.57	72.17	2719.4	72.2	2725.95	72.07	2752.17	72.15	2758.72	72.14
2765.28	72.03	2771.83	72.11	2784.94	72.06	2788.22	72.14	2801.32	71.95
2814.43	71.93	2820.99	71.98	2837.37	71.81	2847.2	72.17	2853.76	72.08
2863.59	72.08	2866.86	72.02	2873.42	72.07	2883.25	72	2906.19	72.01
2912.74	72.08	2919.29	71.93	2925.85	71.98	2938.96	71.78	2952.06	71.73
2958.62	71.76	2978.28	71.66	2984.83	71.75	3001.22	71.71	3011.05	71.65
3027.43	71.71	3033.99	71.67	3043.82	71.76	3070.03	71.72	3083.14	71.78
3089.7	71.6	3096.25	71.55	3106.08	71.57	3122.47	71.43	3138.85	71.46
3142.13	71.35	3151.96	71.33	3165.07	71.37	3181.45	71.26	3194.56	71.09
3201.11	71.13	3204.39	71.04	3214.22	71.08	3217.5	70.97	3227.33	70.96
3237.16	71.01	3240.44	70.9	3246.99	70.9	3260.1	70.79	3269.93	70.79
3283.04	70.72	3299.42	70.56	3305.98	70.64	3319.08	70.63	3328.91	70.5
3335.47	70.55	3342.02	70.5	3358.41	70.55	3364.96	70.61	3374.79	70.61
3397.73	70.83	3410.84	70.75	3417.39	70.76	3423.94	70.67	3430.5	70.8
3450.16	70.68	3463.27	70.7	3473.1	70.81	3479.65	70.8	3496.04	70.96
3505.87	70.81	3525.53	70.69	3535.36	70.33	3555.02	69.86	3564.85	69.58
3571.41	69.53	3581.24	69.68	3587.79	69.47	3594.35	69.49	3600.9	69.27
3614.01	69.01	3617.29	68.82	3623.84	68.71	3630.39	68.44	3640.22	68.23
3646.78	68.18	3659.89	67.93	3669.72	67.94	3689.38	67.83	3695.93	67.91
3699.21	67.8	3702.49	67.89	3718.87	67.91	3741.81	67.8	3748.36	67.91
3751.64	68.15	3754.92	68.75	3761.47	70.67	3764.75	71.72	3768.02	72.97
3771.3	73.83	3774.58	74.93	3777.86	76.37	3781.13	77.23	3784.41	77.68
3790.96	77.53	3794.24	77.54	3804.07	77.73	3807.35	77.61	3810.63	77.02
3813.9	75.91	3820.46	72.38	3827.01	70.59	3830.29	70.12	3833.56	69.96

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.109	2100.06	.066	2123	.025	2277	.066	2473.63	.074

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2100.06	2473.63	375.54	332.57	344.1 .1	.3

Left Levee Station= 34.5 Elevation= 78.49
Right Levee Station= 3804.07 Elevation= 77.73
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	2080.4	75.35	2719.4	3764.75	72.2

CROSS SECTION OUTPUT Profile #Design Flow

E.G. Elev (ft)	74.11	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.11	Wt. n-Val.		0.051	0.074	
W.S. Elev (ft)	74.00	Reach Len. (ft)	375.54	332.57	344.10	
Crit W.S. (ft)	52.23	Flow Area (sq ft)		7087.05	2489.25	
E.G. Slope (ft/ft)	0.000173	Area (sq ft)		7087.05	2489.25	
Q Total (cfs)	20000.00	Flow (cfs)		18984.51	1015.50	
Top Width (ft)	1667.85	Top Width (ft)		369.66	1298.19	
Vel Total (ft/s)	2.09	Avg. Vel. (ft/s)		2.68	0.41	
Max Chl Dpth (ft)	37.15	Hydr. Depth (ft)		19.17	1.92	
Conv. Total (cfs)	1519197.0	Conv. (cfs)		1442060.0	77136.9	
Length Wtd. (ft)	333.34	Wetted Per. (ft)		384.33	1298.45	
Min Ch El (ft)	36.85	Shear (lb/sq ft)		0.20	0.02	
Alpha	1.56	Stream Power (lb/ft s)		0.53	0.01	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	5792.30	2351.14	868.30	
C & E Loss (ft)	0.01	Cum SA (acres)	1481.99	124.32	333.25	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 115

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	74.4	6.56	74.76	9.83	74.73	13.11	74.42	19.67	72.64
26.22	72.69	29.5	72.87	32.78	74.14	36.06	75.11	42.61	76.26
45.89	76.97	52.45	78.16	55.72	78.52	62.28	78.65	65.56	78.61
68.83	78.27	72.11	77.57	78.67	75.72	81.95	74.91	88.5	73.14
95.06	71.57	98.33	71.06	101.61	70.81	108.17	70.01	118	69.28
121.28	68.92	127.84	68.36	140.95	68.21	150.78	68.4	154.06	68.37
160.61	68.46	167.17	68.64	173.72	68.67	180.28	68.83	183.56	68.84
190.11	68.72	196.67	68.96	199.95	68.99	206.5	68.86	216.34	68.95
226.17	68.83	239.28	69.06	249.11	68.92	255.67	69.2	265.5	68.97
278.62	69.15	288.45	69.19	301.56	69.17	308.12	69.25	321.23	69.3
327.78	69.24	334.34	69.45	340.89	69.22	347.45	69.2	350.73	69.31
357.28	69.3	360.56	69.19	363.84	69.25	376.95	69.32	386.78	69.26
393.34	69.35	403.17	69.24	409.73	69.42	422.84	69.3	432.67	69.42
442.51	69.36	458.9	69.51	468.73	69.39	478.56	69.45	485.12	69.41
491.67	69.57	498.23	69.48	501.51	69.51	514.62	69.48	521.17	69.31
534.29	69.51	537.56	69.46	553.95	69.48	560.51	69.45	563.79	69.51
576.9	69.41	580.18	69.48	590.01	69.43	593.29	69.53	603.12	69.53
609.68	69.59	622.79	69.51	626.06	69.58	632.62	69.56	639.18	69.65
652.29	69.65	665.4	69.61	678.51	69.62	681.79	69.7	691.62	69.65
701.45	69.66	714.57	69.73	721.12	69.68	737.51	69.66	744.07	69.6
750.62	69.72	753.9	69.69	763.73	69.81	770.29	69.54	776.84	69.34
783.4	69.03	789.96	69.05	796.51	69.64	799.79	69.73	809.62	69.65
816.18	69.68	822.73	69.59	829.29	69.73	835.85	69.64	842.4	69.71
848.96	69.69	855.51	69.83	865.35	69.71	871.9	69.83	878.46	69.66
885.01	69.68	891.57	69.82	898.12	69.69	904.68	69.69	914.51	69.81
921.07	69.74	927.62	69.81	930.9	69.77	940.74	69.85	953.85	69.78
963.68	69.77	973.51	69.9	980.07	69.85	989.9	69.91	999.74	69.91

1006.29	69.83	1016.13	69.97	1025.96	69.86	1032.52	69.83	1035.79	69.93
1042.35	69.9	1045.63	69.99	1065.29	69.91	1078.4	69.99	1081.68	69.93
1098.07	70.01	1101.35	70.09	1114.46	69.95	1121.02	70.04	1127.57	69.95
1137.41	70.05	1147.24	70.04	1163.63	70.13	1170.18	70.08	1176.74	70.16
1193.13	70.1	1199.68	70.29	1202.96	70.19	1209.52	70.2	1212.79	70.1
1222.63	70.28	1225.91	70.17	1232.46	70.27	1239.02	70.1	1245.57	70.31
1252.13	70.16	1255.41	70.16	1271.8	69.99	1278.35	70.06	1284.91	70.01
1291.46	70.08	1304.57	70.06	1311.13	70.11	1324.24	70.06	1327.52	70.12
1330.8	70	1337.35	70.15	1340.63	70.02	1353.74	70.01	1370.13	70.07
1373.41	70.02	1379.96	70.13	1399.63	70.18	1416.02	70.32	1419.3	70.26
1429.13	70.23	1432.41	70.34	1435.69	70.28	1442.24	70.42	1448.8	70.19
1458.63	70.35	1471.74	70.3	1475.02	70.35	1481.58	70.29	1488.13	70.31
1511.08	70.29	1524.19	70.32	1530.74	70.43	1537.3	70.39	1543.85	70.44
1547.13	70.37	1553.69	70.38	1556.97	70.46	1560.24	70.4	1566.8	70.41
1573.35	70.34	1589.74	70.41	1596.3	70.35	1612.69	70.35	1619.24	70.39
1625.8	70.52	1629.08	70.47	1642.19	70.48	1648.74	70.44	1655.3	70.48
1661.86	70.34	1668.41	70.42	1688.08	70.39	1707.74	70.45	1714.3	70.55
1717.58	70.47	1724.13	70.5	1727.41	70.42	1733.97	70.49	1747.08	70.39
1750.36	70.5	1760.19	70.44	1776.58	70.47	1783.13	70.45	1786.41	70.51
1792.97	70.41	1802.8	70.36	1809.36	70.48	1819.19	70.43	1835.58	70.59
1842.14	70.56	1848.69	70.72	1855.25	70.71	1858.52	70.6	1871.64	70.74
1874.91	70.89	1878.19	70.89	1881.47	70.67	1891.3	70.39	1904.41	70.2
1907.69	70.2	1914.25	70.44	1933.91	71.58	1940.47	72.23	1943.75	72.76
1950.3	74.41	1953.58	75.02	1956.86	75.26	1963.41	75.27	1966.69	75.35
1973.25	75.17	1979.8	75.1	1986.36	76.22	1989.64	75.89	1992.91	73.03
1996.19	67.93	1999.47	63.47	2002.75	60.83	2006.03	58.56	2009.3	57.52
2012.58	57.42	2012.58	54.15	2022.58	49.25	2032.58	45.25	2042.58	41.75
2052.58	38.55	2062.58	37.25	2072.58	37.25	2082.58	38.75	2092.58	40.75
2102.58	42.25	2112.58	44.75	2122.58	48.75	2132.58	49.75	2133.77	51.25
2133.77	57.42	2140.32	57.54	2143.6	58.08	2146.87	58.93	2150.14	59.44
2156.69	60.25	2163.24	60.94	2166.51	61.16	2169.79	61.15	2173.06	61.33
2176.34	61.68	2179.61	62.42	2189.43	65.32	2192.71	66.39	2195.98	67.06
2199.26	67.49	2202.53	67.66	2212.35	67.79	2222.18	68.09	2232	68.29
2248.37	68.95	2258.19	69.16	2264.74	69.21	2271.29	69.5	2284.38	69.69
2287.66	69.84	2294.21	69.88	2300.76	70.14	2304.03	70.15	2310.58	70.31
2317.13	70.19	2323.67	70.34	2336.77	70.54	2343.32	70.48	2356.42	70.64
2359.69	70.74	2372.79	70.85	2376.06	70.92	2382.61	70.88	2385.88	70.94
2395.71	70.85	2398.98	70.96	2405.53	71.03	2408.8	70.98	2421.9	71.12
2431.72	71.16	2438.27	71.26	2461.19	71.31	2471.01	71.41	2477.56	71.33
2484.11	71.4	2497.2	71.35	2507.03	71.44	2516.85	71.33	2523.4	71.4
2529.95	71.34	2536.5	71.45	2546.32	71.44	2559.41	71.51	2565.96	71.64
2572.51	71.63	2579.06	71.71	2611.8	71.81	2615.07	71.74	2624.9	71.75
2631.45	71.82	2637.99	71.77	2654.36	71.88	2657.64	71.84	2670.74	71.93
2677.28	71.88	2680.56	71.76	2687.11	71.88	2696.93	71.82	2700.2	71.89
2716.57	71.83	2726.4	71.9	2739.49	71.77	2746.04	71.79	2749.31	71.64
2759.14	71.4	2765.69	71.3	2772.23	71.32	2775.51	71.26	2782.06	71.34
2785.33	71.26	2791.88	71.29	2798.43	71.22	2801.7	71.29	2808.25	71.23
2814.8	71.29	2847.54	71.16	2857.36	71.08	2867.18	71.2	2883.56	71.09
2896.65	71.09	2899.93	71.13	2916.3	71.03	2922.85	71.03	2929.39	71.11
2939.22	71.06	2949.04	71.13	2962.14	71.13	2968.68	71.01	2975.23	71.11
2985.05	71.02	2991.6	71.13	3011.25	71.06	3017.8	71.15	3024.34	71.05
3034.17	70.99	3040.72	71.12	3047.26	71.06	3057.09	71.05	3063.63	70.97
3070.18	71.01	3089.83	70.83	3096.38	70.89	3106.2	70.89	3112.75	71
3122.57	70.95	3132.39	70.96	3148.76	70.87	3155.31	70.89	3174.96	70.76
3181.5	70.81	3188.05	70.71	3194.6	70.82	3204.42	70.71	3210.97	70.56
3220.79	70.59	3227.34	70.5	3237.17	70.44	3240.44	70.5	3246.99	70.46
3263.36	70.47	3269.91	70.58	3276.45	70.56	3286.28	70.61	3292.83	70.7
3309.2	70.59	3315.75	70.7	3319.02	70.65	3332.12	70.63	3335.39	70.66
3348.49	70.47	3361.58	70.42	3368.13	70.32	3374.68	70.31	3381.23	70.11
3394.32	69.94	3397.6	69.97	3407.42	69.85	3413.97	69.71	3433.61	69.03
3443.44	68.6	3456.53	68.18	3466.36	68.01	3476.18	68.06	3482.73	67.98
3489.28	68	3492.55	68.14	3502.37	68.15	3508.92	68.57	3515.47	69.29
3518.74	69.92	3525.29	71.38	3528.57	72.46	3534.99	75.2	3538.2	76.69
3541.41	77.7	3544.62	77.85	3547.83	77.77	3557.47	77.67	3563.89	77.73
3567.1	77.58	3570.31	76.84	3576.73	73.25	3579.94	72	3583.16	71.39

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.109	1989.64	.066	2012.58	.025	2133.77	.066	2336.77	.074

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1989.64 2336.77 1929.76 1810 1594.01 .1 .3
Left Levee Station= 62.28 Elevation= 78.65
Right Levee Station= 3544.62 Elevation= 77.85
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
72.11	1986.36	76.22	2670.74	3528.57	71.93

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	74.02	Element			
Vel Head (ft)	0.17	Wt. n-Val.		0.053	0.074
W.S. Elev (ft)	73.85	Reach Len. (ft)	1929.76	1810.00	1594.01
Crit W.S. (ft)	52.46	Flow Area (sq ft)		5399.16	2487.44
E.G. Slope (ft/ft)	0.000407	Area (sq ft)		5399.16	2487.44
Q Total (cfs)	20000.00	Flow (cfs)		18357.73	1642.27
Top Width (ft)	1539.87	Top Width (ft)		344.80	1195.07
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)		3.40	0.66
Max Chl Dpth (ft)	36.60	Hydr. Depth (ft)		15.66	2.08
Conv. Total (cfs)	991394.4	Conv. (cfs)		909987.4	81407.0
Length Wtd. (ft)	1804.78	Wetted Per. (ft)		367.88	1195.46
Min Ch El (ft)	37.25	Shear (lb/sq ft)		0.37	0.05
Alpha	1.66	Stream Power (lb/ft s)		1.27	0.03
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	5792.30	2303.47	848.64
C & E Loss (ft)	0.04	Cum SA (acres)	1481.99	121.59	323.40

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 114.8

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	75.76	9.84	77.32	16.4	78.85	26.24	78.85	29.52	78.45
32.8	77.52	42.65	74.14	49.21	71.41	52.49	70.52	62.33	68.84
72.17	67.77	78.73	67.6	82.01	67.29	88.57	66.15	95.13	67.1
108.26	66.12	114.82	65.98	124.66	66.26	134.5	66.06	150.9	66.27
157.46	66.23	183.71	66.44	203.39	66.32	213.23	66.42	229.63	66.45
246.04	66.35	249.32	66.53	255.88	66.33	262.44	66.43	272.28	66.35
278.84	66.65	285.4	66.39	291.96	66.35	305.08	66.56	311.65	66.41
351.01	66.49	373.98	66.33	403.5	66.33	410.06	66.19	426.46	66.14
436.3	66.23	459.27	66.23	472.39	66.16	492.07	66.16	521.6	66.38
531.44	66.3	541.28	66.46	560.96	66.29	564.24	66.44	590.49	66.2
610.17	66.17	616.73	66.26	629.85	66.19	636.41	66.27	656.1	66.17
672.5	66.18	685.62	66.39	695.46	66.23	708.59	66.26	711.87	66.37
728.27	66.35	734.83	66.46	754.51	66.32	767.63	66.54	793.88	66.39
810.28	66.49	833.24	66.43	839.81	66.61	856.21	66.45	862.77	66.63
869.33	66.44	879.17	66.7	885.73	66.53	905.41	66.56	921.82	66.44
938.22	66.43	951.34	66.58	961.18	66.47	967.74	66.59	974.31	66.51
1013.67	66.53	1043.2	66.6	1049.76	66.49	1076	66.59	1089.12	66.57
1095.68	66.68	1102.24	66.53	1108.8	66.64	1138.33	66.57	1161.29	66.73
1174.41	66.63	1194.1	66.69	1203.94	66.8	1253.14	66.72	1256.43	66.64
1282.67	66.81	1292.51	66.64	1308.91	66.79	1328.6	66.77	1358.12	66.93
1381.08	66.82	1394.2	66.87	1404.05	66.67	1417.17	66.89	1427.01	66.71
1446.69	66.86	1459.81	66.75	1466.37	67.02	1472.94	66.92	1486.06	67
1492.62	66.88	1499.18	67.01	1505.74	66.84	1512.3	67.09	1518.86	66.9
1538.54	67.09	1548.39	66.86	1561.51	66.87	1581.19	66.99	1584.47	66.91
1594.31	67.18	1604.15	66.98	1610.71	67.14	1627.12	67.07	1636.96	66.9
1653.36	66.94	1659.92	67.14	1669.76	66.97	1676.32	67.1	1682.88	66.96
1699.29	66.87	1709.13	67	1715.69	66.94	1722.25	67.09	1732.09	66.97
1738.65	67.15	1748.49	66.97	1778.02	66.96	1787.86	67.05	1807.54	67.03
1814.1	67.18	1823.94	67.11	1837.07	67.17	1846.91	67.01	1853.47	67.17
1863.31	66.89	1869.87	66.9	1879.71	67.15	1896.11	67.17	1905.96	66.87
1919.08	66.93	1922.36	66.78	1928.92	65.96	1932.2	65.82	1938.76	67.08
1951.88	67.05	1961.72	66.75	1974.85	66.76	1984.69	66.65	1991.25	66.39
2001.09	66.59	2020.77	66.08	2024.05	65.92	2043.73	65.65	2047.02	65.76
2056.86	65.68	2063.42	65.48	2083.1	65.48	2089.66	65.3	2109.35	65.28
2125.75	65.44	2135.59	65.33	2151.99	65.35	2161.83	65.52	2178.24	65.35
2194.64	65.48	2204.48	65.36	2230.73	65.43	2237.29	65.3	2250.4	65.54
2263.51	65.46	2279.89	66.03	2286.45	65.94	2296.28	66.3	2306.11	66.85
2315.94	67.12	2322.49	67.45	2332.32	68.21	2342.15	68.78	2348.7	69.4
2358.53	69.86	2374.91	70.43	2388.02	70.67	2397.85	70.55	2414.23	70.65
2424.06	70.47	2440.44	70.67	2450.27	70.52	2456.83	70.59	2473.21	70.47
2479.76	70.65	2496.15	70.51	2512.53	70.59	2522.36	70.38	2538.74	70.36
2548.57	70.45	2591.16	70.15	2597.72	70.35	2604.27	70.34	2610.82	70.87
2617.38	70.76	2633.76	71.12	2650.14	70.9	2669.8	71.04	2682.91	71.71
2692.74	71.53	2699.29	71.69	2712.4	71.42	2722.23	71.62	2738.61	71.65
2748.44	71.94	2754.99	71.93	2771.37	71.6	2791.03	71.44	2804.14	71.66
2817.25	71.54	2827.07	71.61	2843.46	71.53	2863.12	71.58	2872.95	71.5
2892.61	71.65	2899.16	71.61	2931.92	71.68	2941.75	71.99	2945.03	71.77
2961.41	71.34	2964.69	71.39	2977.8	69.87	2984.35	68.97	2990.9	68.74
3000.73	67.78	3007.28	67.46	3017.11	67.3	3026.94	67.4	3033.5	67.32
3049.88	67.35	3056.43	67.56	3072.81	67.39	3089.2	67.62	3095.75	67.37
3105.58	67.38	3115.41	67.55	3128.52	67.52	3148.18	67.64	3151.45	67.58
3177.66	67.59	3184.22	67.71	3203.88	67.61	3246.47	67.7	3253.02	67.58
3292.34	67.76	3315.28	67.66	3321.83	67.8	3344.77	67.87	3354.6	68.02
3357.87	67.91	3387.36	67.93	3397.19	68.08	3403.74	67.9	3413.57	68.07
3416.85	68.54	3423.4	70.13	3429.96	70.52	3439.79	70.26	3446.34	70.78
3456.17	70.38	3462.72	69.98	3475.83	70.66	3502.04	71.13	3511.87	71.74
3521.7	72.8	3541.36	73.71	3554.47	73.76	3567.57	73.66	3580.68	73.14
3590.51	73.49	3606.89	73.38	3620	72.87	3626.55	72.78	3636.38	73.28
3656.04	73.67	3682.25	73.48	3695.36	73.05	3708.46	73.11	3711.74	73.44
3718.29	73.67	3721.57	73.51	3731.4	72.12	3741.23	70.19	3754.33	67.98
3760.89	65.37	3770.72	64.7	3787.1	64.69	3793.65	64.84	3826.42	64.66
3832.97	64.85	3836.25	65.54	3846.08	71.07	3849.35	72.34	3852.63	72.76
3859.18	72.96	3872.29	74.12	3878.84	74.3	3898.5	73.99	3908.33	73.33
3911.61	73.25	3921.44	73.52	3927.99	73.45	3934.54	73.09	3941.1	72.95
3950.93	73.21	3957.48	73.17	3967.31	73.53	3973.86	73.45	3986.97	73.7
3993.52	72.9	4003.35	72.78	4013.18	72.86	4023.01	72.64	4032.84	71.8
4042.67	71.58	4052.5	71.11	4059.05	71.05	4068.88	70.61	4085.26	70.35
4091.82	69.92	4095.09	68.9	4101.65	65.65	4104.92	64.72	4114.75	63.56
4118.03	62.5	4124.58	59	4127.86	57.68	4131.14	57.42	4141.14	55.25
4161.14	54.55	4171.14	51.55	4181.14	51.25	4221.14	51.25	4231.14	50.85
4241.14	50.85	4261.14	50.25	4271.14	49.55	4281.14	49.25	4291.14	48.55
4301.14	48.85	4311.14	51.45	4314.6	53.05	4314.6	57.42	4317.88	58.87
4321.15	61.03	4324.43	61.59	4327.7	61.55	4330.98	62.2	4344.08	70.09
4347.36	70.89	4360.46	69.05	4376.84	68.48	4389.94	69.12	4399.77	70.27
4412.88	70.92	4419.43	71.88	4422.7	71.96	4429.26	70.71	4432.53	70.55
4445.63	70.6	4452.19	70.76	4465.29	70.57	4478.39	70.57	4501.32	70.95
4507.88	70.66	4517.7	70.78	4527.53	70.6	4534.08	70.7	4543.91	70.57
4553.74	70.63	4563.57	70.47	4579.95	70.59	4599.6	70.61	4615.98	70.5
4629.08	70.51	4652.02	70.35	4681.5	70.39	4701.15	70.31	4707.71	70.37
4727.36	70.19	4737.19	70.25	4747.02	70.14	4760.12	70.13	4763.4	70.02
4802.71	70.02	4809.26	69.89	4815.81	69.96	4832.19	69.83	4855.12	69.83
4864.95	69.72	4881.33	69.75	4897.71	69.63	4943.57	69.6	4959.95	69.46
4966.5	69.51	5005.81	69.42	5022.19	69.48	5064.78	69.34	5090.98	69.22
5110.64	69.27	5133.57	69.19	5159.78	69.16	5176.16	69.21	5185.98	69.06
5205.64	69.02	5225.29	69.11	5235.12	68.97	5251.5	68.97	5254.78	68.84
5303.92	68.83	5310.47	68.75	5323.57	68.81	5343.23	68.68	5389.09	68.49
5425.12	68.3	5448.05	68.37	5467.71	68.29	5474.26	68.36	5493.92	68.24
5529.95	68.3	5556.16	68.17	5582.36	68.22	5598.74	68.02	5611.85	68
5621.68	67.82	5634.78	67.89	5651.16	67.71	5664.26	67.73	5677.37	68.11
5690.47	68.1	5703.57	68.35	5706.85	68.87	5710.12	70.13	5713.4	70.9
5716.68	72.56	5723.23	70.71	5726.5	69.25	5729.78	69.14	5736.33	73.56
5739.61	76.71	5742.88	77.98	5746.16	78.01	5749.43	77.57	5759.26	77.34

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.14	3986.97	.066	4141.14	.025	4314.6	.066	4347.36	.067

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4091.82	4347.36	731.82	720	723.47 .1	.3

Left Levee Station= 26.24 Elevation= 78.85
Right Levee Station= 5746.16 Elevation= 78.01

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	73.72	Element			
Vel Head (ft)	0.04	Wt. n-Val.	0.139	0.041	0.067
W.S. Elev (ft)	73.68	Reach Len. (ft)	731.82	720.00	723.47
Crit W.S. (ft)	58.69	Flow Area (sq ft)	22203.43	4804.28	5943.05
E.G. Slope (ft/ft)	0.000075	Area (sq ft)	22203.43	4804.28	5943.05
Q Total (cfs)	20000.00	Flow (cfs)	6623.52	10379.35	2997.14
Top Width (ft)	5631.24	Top Width (ft)	3986.61	255.54	1389.09
Vel Total (ft/s)	0.61	Avg. Vel. (ft/s)	0.30	2.16	0.50

Max Chl Dpth (ft)	25.13	Hydr. Depth (ft)	5.57	18.80	4.28	
Conv. Total (cfs)	2314391.0	Conv. (cfs)	766470.3	1201094.0	346827.2	
Length Wtd. (ft)	724.63	Wetted Per. (ft)	3991.92	267.14	1392.30	
Min Ch El (ft)	48.55	Shear (lb/sq ft)	0.03	0.08	0.02	
Alpha	6.76	Stream Power (lb/ft s)	0.01	0.18	0.01	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	5300.48	2091.49	694.39	
C & E Loss (ft)	0.00	Cum SA (acres)	1393.69	109.12	276.12	

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 114.65

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.62	3.28	76.27	16.39	78.33	26.22	78.52	29.49	78.33
42.6	75.06	49.16	72.91	52.43	72.13	65.54	70.38	75.37	68.68
85.21	67.43	91.76	66.81	101.59	65.45	104.87	65.51	108.15	66.1
111.42	66.23	121.25	65.68	127.81	65.53	137.64	65.54	144.2	65.31
160.58	65.34	170.41	65.52	190.08	65.65	209.74	65.6	219.57	65.65
232.68	65.46	242.51	65.55	294.94	65.56	321.16	65.52	337.55	65.61
347.38	65.53	380.15	65.53	383.43	65.58	412.92	65.51	419.48	65.68
429.31	65.55	439.14	65.59	462.08	65.47	475.19	65.63	488.3	65.52
501.41	65.68	511.24	65.51	527.62	65.52	540.73	65.62	547.29	65.52
566.95	65.7	589.89	65.58	606.27	65.7	619.38	65.62	635.77	65.66
652.15	65.57	688.2	65.72	698.03	65.87	711.14	65.63	730.81	65.83
757.02	65.79	783.24	65.65	789.8	65.79	802.9	65.83	825.84	65.67
835.68	65.72	838.95	65.57	855.34	65.62	861.89	65.77	878.28	65.54
884.83	65.24	901.22	65.93	907.77	65.77	917.6	64.8	924.16	64.81
937.27	65.72	947.1	65.77	956.93	65.48	970.04	65.26	976.59	65
989.7	64.76	996.26	64.77	1025.75	64.3	1045.41	64.11	1058.52	64.34
1068.35	64.16	1084.74	64.21	1091.29	64.32	1110.96	64.28	1147.01	64.46
1160.12	64.67	1179.78	64.49	1189.61	64.72	1202.72	64.63	1215.83	64.66
1228.94	64.85	1242.04	64.65	1258.43	64.8	1274.82	64.76	1281.37	64.65
1294.48	64.72	1317.42	64.73	1337.08	64.82	1363.3	64.77	1369.85	64.84
1382.96	64.66	1399.35	64.81	1412.46	64.83	1438.68	65.03	1445.23	64.94
1458.34	65.02	1468.17	64.89	1484.56	64.9	1494.39	65.04	1533.71	65.06
1550.1	64.95	1566.49	65.14	1579.59	65.18	1609.09	65.13	1625.48	65
1632.03	65.16	1654.97	65.17	1677.91	65.05	1687.74	65.19	1710.68	65.26
1730.35	65.12	1736.9	65.23	1750.01	65.16	1763.12	65.33	1776.23	65.1
1786.06	65.25	1818.83	65.22	1831.94	65.38	1838.49	65.21	1851.6	65.36
1864.71	65.28	1884.37	65.33	1897.48	65.45	1923.7	65.35	1949.92	65.41
1956.47	65.32	1979.41	65.45	1985.97	65.3	2002.35	65.54	2015.46	65.35
2025.29	65.37	2035.12	65.56	2051.51	65.39	2058.06	65.53	2087.56	65.68
2094.11	65.46	2110.5	65.58	2136.71	65.65	2149.82	65.51	2166.21	65.7
2192.43	65.57	2195.7	65.47	2208.81	65.73	2215.37	65.6	2238.31	65.76
2257.97	65.68	2267.8	65.82	2277.63	65.63	2284.19	65.78	2303.85	65.82
2310.4	65.69	2323.51	65.84	2330.07	65.65	2349.73	65.91	2362.84	65.91
2375.95	65.8	2385.78	65.95	2408.72	65.85	2418.55	66.03	2425.11	65.9
2431.66	66.01	2477.54	66.09	2484.09	66.21	2503.76	66.25	2510.31	66.09
2523.42	66.1	2536.53	66.26	2546.36	66.09	2556.19	66.07	2569.3	66.42
2579.13	66.09	2595.52	65.98	2608.63	66.05	2618.46	65.84	2634.84	66.04
2651.23	66.05	2657.78	66.22	2677.45	66.38	2690.56	66.41	2713.5	66.15
2733.16	66.31	2762.66	66.63	2782.33	66.5	2818.4	66.48	2864.29	66.33
2880.68	66.36	2903.63	66.63	2936.41	66.44	2969.2	66.3	2979.03	66.42
2998.7	66.45	3008.54	66.35	3021.65	66.5	3034.76	66.44	3060.99	66.45
3087.22	66.67	3120	66.87	3133.11	67.06	3149.5	66.94	3152.78	67.11
3172.45	66.96	3185.56	67.16	3195.4	67.01	3218.35	67.1	3228.18	67.24
3238.02	67.14	3244.57	67.22	3254.41	67.12	3274.08	67.23	3293.75	66.99
3300.31	67.09	3319.98	67.04	3326.53	67.14	3342.92	67.11	3349.48	67.01
3369.15	67.1	3382.26	66.95	3395.38	67.15	3405.21	67.06	3421.6	67.16
3434.72	66.99	3477.33	66.97	3513.39	67.18	3526.51	67.09	3539.62	67.15
3582.24	67.07	3621.58	67.16	3651.08	67.39	3680.59	67.41	3690.42	67.71
3700.26	67.51	3706.81	67.62	3716.65	67.35	3723.21	67.62	3733.04	68.68
3739.6	70.46	3746.15	73.07	3752.71	74.31	3755.99	74.15	3765.82	73.2
3769.1	72.67	3782.22	68.5	3792.05	67.92	3798.61	68.48	3805.16	67.92
3811.72	68.79	3818.28	68.7	3831.39	67.71	3844.5	67.34	3860.89	68.54
3870.73	71.11	3877.29	72.57	3887.12	72.29	3896.96	71.44	3903.51	70.64
3906.79	70.48	3916.63	71.73	3923.18	71.77	3926.46	70.39	3933.02	65.99
3936.3	65.06	3942.85	65.06	3955.97	64.74	3962.52	64.83	3992.03	64.82
3995.3	65.48	4001.86	68.57	4005.14	69.24	4011.7	69.27	4014.97	69.51
4024.81	71.18	4031.37	71.83	4037.92	73.26	4041.2	73.65	4047.76	73.86
4057.59	74.4	4064.15	73.18	4073.98	69.47	4080.54	68.77	4096.93	68.95
4119.88	69.73	4129.71	69.98	4155.94	69.57	4175.61	68.9	4287.07	68.96
4306.74	69.36	4342.8	69.32	4369.03	69.38	4388.7	69.28	4398.53	69.41
4418.2	69.32	4431.32	69.39	4480.49	69.37	4496.88	69.25	4503.44	69.47
4510	70.25	4516.55	71.93	4523.11	73.3	4529.66	73.68	4536.22	72.89
4539.5	72.04	4549.33	67.82	4552.61	66.6	4555.89	66.08	4562.45	65.52
4565.73	65.51	4572.28	66.43	4575.56	67.21	4582.12	67.65	4588.67	64.56
4601.79	61.04	4608.34	60.02	4618.18	59.14	4628.01	59.17	4637.85	58.48
4647.68	58.73	4657.52	59.41	4660.8	58.82	4667.35	54.8	4670.63	53.19
4674.91	52.67	4683.91	50.92	4703.91	49.42	4713.91	48.92	4733.91	48.22
4753.91	48.22	4763.91	47.42	4783.91	46.42	4793.91	45.22	4813.91	44.62
4823.91	43.92	4833.91	44.12	4843.91	47.12	4853.91	51.92	4854.18	52.69
4857.45	52.94	4860.73	54.14	4864.01	56.03	4867.29	57.35	4877.12	59.67
4880.39	60.69	4883.67	62.41	4893.5	68.89	4896.78	70.4	4900.06	70.99
4903.34	71.07	4916.45	70.95	4926.28	70.57	4932.83	69.93	4939.39	67.44
4942.66	66.82	4945.94	66.75	4949.22	67.16	4955.77	67.47	4959.05	68.08
4965.61	69.8	4968.88	70.33	4972.16	70.42	4978.71	70.08	4988.55	70.35
4995.1	70.2	5024.6	70.66	5103.25	70.8	5119.64	70.67	5152.41	70.6
5155.69	70.71	5168.8	70.58	5178.63	70.73	5191.74	70.63	5208.13	70.76
5214.68	70.97	5227.79	70.92	5234.35	70.77	5257.29	70.78	5273.68	70.69
5290.06	70.82	5303.17	70.7	5335.95	70.69	5352.33	70.53	5404.77	70.4
5414.6	70.46	5424.43	70.35	5457.21	70.3	5483.43	70.2	5493.26	70.26
5506.37	70.07	5512.92	70.16	5548.97	70.05	5568.64	70.05	5575.19	69.92
5591.58	69.97	5621.07	69.81	5637.46	69.89	5660.4	69.77	5712.84	69.66
5719.39	69.74	5732.5	69.63	5768.55	69.66	5778.39	69.81	5814.44	69.65
5847.21	69.56	5866.88	69.65	5873.43	69.55	5889.82	69.55	5899.65	69.64
5906.2	69.52	5922.59	69.61	5988.14	69.35	5991.41	69.53	5997.97	69.38
6014.36	69.3	6024.19	69.34	6030.74	69.22	6053.68	69.26	6070.07	69.19
6079.9	69.29	6122.51	69.07	6132.34	69.19	6152	68.87	6158.56	69.06
6168.39	68.84	6181.5	68.86	6188.05	68.73	6194.61	68.84	6217.55	68.56
6233.94	68.58	6243.77	68.69	6250.32	68.48	6289.65	68.3	6299.48	68.33
6325.7	68.13	6348.64	68.28	6351.92	68.12	6365.03	68.25	6374.86	67.97

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 6378.14   68.11 6401.08   68.03 6407.64   68.19 6417.47    68.2  6427.3   68.05
 6433.86   68.22 6446.96   69.63 6450.23   70.81 6460.04   76.13  6463.3   77.17
 6466.57    77.4 6486.18   77.12 6492.71   77.15 6495.98    76.6 6502.52    73.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .174 4503.44    .066 4683.91    .025 4853.91    .066 4903.34    .068

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4529.66 4903.34          1166.91 1551.67 1518.74             .1       .3
Left Levee      Station=   26.22       Elevation=   78.52
Right Levee     Station= 6466.57       Elevation=    77.4
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 4057.59 4529.66   73.68 4903.34 6446.96   71.07

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             73.66    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                 0.174      0.050      0.068
  W.S. Elev (ft)             73.64    Reach Len. (ft)         1166.91    1551.67    1518.74
  Crit W.S. (ft)             54.88    Flow Area (sq ft)       30054.66    6861.37    3988.42
  E.G. Slope (ft/ft)      0.000061    Area (sq ft)            30054.66    6861.37    3988.42
  Q Total (cfs)           20000.00    Flow (cfs)               7778.70   10940.77    1280.53
  Top Width (ft)           5907.60    Top Width (ft)           3982.13     373.36    1552.11
  Vel Total (ft/s)            0.49    Avg. Vel. (ft/s)            0.26       1.59       0.32
  Max Chl Dpth (ft)          29.72    Hydr. Depth (ft)            7.55      18.38       2.57
  Conv. Total (cfs)       2551172.0     Conv. (cfs)             992239.8   1395590.0   163342.2
  Length Wtd. (ft)         1463.62    Wetted Per. (ft)         3988.55     384.41    1554.48
  Min Ch El (ft)             43.92    Shear (lb/sq ft)            0.03       0.07       0.01
  Alpha                       5.95    Stream Power (lb/ft s)      0.01       0.11       0.00
  Frctn Loss (ft)             0.14    Cum Volume (acre-ft)     4861.51    1995.08     611.92
  C & E Loss (ft)             0.01    Cum SA (acres)           1326.75     103.92     251.69


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 114.47*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   73.84   15.71   76.99   29.45   78.13    38.4   76.87   46.74   74.53
   53.87   72.25   59.71   71.13   69.34   69.89    82.6   68.74  100.28   66.81
  111.59   66.04  124.56   64.91  137.53    65.3  159.15   64.84  172.12   64.85
  193.11   64.54  206.37   64.85  226.26   65.02  239.52   64.93     255   65.16
  272.68   65.68  294.78   65.59  327.93   65.58  356.67   65.48   363.3   65.61
  389.82   65.72   407.5   65.15  414.14   64.63  422.98   64.36  467.18   64.11
  535.27   64.22  577.69   64.79  593.17    64.8  615.27   64.49  628.53    64.5
     652   64.76  664.97   64.69  692.63   64.97  701.47   65.27  716.94    65.4
  732.41    65.8   750.1   65.31  765.56   65.69  772.19   65.54  783.24   66.06
  800.93   66.02  807.63   65.83   816.4   66.19  825.24   66.22  847.34   65.82
  860.61   66.46  869.45   66.29  887.13   66.29  893.76   66.52  911.38   66.41
  937.96   65.53  960.07   65.06  968.91   64.98 1024.17   64.95 1035.21   65.13
 1050.68   65.04 1068.37   65.11 1097.28   65.67 1110.36   65.45 1121.42   65.62
 1134.68   66.12 1147.94   65.96 1157.81   65.59 1167.83   65.86 1179.43   65.56
 1192.14   64.47 1201.04    63.9 1209.69   63.79 1226.99   64.38 1239.95   64.47
 1270.22   64.08 1296.15   63.59 1307.07    63.6 1329.18   63.33 1346.86   63.48
 1357.91   64.29 1366.75   64.55 1373.38   64.27 1406.54   63.82  1419.8   63.97
  1441.9   64.69 1450.74   65.65 1459.58   65.78 1475.05   65.61 1492.73   64.85
 1512.63   64.83 1534.73   64.57 1545.78   64.34 1559.87   64.48 1578.93   64.42
 1594.46   64.53 1611.76   65.06 1631.98   65.31 1643.03   65.26 1662.93   64.47
 1680.92   64.21 1718.18   64.02 1724.81   64.13 1740.28   64.06 1753.54   64.21
    1789   64.13 1811.01   64.38 1826.48   64.66 1833.12   64.49 1857.42   64.58
 1864.05   64.87 1890.58   65.16 1903.84   65.05 1939.21   65.08 1965.73   65.42
 1990.04   65.39 2027.61   65.57 2065.19   65.95 2085.08   65.95 2098.34   65.79
  2133.7   65.93 2144.76   65.87  2175.7    65.9 2226.54   66.29 2235.38   66.19
 2250.85   66.32 2281.86   66.27 2292.84   66.12 2316.44   66.39 2333.74   66.24
 2383.47    66.5 2387.89   66.37 2414.41   66.54 2421.04   66.44 2454.19   66.59
 2469.66    66.4 2476.29   66.55 2491.77   66.53  2498.4   66.66 2522.71   66.47
 2535.97   66.73 2544.81   66.59 2549.23   66.84 2558.07   68.23 2562.49   68.12
 2571.33   66.89 2591.23   65.77  2606.7   65.87 2617.75   66.87 2631.01   67.09
 2655.33   66.86 2666.37   65.88    2673   65.89 2686.27   65.38 2701.74   65.15
 2708.37   64.76 2728.26   65.07 2744.44   65.16 2753.09   64.88 2783.52   64.99
 2787.94   65.15 2812.26   64.98 2843.19   65.05 2852.03   65.17 2860.88   65.03
 2878.56    65.2  2887.1   65.07  2904.4   65.27 2922.77   65.34 2927.19   65.52
 2933.82   65.28  2951.5   65.47 2960.34   65.95 2964.76   65.89 2984.66   66.84
 2995.18    66.7  3015.6   66.98 3035.49    66.9 3039.91   67.08 3055.71   67.09
 3064.36   66.88 3117.27   66.87 3143.79   66.76 3157.06   66.81 3170.32   67.04
 3189.74   66.88  3207.9   67.33 3216.74   67.37 3234.41   67.18 3256.52   67.12
 3271.99   67.29 3291.88   67.23 3298.51   67.02 3318.41   66.82 3344.93   67.02
  3360.4   66.92 3378.09   67.71 3400.19   67.47 3415.66   67.05 3420.08   67.29
  3424.5   68.32 3439.97   70.13 3448.81   67.96 3453.23   67.52 3459.86   67.39
 3466.49   65.07 3470.91   63.93 3477.55   63.71 3488.04   63.71 3501.86   63.96
  3510.7   66.89 3521.75   67.32 3526.17   68.64 3530.59   69.15 3539.43   68.61
 3548.28   68.79 3557.12   67.82 3572.59   67.15  3596.9   67.04  3616.8   67.21
 3627.85   67.17 3638.89   67.34 3652.16   67.13 3674.26   67.14 3680.89    67.3
 3689.73    67.1 3696.36    67.3 3729.52   67.13 3758.25   67.22 3762.67   67.06
 3826.77   67.36 3868.76    67.2 3879.82   67.27 3921.81   67.18 3954.97   67.34
  3961.6   67.21 3972.65   67.64  3983.7   67.36  4003.6   67.38 4027.91   67.27
 4072.11   67.55 4096.42   67.58  4111.9   67.82 4151.68   67.82 4175.63   67.73
 4191.47   68.01 4195.89    67.8 4233.47   67.83 4242.31   68.02 4253.35   67.86
 4288.72   67.94 4297.56   67.86  4344.3   67.88 4366.08   67.83 4381.55   68.04
  4392.6   67.84 4435.11   67.82 4450.07   67.73 4458.91   67.99 4482.68   67.81
 4504.31   67.89 4521.61    67.8 4595.95   67.92 4620.26   68.06  4626.9   67.96
 4651.21   68.07 4666.68   67.99 4699.83   68.06 4728.56   67.93 4746.25   68.04
 4781.61   68.03  4799.3   68.36 4805.93   68.12  4821.4    68.4 4845.96   68.29
 4858.93   68.47 4871.91   68.36 4880.55   68.48 4893.53   68.26 4915.16   69.14
 4923.81   70.32 4932.45   72.09  4941.1   72.99 4945.43   72.92 4962.73    71.9
  4971.7   70.62 4980.03   69.09    4993   68.88 5001.66   69.17  5010.3   68.69
 5018.95   69.32  5027.6    69.3  5044.9   68.65 5051.27   68.71 5062.32   68.35
 5083.81   69.24  5096.8   71.03 5105.45   72.02 5118.42   71.74 5144.37   70.49
 5157.35   71.41 5165.99   71.42 5170.31   70.47 5178.97   67.61 5183.29      67
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 5209.24   66.74 5256.83   66.93 5261.13   67.35 5269.78   69.37 5274.11   69.79
 5287.08   69.99 5300.06   71.17 5308.71   71.65 5321.68   72.82  5343.3    73.4
 5351.95   72.56 5364.92   70.18 5373.58   69.65 5382.81   69.64 5438.44   70.47
 5486.69   70.09 5497.74   69.58    5511    70.3 5519.85   70.13 5533.11   69.05
 5546.37    68.8 5555.21   68.26 5568.47   68.04 5594.99   68.51 5625.93   68.42
 5654.66   68.52 5670.13   68.93  5685.6   69.99 5692.23   69.75 5698.86   68.98
  5707.7   68.58 5716.54   68.54 5723.17   68.15  5729.8   68.27 5740.85   68.99
  5751.9   68.84 5762.95   68.31    5774   68.78 5780.63   68.81 5787.26   68.46
 5798.31   68.95 5813.78   68.61  5818.2    68.7 5833.67   69.77 5846.93   68.75
 5855.77   68.71 5864.61   67.91 5873.43   67.89 5882.26   68.33 5886.66   69.13
 5897.69   69.61 5904.31    69.1 5913.13    69.6 5917.54   69.59 5931.52   68.87
 5941.79   68.98 5946.21   69.89 5957.41   71.28 5966.05   71.64 5972.42   70.89
  5975.6   70.11 5985.15   66.56 5988.33   65.61 5997.88   64.89 6001.06   64.88
 6011.33   66.04 6016.97   65.38 6023.33   62.88 6036.07   59.98 6042.42    59.3
 6051.98   58.72 6061.52   59.15 6071.07   58.93 6080.61   59.01 6090.16   59.35
 6093.34   58.94 6102.89   54.47 6107.04   53.08 6108.86   50.55 6109.86 50.4026
 6115.78   49.53 6123.0249.07898 6135.19   48.37 6164.31    47.4 6183.72   47.24
 6193.43   46.62 6212.84   45.62 6222.55   44.61 6241.96   43.92 6251.67   43.29
 6258.66   47.15 6268.3550.29658 6275.37    53.7 6279.98 55.3059 6283.36   57.08
 6293.72   60.91 6298.89   63.56 6306.66   69.13 6309.25   70.38 6314.44   71.16
 6332.23   70.62 6337.31   70.14 6342.39   68.48 6344.93   68.08  6355.1   68.54
 6362.73   70.12 6367.81   70.55 6372.89   70.31  6385.6   70.36 6408.48   70.62
 6469.47   70.69 6482.18   70.61 6520.31   70.55  6538.1   70.58 6555.89   70.81
 6571.14   70.67 6601.64   70.62 6649.94   70.62 6662.64   70.51 6771.93   70.29
 6830.39    70.1 6871.05   69.93 6901.56    69.9 6957.47   69.77 6985.43   69.77
 6993.06   69.89 7046.43   69.83 7061.69   69.89 7092.18   69.82 7104.89   69.88
 7188.76   69.58 7219.26   69.51 7226.89   69.57 7259.93   69.38 7267.56   69.45
  7282.8   69.24 7315.85   69.22 7333.64   69.04 7353.97   69.12 7371.34   68.94
 7397.18   69.08 7417.51   68.99  7435.3   69.13 7448.01   68.99 7455.64   68.66
 7475.97   68.56 7496.31   69.43 7501.39   69.81 7511.55   71.28 7514.09    72.2
  7521.7   76.14 7526.76   77.26 7551.32   77.11  7554.4   76.74 7560.54   74.73

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .174 5966.05    .066 6108.86    .025 6268.35    .066 6314.44    .068

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5966.05 6314.44          1166.91 1551.67 1518.74             .1       .3
Left Levee      Station=   29.43      Elevation=   78.13
Right Levee     Station= 7526.76      Elevation=77.25667
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   32.13 5337.92   72.35 6315.55 7536.43   71.11

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 114.28*

INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   72.07   15.03   75.65   29.54   77.93   40.52    77.1   59.73   71.22
   78.95   68.63   95.41   67.84  117.37   65.94  147.53   64.37  177.77   64.33
  199.73   64.07  213.46    64.2  232.67   63.76  249.13   64.31  273.84   64.46
  290.31   64.21  309.53   64.69  331.49   65.75  378.16   65.58  400.11    65.6
   435.8   65.41  444.03   65.65  476.98    65.9  498.94   64.76  507.27   63.74
  518.15   63.16  573.06    62.7   609.3   62.85  616.97   62.74  666.38   62.98
  691.09   63.64  699.33   63.56  710.31   64.02  729.52   64.11  756.98   63.38
  773.44   63.43  784.42   63.81  811.87   63.79  853.05   64.38  864.03   64.94
  883.25   65.25  888.74   65.72  902.46   65.95  924.42   64.96  943.63   65.78
  951.87   65.49  965.59   66.46  987.55   66.38  995.79   66.03 1006.77   66.74
 1017.75   66.78  1045.2   66.05 1061.67   67.31 1072.65   66.94 1094.62   66.89
 1102.85   67.34 1119.31   67.14 1141.28   66.29 1157.75   65.35  1185.2   64.29
 1196.18   64.14 1226.38   64.12 1264.34   64.24 1278.53   64.47 1297.74   64.25
  1319.7   64.48 1341.66   65.15 1355.39   65.79 1371.86   65.31 1385.59   65.57
 1402.06   66.54 1418.53   66.37 1429.51   65.94 1443.23   66.17 1451.46   65.87
 1473.42   63.48 1484.48   63.01 1500.88   62.71 1532.81   63.18 1583.23   62.77
 1605.19   62.39 1616.17   62.46 1643.62   62.19 1665.58   62.68  1679.3   64.38
 1690.29   64.97 1698.52   64.39 1712.25   63.94  1739.7   63.46 1756.17   63.74
 1783.61   65.08 1794.59      67 1805.57   67.26 1824.79   66.86 1846.75   65.29
 1871.46   65.09 1885.18   64.64 1912.64   64.19 1953.81    64.2 1973.02   64.39
 1997.73   65.39 2019.69   65.96 2033.42   65.78 2058.12   64.16 2101.95   63.45
 2126.74   63.31 2134.98   63.54  2154.2   63.34 2170.67   63.61  2178.9   63.41
 2192.63   63.63 2214.71    63.5 2242.04   64.07 2247.53   64.52 2261.26   64.58
 2269.49    64.2 2299.68   64.31 2307.92   64.86 2324.39   64.92 2340.86   65.31
 2357.33   65.12 2401.25   65.26 2412.23   65.62 2434.19   65.79 2464.38   65.73
 2491.84   65.91 2500.07   66.26 2511.05   66.14 2535.76   66.53 2543.99   66.35
 2557.72   66.73 2582.43   66.73  2598.9   66.42 2642.81   66.86 2656.54   66.57
 2664.77   66.89 2673.01   66.64 2694.97   66.63 2716.93   67.04 2758.11   67.38
 2769.09   67.14 2788.31    67.4 2815.75   67.46 2840.46   67.05 2878.89   67.53
 2895.36   67.36 2920.07   67.47  2928.3   67.82 2936.54   67.54 2953.01   67.77
  2958.5   67.53 2980.45   67.59 2991.43   67.84 2999.67   67.63 3021.63   67.63
 3040.85    67.9 3060.06   67.48  3068.3   67.77 3087.51   67.63 3095.75   67.88
 3125.95   67.58 3142.41   68.09 3153.39   67.81 3158.88    68.3 3169.86   71.05
 3175.35   70.82 3186.33   68.46 3211.04   66.13 3216.53   65.97 3230.25   66.37
 3243.98   68.36 3260.45   68.64 3290.65   68.35 3304.37   66.32  3312.6   66.25
 3329.07   65.29 3348.29   64.83 3356.52   63.98 3381.23   64.53 3405.94   64.64
 3411.43   64.31 3449.86   64.38 3455.35    64.7 3471.82   64.65 3485.55   64.34
 3523.97   64.44 3534.95   64.66 3545.93   64.42 3567.89   64.81 3587.11   64.62
  3622.8   65.04 3628.29   65.36 3636.52   64.86 3658.49    65.2 3669.47    66.2
 3674.96   66.08 3699.66   67.89 3727.11   67.77  3738.1   68.16 3746.32   67.88
 3762.79   68.07 3768.28   68.45 3782.01   68.43 3812.21   67.93 3864.37   67.88
 3897.31   67.59 3913.78   67.74 3930.25    68.2 3946.72   67.88 3960.45    67.9
 3976.92   68.64  3987.9    68.7 4009.85   68.31 4018.09   68.43  4037.3   68.15
 4056.52   68.37 4081.23   68.21 4089.46   67.89 4103.19   67.93 4114.17   67.54
 4147.11   67.88 4166.33   67.77 4188.29   69.03 4215.74   68.89 4234.96   68.11
 4240.45   68.58 4245.94   70.63 4251.43   71.45 4265.14   74.33 4276.12   70.05
 4281.62   69.11 4289.85   68.79  4292.6   67.74 4298.09   64.09 4303.58   61.82
 4311.81   61.38 4333.77    61.4 4342.01   61.67 4344.75   62.66 4352.99   67.48
 4366.72   68.26 4372.21   70.89  4377.7    71.9 4388.68    70.8 4399.66   71.25
 4410.64   69.37 4429.85   68.13 4460.05   67.77 4484.76   67.95 4498.48   67.77
  4512.2   68.07 4528.67   67.72 4556.12   67.78 4564.36    68.1 4575.34   67.71
 4583.58   68.12 4594.56   67.89 4624.75   67.82 4660.44   68.09 4665.93   67.78
 4696.13   67.97 4734.56   67.98 4745.54   68.11 4770.24   67.96 4797.69   67.98
 4836.12   68.18 4863.58   67.95 4871.81   68.25 4882.79   68.03 4904.75   68.29
 4912.99   68.04 4926.72   68.81 4940.44   68.25 4965.15   68.32 4995.34   68.08
 5009.07   68.38 5014.55   68.17 5050.24    68.4 5080.44   68.34 5099.65   68.72
 5116.12    68.5  5141.2   68.64 5184.75   68.51 5198.48   68.87 5203.97   68.48
 5250.64   68.57 5261.62   68.88 5275.34   68.51 5319.26   68.74 5330.24   68.54
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 5354.95   68.52 5368.67   68.71 5415.34   68.61 5434.56   68.94 5448.28   68.56
  5467.5   68.69 5483.97   68.54 5519.65   68.48 5530.63   68.96 5544.35   68.56
 5643.18   68.66 5656.91   68.85 5678.87   68.81 5692.59   69.04 5700.83   68.79
 5731.03   68.96 5739.26   68.76 5769.46   69.03 5788.67   68.85 5829.85   69.02
 5851.81   68.82 5860.04   69.13 5865.53   68.76 5887.49   68.96 5909.46   68.88
 5920.44   69.08 5931.42   68.83 5945.14   68.98 5953.38   69.38 5961.61   68.85
  5967.1   69.26 5980.83    69.4  5997.3   69.19 6043.56   69.21 6057.69   69.35
 6065.92   69.09 6079.65   69.47 6097.27    69.6 6118.75    71.1 6134.55   71.71
 6148.28   71.14 6167.49   70.74 6178.47   69.66  6204.7   69.85 6215.43   69.47
 6236.93    69.9 6260.83   69.57 6266.32   69.84 6279.89   69.36    6302   69.69
 6333.61   71.46 6381.94    70.5 6398.06   71.09 6408.79   71.06 6424.92   69.23
 6433.77   68.75 6447.49   68.86 6480.44   68.72  6521.6   69.03  6537.7   70.16
 6559.18   70.47 6596.78   71.91 6629.01   72.39 6655.86   70.89 6678.08   70.44
  6697.3   70.66 6747.17   70.96 6790.15    70.8 6807.09   70.95 6820.82   70.23
 6837.29   71.69 6848.27   71.35 6864.74   69.19 6881.21   68.68 6892.19    67.6
 6908.66   67.15  6941.6   68.09 6980.02    67.9  7015.7   67.94 7034.92   68.53
 7054.14   70.62 7062.37   70.15  7070.6   68.63 7081.58   67.83 7092.56   67.75
  7100.8   66.98 7109.03   67.21 7122.76   68.63 7136.47   68.31  7150.2   67.28
 7163.93   68.25 7172.16   68.34 7180.39   67.57 7194.11   68.51 7199.61   68.55
 7213.33   67.89 7218.82   68.07 7232.55   69.79 7238.03   70.15  7254.5   68.12
 7265.48   68.03 7276.46   66.44 7287.42   66.39 7298.37   67.29 7303.85   68.88
 7317.54   69.85 7325.76   68.84 7336.71    69.9 7342.19   69.91  7359.668.27193
 7372.32   67.39  7377.8   68.35 7391.71   69.25 7402.45   69.59 7411.71   68.18
 7422.72   64.79  7436.4   64.25 7446.36   64.83 7457.99    61.2    7470   58.96
 7486.89   58.29 7493.65   59.06 7507.16   59.55 7525.89   59.06  7530.8   57.94
 7535.8155.36762 7539.17    53.5 7540.94    48.8 7548.0148.11979 7560.53   47.52
 7594.71   46.58 7613.53   46.25 7641.77   44.81 7651.18      44 7679.42   42.67
  7682.847.62791 7684.56   50.21 7693.5853.87538 7705.04   59.13 7712.21   63.31
 7719.82   69.36 7725.53   71.24 7741.78   70.34  7747.2   69.34 7754.42   69.61
 7761.65   70.63  7776.1   70.53 7835.69   70.59 7884.46   70.53  7897.1   70.64
 7929.61   70.55 8007.26   70.47 8121.04   70.05 8171.61   69.97 8194.89   69.84
 8256.49   70.14 8316.38   70.11 8413.61   69.61 8464.18   69.56 8476.51   69.46
 8493.08   69.81  8526.2   69.96 8542.78   69.06 8553.81   69.15 8568.92    71.4
 8576.14   72.93 8583.35   76.16 8586.95   77.11 8609.94   77.06 8618.57   75.56

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .11 7402.45    .066 7539.17    .025 7693.58    .066 7725.53    .071

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       7402.45 7725.53          1166.91 1551.67 1518.74             .1       .3
Left Levee      Station=   29.52       Elevation=   77.93
Right Levee     Station=8586.949       Elevation=77.11333
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0 6629.01   72.39 7725.53 8618.57   71.24

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 114.1

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   70.29   22.96   76.72   29.52   77.74   42.64   77.33    65.6   70.18
   88.56   67.37  108.23   66.93  134.47   65.06  183.67   63.39  206.63   63.62
  232.87   63.34  249.27   63.61  272.23   62.98   291.9   63.77  321.42   63.91
   341.1    63.5  364.06   64.22   390.3   65.81   423.1    65.8  429.66   66.07
  446.06    65.6  472.29   65.62  514.93   65.34  524.77    65.7  564.13   66.07
  590.37   64.38  600.21   62.86  613.33   61.96  678.93   61.28  721.56   61.49
   731.4   61.33  767.48   61.66  790.44   61.65  819.96   62.68   829.8   62.55
  842.92   63.25  865.88   63.41  898.68   62.26  918.35   62.37  931.47   62.95
  964.27   62.89 1013.47   63.79 1026.59    64.6 1049.55    65.1 1056.11   65.79
 1072.51   66.09 1098.75   64.61  1121.7   65.88 1131.54   65.43 1147.94   66.86
 1174.18   66.75 1184.02   66.24 1197.14   67.29 1210.26   67.35 1243.06   66.29
 1262.74   68.17 1275.86    67.6  1302.1   67.49 1311.94   68.16 1331.61    67.8
 1357.85   66.59 1377.53   65.18 1410.33   63.52 1423.45    63.3 1459.53    63.3
 1505.45   63.54 1521.84    63.8  1544.8   63.46 1571.04   63.86 1597.28   64.88
 1613.68   65.89 1633.36   65.16 1649.76   65.53 1669.44   66.97 1689.12   66.78
 1702.24   66.27 1718.63   66.47 1728.47   65.92 1744.87   63.46 1754.71   62.49
 1787.51   61.54 1830.15   61.92 1885.91   61.66 1912.15    61.2 1925.26   61.32
 1958.06   61.05  1984.3   61.88  2000.7   64.47 2013.82   65.39 2023.66    64.5
 2040.06   63.76 2072.86    63.1 2092.54   63.51 2125.33   65.47 2138.45   68.36
 2151.57   68.74 2174.53   68.12 2200.77   65.72 2230.29   65.35 2246.69   64.64
 2263.09   64.56 2279.49   64.03 2328.68   63.99 2351.64   64.26 2381.16   65.67
  2407.4    66.6  2423.8   66.29 2453.32   63.85  2505.8   62.81 2535.31    62.6
 2545.15   62.94 2568.11   62.63 2587.79      63 2597.63   62.71 2614.03   63.04
 2640.27   62.86 2673.07   63.75 2679.63   64.45 2696.03    64.5 2705.87    63.9
 2741.94   64.04 2751.78   64.84 2771.46   64.89 2791.14   65.46 2810.82    65.2
  2863.3   65.44 2876.42   65.98 2902.66   66.17 2938.73   66.07 2971.53   66.33
 2981.37   66.88 2994.49   66.72 3024.01   67.26 3033.85   66.97 3050.25   67.52
 3079.77   67.51 3099.45   67.06 3151.92   67.78 3168.32   67.28 3178.16   67.75
    3188   67.38 3214.24   67.37 3240.48   68.01 3289.68   68.46  3302.8    68.1
 3325.76   68.48 3358.55   68.63 3388.07   67.98 3433.99   68.68 3453.67   68.47
 3483.19   68.58 3493.03   69.11 3502.87    68.7 3522.55   69.05 3529.11   68.68
 3555.34   68.71 3568.46   69.14  3578.3   68.82 3604.54   68.78  3627.5   69.21
 3650.46   68.56  3660.3   68.99 3683.26   68.73  3693.1    69.1 3729.18   68.68
 3748.85   69.45 3761.97   69.02 3768.53   69.76 3781.65   73.88 3788.21   73.53
 3801.33   70.03 3830.85   66.49 3837.41   66.25 3853.81   66.88 3870.21   69.85
 3889.89    70.2 3925.97   69.85 3942.36   66.77  3952.2   66.61 3971.88    65.2
 3994.84   64.51 4004.68    63.2  4034.2   63.98 4063.72   64.16 4070.28   63.73
  4116.2   63.77 4122.76   64.24 4142.44   64.16 4158.84    63.7 4178.51   63.95
 4204.75   63.83 4217.87   64.15 4230.99    63.8 4257.23   64.42 4280.19   64.14
 4322.83   64.73 4329.39    65.2 4339.23   64.43 4365.47   64.93 4378.59   66.45
 4385.15   66.27 4414.67   68.94 4447.47   68.76 4460.59   69.34 4470.42   68.92
  4490.1   69.24 4496.66   69.83 4513.06   69.74 4549.14   69.02 4575.38   68.85
 4611.46    68.9 4650.82   68.42  4670.5   68.66 4690.18   69.36 4709.86   68.83
 4726.26   68.87 4745.94   69.95 4759.06   70.03 4785.29   69.43 4795.13   69.61
 4818.09   69.18 4841.05   69.44 4870.57   69.19 4880.41   68.76 4896.81   68.85
 4909.93   68.26 4939.45   68.44 4949.29   68.75 4972.25   68.62 4998.49   70.36
 5031.29   70.31 5054.25   69.17 5060.81   69.87 5067.37   72.93 5073.93   74.16
 5090.32   78.54 5103.44   72.14    5110   70.71 5119.84    70.2 5123.12   68.61
 5129.68   63.12 5136.24   59.71 5146.08   59.05 5172.32   59.01 5182.16   59.38
 5185.44   60.85 5195.28   68.06 5211.68   69.21 5218.24   73.14  5224.8   74.66
 5237.92      73 5251.04    73.7 5264.16   70.93 5287.12   69.12  5323.2   68.49
 5352.72   68.68 5369.12   68.37 5385.51    68.8 5405.19   68.31 5437.99   68.42
 5447.83   68.91 5460.95   68.32 5470.79   68.93 5483.91    68.6 5519.99   68.52
 5562.63   68.96 5569.19    68.5 5605.27   68.78 5651.19   68.67 5664.31   68.87
 5693.82   68.68 5726.62   68.75 5743.02   69.04  5762.7   68.84 5772.54   69.11
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5805.34	68.71	5815.18	69.16	5828.3	68.82	5854.54	69.25	5864.38	68.88		
5880.78	69.99	5897.18	69.14	5926.7	69.26	5962.78	68.9	5979.18	69.31		
5985.73	68.99	6028.37	69.24	6064.45	69.1	6087.41	69.61	6107.09	69.23		
6139.89	69.52	6146.45	69.26	6189.09	69.26	6205.49	69.73	6212.05	69.15		
6231.73	69.38	6267.81	69.31	6280.93	69.73	6297.32	69.16	6349.8	69.54		
6362.92	69.22	6392.44	69.2	6408.84	69.53	6464.6	69.39	6487.56	69.84		
6503.96	69.28	6526.92	69.53	6546.6	69.28	6589.23	69.24	6602.35	69.92		
6618.75	69.26	6736.83	69.5	6753.23	69.79	6779.47	69.73	6795.87	70.05		
6805.71	69.66	6841.79	69.86	6851.63	69.55	6887.71	69.98	6910.66	69.7		
6959.86	69.99	6986.1	69.7	6995.94	70.16	7002.5	69.6	7028.74	69.88		
7054.98	69.74	7068.1	70.02	7081.22	69.62	7097.62	69.82	7107.46	70.4		
7117.3	69.58	7123.86	70.2	7140.26	70.4	7159.94	70.08	7205.85	69.97		
7232.09	70.24	7241.93	69.92	7258.33	70.41	7271.45	70.07	7300.97	70.04		
7323.93	70.48	7340.33	70.03	7363.29	70.85	7376.41	70.25	7396.09	70.85		
7419.05	70.23	7458.41	70.61	7474.81	70.52	7481.37	70.97	7497.77	70.36		
7524	70.37	7533.84	70.82	7569.92	70.93	7583.04	70.59	7619.12	70.51		
7642.08	70.81	7665.04	70.56	7674.88	71.05	7681.44	70.6	7697.84	70.81		
7737.2	70.67	7786.4	71.14	7819.19	70.83	7868.39	71.33	7884.79	71.13		
7901.19	71.45	7930.71	71.31	7943.83	71.64	7973.35	71.23	7996.31	71.48		
8107.82	71.41	8127.5	71.82	8143.9	70.88	8163.58	73.09	8176.7	72.57		
8196.38	69.33	8216.06	68.56	8229.18	66.94	8248.85	66.26	8288.21	67.66		
8334.12	67.37	8376.75	67.36	8399.71	68.13	8422.67	71.26	8432.51	70.56		
8442.34	68.27	8455.46	67.08	8468.58	66.96	8478.42	65.8	8488.26	66.14		
8504.66	68.26	8521.05	67.78	8537.45	66.25	8553.85	67.72	8563.69	67.87		
8573.52	66.68	8589.92	68.07	8596.48	68.14	8612.88	67.16	8619.44	67.45		
8635.84	70	8642.39	70.54	8662.07	67.48	8675.19	67.36	8688.31	64.97		
8701.4	64.9	8714.49	66.24	8721.03	68.64	8737.39	70.09	8747.21	68.58		
8760.3	70.2	8766.85	70.22	8802.84	65.8	8809.39	66.81	8838.84	67.55		
8845.39	66.84	8858.48	63.62	8881.38	63.61	8887.93	60.2	8904.29	57.87		
8920.65	57.87	8927.2	59.01	8940.29	60.04	8950.1	59.3	8963.19	59.1		
8966.47	57.76	8973.01	52.55	8973.01	47.04	8981.99	46.64	8991.99	46.34		
9001.99	46.24	9021.99	45.84	9051.99	45.04	9071.99	43.94	9081.99	43.24		
9091.99	42.84	9107.18	42.04	9107.18	52.53	9110.46	53.26	9123.54	59.93		
9133.36	69.99	9136.63	71.33	9146.45	70.53	9159.54	70.81	9179.18	70.48		
9306.8	70.48	9355.89	70.19	9401.7	70.13	9414.79	69.94	9444.25	70.36		
9486.79	70.47	9535.88	69.98	9581.69	69.99	9591.51	70.55	9611.14	70.86		
9620.96	69.55	9627.5	69.64	9647.14	76.97	9673.32	77.03	9676.59	76.39		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	8838.84	.066	8973.01	.025	9107.18	.066	9136.63	.071

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
8838.84	9136.63	1686.3	1916.67 202.14	.1	.3

Left Levee Station= 29.52 Elevation= 77.74
Right Levee Station= 9647.14 Elevation= 76.97
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	8163.58	73.09	9136.63	9676.59	71.33

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.91	Element			
Vel Head (ft)	0.13	Wt. n-Val.	0.110	0.049	0.071
W.S. Elev (ft)	72.78	Reach Len. (ft)	1686.30	1916.67	202.14
Crit W.S. (ft)	53.90	Flow Area (sq ft)	3290.11	5714.10	721.62
E.G. Slope (ft/ft)	0.000231	Area (sq ft)	3290.11	5714.10	721.62
Q Total (cfs)	20000.00	Flow (cfs)	1948.53	17758.38	293.09
Top Width (ft)	1464.54	Top Width (ft)	667.46	297.79	499.29
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	0.59	3.11	0.41
Max Chl Dpth (ft)	30.74	Hydr. Depth (ft)	4.93	19.19	1.45
Conv. Total (cfs)	1316916.0	Conv. (cfs)	128302.4	1169314.0	19299.1
Length Wtd. (ft)	1776.32	Wetted Per. (ft)	670.78	323.77	499.55
Min Ch El (ft)	42.04	Shear (lb/sq ft)	0.07	0.25	0.02
Alpha	2.04	Stream Power (lb/ft s)	0.04	0.79	0.01
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	3983.78	1324.51	377.92
C & E Loss (ft)	0.02	Cum SA (acres)	909.37	68.05	144.35

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 113.73*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.05	29.61	71.09	36.66	72.92	42.3	73.62	50.76	72.62
54.99	73.26	63.45	76.24	71.57	77.2	82.18	76.79	100.74	71.22
119.3	68.52	135.2	67.56	156.42	65.41	177.56	64.24	196.2	63.53
214.76	63.55	235.97	63.26	249.23	63.38	267.79	62.87	281.7663.28464	
307.56	63.45	323.47	63.18	342.03	63.66	363.25	64.71	408.33	64.52
464.01	64.45	471.96	64.71	503.78	65.11	520.24	64.34	532.71	61.99
543.56	61.25	563.88	61.09	588.79	62.55	613.73	62.09	639.02	61.82
686.75	61.86	729.18	62.91	747.74	63.05	774.26	62.3	790.16	62.33
800.77	62.7	827.28	62.32	850.57	62.22	867.06	62.45	877.67	63
896.23	63.42	914.79	64.28	936.01	64.13	954.56	65.19	962.51	64.86
975.77	65.73	996.99	65.57	1004.94	65.23	1015.55	65.92	1026.16	65.95
1052.67	65.21	1068.59	66.43	1079.19	66.03	1100.41	66.03	1108.36	66.52
1124.26	66.38	1145.48	65.7	1161.39	64.83	1180.89	64.08	1205.83	62.17
1224.53	62.15	1243.21	63.86	1255.68	63.96	1296.62	63.38	1317.84	63.65
1339.05	64.34	1352.31	65.02	1368.22	64.55	1381.48	64.81	1397.39	65.79
1423.91	65.35	1437.16	65.49	1445.11	65.14	1466.33	62.85	1492.84	62.22
1527.32	62.47	1572.4	62.29	1593.61	62	1630.73	61.94	1651.94	62.52
1665.2	64.26	1675.81	64.88	1697.02	63.81	1723.54	63.37	1739.45	63.65
1765.96	64.99	1776.57	66.93	1787.17	67.2	1805.74	66.82	1826.95	65.25
1850.82	65.04	1864.07	64.56	1890.59	64.12	1930.36	64.07	1948.92	64.24
1972.79	65.18	1994	65.79	2007.26	65.58	2031.13	63.96	2073.56	63.34
2097.41	63.24	2105.37	63.48	2123.93	63.3	2139.84	63.57	2182.27	63.58
2208.79	64.24	2214.09	64.72	2227.35	64.79	2235.31	64.38	2264.47	64.43
2272.42	64.94	2288.33	64.94	2304.24	65.28	2320.15	65.06	2362.58	65.15
2373.19	65.5	2394.4	65.66	2450.08	65.79	2458.04	66.12	2468.64	65.96
2492.51	66.3	2500.47	66.11	2513.72	66.49	2537.59	66.5	2553.5	66.21
2595.92	66.73	2609.18	66.4	2646.3	66.52	2667.52	66.99	2707.3	67.37
2717.9	67.15	2736.46	67.41	2762.97	67.51	2786.84	67.08	2823.96	67.54
2863.74	67.45	2871.7	67.79	2879.65	67.51	2895.56	67.74	2900.87	67.49
2922.07	67.5	2932.68	67.78	2961.85	67.53	2980.41	67.8	2998.97	67.36

3006.93	67.65	3025.49	67.48	3033.45	67.73	3062.62	67.46	3078.52	67.97
3089.13	67.67	3094.43	68.16	3105.04	70.9	3110.34	70.66	3120.95	68.33
3144.81	65.98	3163.37	66.25	3176.63	68.23	3192.54	68.47	3221.71	68.24
3234.96	66.2	3242.92	66.09	3258.83	65.17	3277.39	64.74	3285.35	63.88
3309.21	64.48	3333.08	64.62	3338.38	64.33	3375.51	64.31	3380.81	64.62
3409.98	64.26	3447.1	64.37	3457.7	64.59	3468.31	64.36	3489.53	64.75
3508.09	64.54	3542.56	64.9	3547.86	65.21	3555.82	64.71	3577.03	65.07
3587.64	66.09	3592.94	65.97	3616.81	67.78	3643.33	67.69	3653.93	68.1
3661.88	67.85	3677.79	68.1	3683.1	68.51	3696.36	68.49	3725.52	68.09
3775.91	68.01	3807.73	67.64	3823.64	67.77	3839.55	68.24	3855.46	67.9
3868.72	67.98	3884.63	68.76	3895.24	68.86	3916.44	68.55	3942.96	68.52
3961.52	68.79	4006.6	68.45	4017.21	68.06	4049.03	68.31	4067.59	68.14
4088.81	69.24	4115.33	69.16	4133.89	68.37	4139.19	68.83	4144.5	70.86
4163.05	74.57	4173.66	70.28	4178.96	69.32	4186.92	68.96	4194.87	64.24
4200.17	61.96	4208.13	61.53	4229.34	61.5	4237.3	61.75	4239.95	62.73
4247.91	67.54	4261.17	68.31	4266.47	70.93	4271.77	71.94	4282.38	70.82
4292.99	71.28	4303.59	69.42	4322.16	68.21	4351.33	67.79	4375.19	67.93
4388.45	67.72	4401.7	68.01	4417.61	67.67	4444.13	67.68	4452.08	67.99
4462.69	67.58	4470.65	67.97	4481.25	67.72	4510.42	67.61	4544.9	67.86
4550.2	67.56	4577.65	67.76	4616.49	67.62	4627.52	67.73	4671.15	67.5
4690.73	67.83	4714.6	67.96	4741.12	67.7	4749.07	68.01	4759.68	67.8
4780.9	68.12	4788.85	67.89	4802.11	68.6	4815.37	68	4839.23	68
4868.4	67.66	4950.6	67.75	4969.16	68.1	4985.07	67.83	5011.59	68.01
5016.89	67.83	5051.37	67.93	5064.63	68.15	5069.93	67.78	5085.84	67.96
5115.01	67.93	5125.62	68.21	5138.87	67.84	5181.29	68.05	5191.9	67.82
5215.77	67.8	5229.03	68.01	5274.11	67.86	5292.67	68.17	5305.93	67.79
5324.49	67.97	5374.87	67.8	5385.47	68.24	5398.73	67.79	5475.14	67.89
5507.45	68.18	5528.67	68.14	5541.93	68.39	5549.88	68.15	5579.05	68.36
5587.01	68.18	5616.18	68.51	5634.73	68.34	5674.51	68.54	5708.98	68.39
5730.19	68.65	5772.62	68.4	5793.84	68.96	5801.79	68.43	5807.1	68.85
5820.35	69.01	5836.27	68.82	5873.38	68.79	5894.6	68.93	5902.55	68.7
5915.81	69	5926.42	68.75	5950.28	68.74	5968.85	69.06	5982.1	68.8
6000.67	69.41	6011.27	69.05	6027.18	69.5	6045.75	69.16	6096.13	69.75
6109.39	69.37	6130.59	69.33	6138.55	69.62	6167.72	69.62	6178.33	69.35
6207.5	69.17	6226.06	69.24	6244.62	68.99	6271.14	69.09	6297.85	68.94
6316.55	67.83	6347.7	67.07	6360.17	67.07	6397.57	70.05	6422.5	70.69
6470.01	71.18	6493.88	71.04	6522.22	71.46	6534.69	71.43	6559.61	70.93
6602.59	70.4	6618.5	70.61	6631.76	69.94	6647.67	71.37	6658.28	70.97
6674.19	68.73	6690.1	68.13	6700.71	67.01	6716.61	66.54	6748.43	67.44
6785.55	67.23	6820.01	67.17	6838.58	67.71	6857.14	69.83	6865.09	69.38
6873.04	67.86	6883.65	67.09	6894.25	67.02	6902.21	66.25	6910.17	66.47
6923.42	67.88	6936.67	67.55	6949.93	66.53	6963.19	67.5	6971.15	67.6
6979.09	66.8	6992.35	67.72	7010.92	67.11	7016.22	67.3	7034.77	69.35
7050.68	67.3	7061.29	67.22	7071.9	65.62	7082.48	65.56	7093.06	66.45
7098.35	68.05	7111.58	69.01	7119.52	67.99	7130.1	69.07	7135.4	69.08
7164.49	66.11	7169.79	66.79	7193.6	67.44	7198.8	66.82	7209.2	63.84
7220.65	62.5	7227.39	61.12	7233.6657.74387		7245.59	56.1	7258.59	56.07
7274.19	57.48	7282.4	56.96	7292.38	54.76	7294.99	53.69	7300.18	46.32
7315.26	45.61	7332.5845.14087		7343.0844.79408		7354.95	44.36	7379.82	41.98
7406.77	40.71	7412.23	49.02	7423.14	50.73	7430.7	53.29	7430.71	54.33
7438.93	57.21	7451.26	58.97	7456.74	59.19	7464.97	60.82	7471.5663.21661	
7482.83	65.56	7491.49	68.72	7502.07	70.18	7508.46	69.78	7546.67	69.37
7572.4	69.57	7638.95	70.35	7674.82	70.37	7724.79	70.17	7761.94	70.18
7796.53	70.35	7815.75	70.3	7833.69	70.75	7855.46	70.19	7911.84	70.37
7961.8	70.38	8015.61	70.23	8056.61	70.35	8142.45	70.23	8180.89	70.34
8238.54	70.29	8288.5	70.39	8365.37	70.23	8388.43	70.29	8443.53	70.22
8494.77	70.31	8547.3	70.27	8697.2	70.34	8763.82	70.11	8820.19	70.31
8835.56	70.27	8888.09	70.44	8947.03	70.33	8957.28	70.46	8986.74	70.32
9099.49	70.47	9182.76	70.22	9219.92	70.54	9227.6	70	9237.85	70.22
9244.25	69.88	9304.47	70.2	9322.41	70.08	9386.46	70.13	9513.29	70.04
9570.95	70.36	9651.66	70.55	9701.87	69.58	9731.57	69.55	9755.43	70.79
9797.71	72.56	9813.08	73.56	9820.77	77.18	9840.17	77.21	9842.59	76.78

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	7193.6	.066	7294.99	.025	7430.7	.066	7502.07	.071

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
7193.6 7502.07 1686.3 1916.67 202.14 .1 .3
Left Levee Station= 71.57 Elevation= 77.2
Right Levee Station=9820.773 Elevation=77.18333
Blocked Obstructions num= 1

Sta L	Sta R	Elev
103.27	6517.5	70.49

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 113.37*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	67.81	23.32	68.29	37.31	68.88	48.96	69.02	55.95	70.42
60.61	71.99	69.95	72.84	76.93	70.86	83.93	70.02	90.92	70.9
100.25	74.8	104.91	76.03	113.62	76.67	121.71	76.25	135.88	72.27
150.04	69.67	161.48	68.29	170.9	66.7	185.06	65.05	194.5	64.32
208.72	63.66	217.3263.53123		249.19	63.15	263.36	62.76	293.7	62.99
305.84	62.86	336.2	63.6	370.6	63.43	413.08	63.56	443.44	64.16
456	63.93	465.51	61.08	473.79	60.54	489.29	60.49	503.55	63.25
508.31	63.72	517.82	63.48	527.33	62.8	546.63	62.31	583.05	62.08
615.43	62.58	636.73	62.66	649.83	62.33	670.06	62.44	693.79	61.66
708.06	61.03	720.65	61.12	742.91	61.74	760.37	62.52	769.89	63.57
787.42	64.5	793.49	64.29	803.61	64.6	825.87	64.21	842.05	64.55
862.29	64.13	874.43	64.7	882.52	64.47	898.71	64.56	904.78	64.88
933.11	64.82	960.13	64.21	964.89	63.6	974.4	61.65	979.16	61.05
993.43	60.99	1002.93	63.48	1007.69	64.33	1017.2	64.43	1031.47	63.5
1048.44	63.3	1064.63	63.43	1090.94	64.15	1103.08	63.94	1113.19	64.09
1125.34	64.61	1161.75	64.35	1177.94	63.21	1198.18	62.89	1224.48	63.01
1275.07	62.81	1303.39	62.83	1319.58	63.15	1329.7	64.04	1337.79	64.37
1353.98	63.85	1374.22	63.64	1386.36	63.79	1406.59	64.51	1414.68	65.51
1422.78	65.67	1436.94	65.51	1453.13	64.77	1471.34	64.72	1501.69	64.22
1532.04	64.15	1546.21	64.23	1580.61	64.98	1590.72	64.87	1608.94	64.07
1641.31	63.87	1679.75	63.97	1691.89	64.15	1724.27	64.3	1758.67	65.07
1764.74	64.86	1786.99	64.82	1793.06	65.05	1817.35	65.09	1829.49	64.93
1861.86	64.87	1869.96	65.02	1916.09	65.34	1934.71	65.36	1949.38	65.19
1977.2	65.45	2007.55	65.36	2039.92	65.67	2050.04	65.52	2078.37	65.66
2094.56	65.96	2124.91	66.27	2133	66.2	2167.4	66.39	2185.61	66.18
2213.94	66.41	2244.29	66.31	2288.8	66.28	2296.9	66.42	2319.16	66.27
2333.32	66.4	2347.49	66.16	2373.79	66.36	2396.05	66.24	2420.33	66.56

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 2428.42   67.92 2432.47    67.8 2440.56   66.64 2458.77   65.47 2472.94   65.61
 2483.06   66.61  2495.2   66.74 2517.46   66.64 2527.57   65.62 2545.78   65.14
 2559.95   64.97 2566.02   64.56 2591.45   65.08 2634.82   64.86 2638.86      65
 2661.12   64.81 2673.26   64.92 2705.63   64.92 2721.82   65.09 2735.99   64.94
 2772.41   64.99  2788.6    65.2 2818.95   66.62 2853.34   66.77 2869.53   67.19
 2914.85   67.21 2940.36   67.11 2964.64   66.85 2988.92   67.11 3011.18   67.09
 3023.32   67.58 3067.83   67.86 3086.07   68.19 3124.49   67.86 3148.77   67.87
 3162.94   67.67 3179.13   68.12 3199.36   68.01 3213.53   67.57 3235.78   70.59
 3243.87   68.42 3253.99   67.73 3264.11   64.22 3270.18      64 3292.44   64.12
 3300.53   67.01 3310.65    67.4 3318.74   69.22 3326.84   68.65 3334.93   68.86
 3343.03   67.91 3357.19   67.29 3379.45    67.1 3407.78   67.08 3417.89   67.23
 3430.03   67.03 3500.86   66.71 3527.16   66.76 3531.21   66.61 3553.47   66.75
 3590.21   66.59 3623.51   66.26 3638.45   66.62 3656.66   66.81  3676.9    66.7
 3723.44   67.21 3733.56   66.86 3751.77   66.74 3770.94   66.43 3813.74   66.27
 3850.91   66.59 3863.06   66.44 3889.83   66.39 3913.61   66.59 3927.81   66.41
 3962.21   66.54 4012.79   66.57 4020.88   66.43 4049.21   66.49 4083.61   66.33
 4097.78   66.49  4107.9   66.31 4122.06   66.41  4160.5   66.37  4168.6   66.57
 4179.95   66.31 4237.02   66.33 4261.68   66.57 4277.87   66.54 4344.64   67.03
 4415.46   67.18 4431.65   67.41 4464.03   67.19 4480.21   67.52 4486.28   67.28
 4500.45   67.62 4536.66   67.65 4573.29   67.58 4584.21   67.41 4613.76   67.64
 4623.88   67.56 4638.04   67.97 4646.14   67.85 4658.28   68.16 4672.44   68.09
 4706.84   68.34 4710.89   68.53 4737.19    68.3 4765.52   68.32 4773.61   68.11
  4824.2   67.41 4864.82   67.18 4879.09   64.84 4888.59   63.85 4902.86   63.05
 4912.37   63.21 4940.92   68.91 4959.94   70.25 4969.44    70.2 4983.71   70.65
 5014.41   70.85 5036.04   71.44 5045.55    71.4 5064.56   70.42 5088.35   69.55
 5109.51   69.39 5119.62   69.01 5131.77   69.66 5139.86   69.37    5152   68.13
 5164.14    67.7 5172.24   67.08 5184.37   66.82 5208.65   67.21 5263.28   66.99
 5277.44   67.29 5291.61    68.4 5303.74   67.45 5332.07   66.81 5342.19    67.5
  5352.3   67.33 5362.42   66.81 5378.61   67.33 5384.67   66.92 5394.79   67.38
 5408.95   67.05 5427.16   68.16  5439.3   67.12 5447.39   67.08 5455.49   66.27
 5463.56   66.23 5471.64   66.66 5475.67   67.46 5485.77   67.92 5491.82   67.41
 5503.94   67.94 5526.14   66.43 5530.18   66.77 5548.35   67.33 5553.38   66.54
 5559.92   64.07  5568.4   61.38 5578.44   55.29 5589.8154.31183 5596.53   54.27
 5608.09   54.92 5614.17   54.63 5623.51   49.62 5627.36   45.59 5632.64    45.2
 5667.95    43.4 5686.39   40.12 5692.15 39.8621 5703.0239.50328 5706.36   39.38
 5715.59   45.14 5734.05   47.29 5746.82   51.22 5746.85   53.29 5760.75   57.77
 5767.69   57.93 5776.95   59.14 5781.59   59.34 5786.22   58.82 5804.77   60.05
 5814.07   62.65 5835.9564.02303 5848.92   67.42 5858.21   67.47 5867.51   69.04
 5878.89   68.34 5885.71   68.43 5903.92   68.16  5946.9   68.21 5992.69   68.49
  6029.1   68.87 6051.86   69.21 6072.36   69.28 6079.21   69.56 6097.44   69.66
 6111.13   70.01 6124.81   69.96 6174.97   70.19 6213.74   70.02 6231.99   70.09
 6263.91   69.87 6288.99      70 6330.04   69.89 6359.68   69.98  6391.6   70.22
  6425.8   70.12 6437.21   70.67 6457.73   71.02 6496.49    69.9 6510.18      70
 6560.35   70.09 6596.83   70.27 6635.59   70.11 6651.55    70.3 6672.08   70.15
 6685.76   70.27 6749.61   70.05 6763.29   70.19 6781.53   69.97 6792.93   70.13
  6854.5   70.21 6895.54   70.11 6959.39   70.15 6968.51   70.01 6998.16    70.1
 7007.27   69.97 7075.69   70.19 7123.57   70.09 7132.69   70.25 7146.38   70.09
  7178.3    70.1  7212.5   70.26 7244.43    70.2 7283.19   70.28 7404.04   70.11
 7445.09   70.26 7479.29   70.04 7483.85   70.19 7520.34   70.27 7543.14   70.17
 7593.31   70.25 7618.39    70.4 7668.56   70.36 7693.64   70.47 7727.85   70.37
 7798.53   70.46 7816.77   70.31 7828.18   70.44 7889.74   70.44 7923.95   70.53
 7967.27   70.45 7994.63   70.54 8065.32   70.46 8079.01    70.3 8108.65   70.38
 8113.21   70.28 8213.54    70.5  8240.9   70.39 8272.83   70.56 8304.75   70.42
  8334.4   70.55 8348.08   70.46 8377.72   70.52 8439.29   70.28 8457.53   70.52
 8491.74   70.39 8509.98   70.22 8580.67   70.41 8596.63   70.31    8681   70.37
 8710.64   70.48  8749.4   70.32 8774.48    70.4 8858.86   70.17 8877.09   70.27
 8890.78   70.76 8899.89   70.55 8904.46   70.82 8924.98   70.88 8938.66   69.83
 8950.06   69.79 8956.91   70.28  8968.3   69.62 8977.42   69.67 8979.71   70.32
 8993.38   69.83 9000.23   69.98 9045.83   70.18 9075.48   70.39 9082.32   70.23
  9175.8   70.11 9221.41   70.27 9301.22   70.16 9346.82    70.2 9362.78   70.09
 9385.58    70.2 9424.35   70.08 9469.95    70.2 9488.19   70.12  9499.6   70.26
 9517.84   70.13 9538.36   70.28 9549.76   70.16 9595.37   70.24 9693.42   70.25
 9707.09   70.09 9750.42   69.87 9766.38   69.63 9811.98   69.59 9835.64   69.46
 9878.11   69.97 9894.08   69.83  9948.8   69.95 9962.48   70.78 9967.04   70.54
 9980.72   70.77    9983   71.47 9989.85    75.5 9994.41    77.410008.59   77.18

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  113.62    .066 5548.35     .07 5623.51    .025 5734.05     .07
 5867.51    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       5548.35 5867.51           1686.3 1916.67  202.14             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 5548.35   67.33       T
 5867.5110008.59   69.04       T
Left Levee      Station=  113.62      Elevation=   76.67
Right Levee     Station=9994.406      Elevation=77.39667

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 113

INPUT
Description: Bathymetric elevations translated from IBWC 2008 Cross-sections
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   66.57   19.52   66.49   32.53   66.61   52.05   67.08   68.31   66.95
   78.07   68.85   84.57   71.06   91.08   72.07   97.59   72.06  100.84    71.4
  107.34   68.89   117.1   67.42  126.86   68.54  130.11   69.56  139.87   74.11
  146.38   75.82  152.88   76.34  162.64   75.61  175.65   72.04  188.67   68.95
  195.17   67.09  204.93   65.23  211.44   64.39   224.5    63.6  263.85   62.51
  303.21   62.56  326.16   62.31  342.56   62.41  372.07   62.81  391.75   63.51
  398.31   60.17  401.59   59.81  414.71   59.88  424.54   64.15  427.82   64.89
  434.38   64.57  440.94   63.51  450.78   62.87  483.57   62.21  509.81   62.26
  516.37   62.49  539.32   62.19  555.72      61  565.56   59.83  578.68   59.76
  595.07   60.22  601.63   60.89  608.19    62.9  614.75    63.7  621.31   63.83
  637.71   63.24  663.94   63.13   686.9   62.89  693.46   62.97  722.97   64.01
  739.37   64.33  742.65   63.62  749.21   60.82  752.49   59.92  762.33   59.84
   765.6   61.17  768.88   63.54  772.16   64.79  778.72   64.91  788.56   63.39
  791.84   63.21  818.08   63.22  880.38   63.58  945.97   63.55    1005   63.89
 1034.52   63.93 1093.55   64.42 1126.34   64.24 1182.09   64.14 1247.68   64.76
 1290.31   65.36 1306.71   65.25 1346.07   64.69 1369.02   64.53 1398.54   64.93
 1421.49   64.33  1500.2   64.69 1549.39   65.26 1601.86   65.28 1637.94   65.12
 1696.97   64.96 1733.04   65.03 1752.72   64.93 1828.14   65.06  1851.1   65.28
 1864.22   65.59 1903.57   65.34  1946.2   65.49    1979   65.21 2034.75   65.54
 2087.22   66.37 2133.13   65.97 2146.25   66.02 2179.04   66.79 2205.28   67.59
 2238.07   67.68 2264.31   67.05 2323.34   66.47 2365.97    66.5 2388.93   66.37
 2438.12   66.45 2484.03   65.86 2510.27   65.66 2526.66   65.74  2552.9   65.45
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 2575.86   65.03 2592.25   65.64 2618.49   65.71 2638.16   65.92 2657.84   65.64
 2677.52   65.17 2684.08   65.19 2707.03   64.79 2726.71   65.11  2759.5   64.96
  2775.9   65.26 2782.46   64.99  2792.3   65.12 2831.65   65.21 2848.05   65.04
 2877.56   64.94  2887.4    64.8 2916.92   64.83 2936.59   64.99 2959.55   64.84
  2998.9   64.77 3012.02   65.02 3021.86   64.87 3061.21   65.48 3094.01   65.69
 3100.56   65.59 3133.36   66.18 3146.48   65.88 3205.51   66.48  3238.3   66.08
 3261.26   66.24 3303.89   67.11 3320.29   67.18 3330.12   67.43 3362.92   67.02
  3382.6   66.55 3398.99   65.91 3431.79   65.43 3441.63   61.84 3448.18   60.29
 3458.02   59.04 3464.58   59.35 3484.26   67.77 3497.38    69.8 3503.93   69.58
 3513.77   70.31 3520.33    70.2 3540.01   70.81 3549.85   71.43 3556.41   71.37
 3569.52   69.91 3585.92   68.62 3595.76   68.25 3615.44   67.95 3641.67   67.17
 3664.63      67 3694.14   66.93 3707.26   66.79 3746.51   67.16  3834.6   66.93
 3890.06   66.73 3903.11   67.22 3906.38   66.63  3912.9   63.05 3916.16   60.27
 3919.43   56.13 3922.69   52.98 3925.95   52.59 3945.95    52.3 3950.95   45.85
 3954.95   44.75 3980.95   42.45 3992.95   38.25 4005.95   38.05 4018.95   41.25
 4030.95   42.65 4044.95   43.85 4062.95   49.15 4062.98   52.26 4066.24   52.69
 4072.77   55.61 4082.56   58.32 4092.34   58.24 4105.39   59.62 4111.92   59.71
 4118.44   58.71 4124.97   58.66 4131.49   59.42 4144.57   59.28 4147.85   59.71
 4154.39    61.8 4157.67   62.31 4187.12   62.19  4190.4   62.49 4200.22   65.11
 4206.76    66.2 4219.85   65.89 4232.95   67.89 4242.77    67.6 4249.31    66.9
 4259.13   67.07 4285.32   66.76 4304.95   66.94 4324.59   66.88 4403.15   67.45
 4412.97   67.41 4465.34   67.93 4498.07   68.41 4527.56   68.53  4537.4   68.96
 4563.63   69.13 4583.31   69.67 4602.99   69.61 4675.13      70 4691.53   69.84
 4730.88   69.79 4757.12   69.89 4783.35    69.8 4803.03   69.56  4839.1   69.76
 4862.06   69.61 4875.17   69.69 4898.13   69.59 4911.25   69.78 4940.76   69.73
 4986.67   70.09 5012.91   69.92 5035.86   69.94 5052.26   70.76 5081.78   71.29
 5091.61   70.87 5101.45   70.78 5117.85    70.1 5137.52   69.61  5157.2   69.76
 5196.55   69.84 5199.83   69.94 5229.35    69.9 5255.58   70.12 5281.82   70.16
 5308.05   69.93 5337.57   69.92 5360.52   70.21 5390.04   69.98 5409.71   70.17
 5442.51   70.13 5465.46   69.98 5488.42   70.07 5501.54   69.83 5521.21   70.04
 5547.45   69.72 5563.84   69.95  5570.4   69.76  5586.8   69.98 5632.71   70.07
 5639.27   69.89 5652.39   70.08  5665.5   69.85 5675.34   70.04 5711.41   69.93
    5777   69.91  5793.4    69.8 5803.24   69.98 5816.35   69.77 5826.19   69.91
 5839.31   69.78 5858.99   69.91  5872.1   69.72 5924.57   69.94 5950.81   69.88
 5970.49   70.05 6019.68    69.9 6032.79   70.07 6039.35    69.9 6052.47   70.13
 6072.15   69.89 6118.06   69.91  6127.9   70.03 6167.25   70.15 6213.16   70.06
 6229.56   70.24 6236.11   70.04 6245.95   70.26 6255.79   69.93 6268.91   70.19
 6282.03      70  6301.7   70.16 6327.94   70.06 6380.41   70.07 6419.76   69.97
 6436.16   70.21 6442.71   69.98 6475.51   70.04 6501.74   70.22  6508.3   70.02
 6531.26   70.15 6550.93   69.91 6557.49   70.13 6593.57   70.15 6609.96   70.26
 6642.76   70.13 6682.11   70.27  6714.9   70.27 6750.98    70.5 6773.93   70.54
 6823.12   70.44 6859.19   70.61 6908.39   70.47 6947.74   70.62  6954.3   70.49
 7010.05   70.61 7036.28   70.39 7052.68   70.58 7075.63   70.55 7114.99   70.66
 7141.22   70.59 7190.41   70.73 7219.93   70.64 7229.76   70.73 7252.72    70.6
 7262.56   70.78 7275.68   70.62 7292.07   70.75 7341.26   70.67 7364.22    70.7
 7374.06   70.48 7393.73   70.67 7413.41   70.45 7456.04    70.6  7462.6   70.44
 7485.56   70.64 7495.39   70.51 7521.63   70.61 7531.47   70.49 7547.86   70.63
 7564.26   70.52 7593.77   70.57 7606.89    70.7 7646.24    70.5 7692.16   70.73
 7705.27   70.54 7718.39   70.63 7738.07    70.5  7780.7   70.67 7800.38   70.52
 7816.77   70.66 7823.33   70.51 7843.01   70.59 7869.24   70.41  7892.2   70.43
 7902.04   70.23 7931.55   70.22 7957.78   70.59 7984.02   70.52 7993.86   70.27
 8006.98   70.39 8033.21   70.13 8062.72   70.33  8082.4   70.24 8134.87    70.4
 8157.83   70.24 8180.78   70.38 8187.34   70.28 8279.16   70.32 8302.12   70.24
 8321.79    70.5 8331.63   70.34 8354.58   70.48 8377.54   70.27 8413.61   70.41
 8426.73   70.29 8459.52   70.36 8492.32    70.2 8534.95   70.12 8561.18   70.28
 8580.86   71.02 8593.97   70.71 8600.53   71.12 8616.93   71.34 8630.05   71.23
 8649.72   69.66 8666.12   69.61 8675.96   70.35 8682.51   70.19 8692.35   69.36
 8705.47   69.44 8708.75   70.42 8728.42   69.69 8738.26   69.92 8744.82   69.59
 8751.38   69.99 8803.85   70.25 8846.48   70.58 8856.32   70.35 8892.39   70.27
 8948.14   70.27 8967.81   70.35 8990.77   70.18 9023.56   70.35 9039.96   70.24
 9056.35   70.41 9092.43   70.36 9102.26   70.45 9118.66   70.23 9125.22   70.33
 9171.13   70.25  9207.2   70.33 9226.88   70.18 9236.72   70.31 9259.67   70.14
 9292.46   70.31 9305.58   70.06 9312.14   70.19 9348.21   70.13 9371.17   70.26
    9381   70.14  9413.8   70.29 9440.03    70.1 9456.43   70.28 9482.66   70.01
 9512.18   70.16 9528.57   69.96 9564.65   70.01  9571.2   69.89 9594.16   70.04
 9620.39   69.79 9626.95   69.95  9682.7   69.99 9692.54   70.08 9708.93   69.85
 9735.17   69.96 9754.84   69.73 9817.15   69.77 9840.11   69.54 9849.94   69.75
 9876.18   69.55 9905.69   69.59 9941.76   69.3510000.79   69.1610023.75   68.58
10066.38   68.0710102.45    67.510109.01   67.5410122.13   68.4210128.68   67.96
10148.36   67.9910151.64   68.9910161.48   74.8710168.04   77.6110174.59   77.57

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .085  152.88    .066 3903.11     .07 3945.95    .025 4062.95     .07
 4232.95    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3903.11 4232.95          1041.61 1416.67  323.99             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 3903.11   67.22       T
 4232.9510174.59   67.89       T
Left Levee      Station=  152.88      Elevation=   76.34
Right Levee     Station=10168.04      Elevation=   77.61

CROSS SECTION OUTPUT  Profile #Design Flow

  E.G. Elev (ft)             72.40    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                 0.066      0.056     0.066
  W.S. Elev (ft)             72.39    Reach Len. (ft)          1041.61    1416.67     323.99
  Crit W.S. (ft)             53.01    Flow Area (sq ft)       18854.08    6069.94   14069.07
  E.G. Slope (ft/ft)      0.000048    Area (sq ft)            26999.46    6069.94   14233.18
  Q Total (cfs)           20000.00    Flow (cfs)               8628.83    7475.43    3895.74
  Top Width (ft)           9982.95    Top Width (ft)           3728.73     329.84    5924.38
  Vel Total (ft/s)            0.51    Avg. Vel. (ft/s)            0.46       1.23       0.28
  Max Chl Dpth (ft)          34.34    Hydr. Depth (ft)            5.06      18.40       2.37
  Conv. Total (cfs)       2893909.0    Conv. (cfs)           1248552.0  1081661.0   563695.4
  Length Wtd. (ft)         1033.67    Wetted Per. (ft)         3737.49     345.84    5926.16
  Min Ch El (ft)             38.05    Shear (lb/sq ft)            0.02       0.05       0.01
  Alpha                       2.56    Stream Power (lb/ft s)      0.01       0.06       0.00
  Frctn Loss (ft)             0.04    Cum Volume (acre-ft)     1404.67     547.75     274.69
  C & E Loss (ft)             0.00    Cum SA (acres)            340.56      26.63      99.69


Note:    Manning's n values were composited to a single value in the main channel.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION


RIVER: Rio Grande
REACH: Lower Reach        RS: 112.73*
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INPUT
Description:
Station Elevation Data    num=     460
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    7.33   69.39   29.02   69.42   42.03   69.73   52.87   69.65   59.38   70.91
   63.71   72.39   68.05   73.06   72.39   73.05   78.89   70.94    85.4   69.96
   91.91   70.71   94.07   71.39  100.58   74.42  104.92   75.56  109.25   75.91
  121.86   75.42  138.66   73.04  155.47   70.98  163.86   69.74  176.46    68.5
  184.87   67.94     20167.43295  252.54   66.69  303.37   66.72     333   66.55
  354.18   66.62  392.28   66.89  417.69   67.35  426.16   65.13   430.4   64.89
  447.34   64.93  460.03   67.78  464.27   68.27  472.74   68.06  481.21   67.35
  493.92   66.93  536.26   66.49  570.14   66.52  578.61   66.67  608.24   66.47
  629.42   65.68  642.13    64.9  659.07   64.85  680.23   65.16   688.7   65.61
  697.17   66.95  705.64   67.48  714.11   67.57  735.29   67.17  769.16    67.1
  798.81   66.94  807.28   66.99  845.38   67.69  866.56    67.9  870.79   67.43
  879.26   65.56   883.5   64.96  896.21   64.91  900.43   65.79  904.66   67.37
   908.9   68.21  917.37   68.29  930.08   67.27  934.31   67.15  968.19   67.16
 1048.64    67.4 1133.33   67.38 1209.55   67.61 1247.67   67.63 1323.89   67.96
 1366.23   67.84 1438.22   67.77 1522.91   68.19 1577.96   68.59 1599.14   68.51
 1649.96   68.14 1679.59   68.03 1717.71    68.3 1747.35    67.9 1848.98   68.14
  1912.5   68.52 1980.25   68.53 2026.84   68.43 2103.06   68.32 2149.64   68.37
 2175.05    68.3 2272.43   68.39 2302.08   68.53 2319.02   68.74 2369.83   68.57
 2424.88   68.67 2467.23   68.49 2539.22   68.71 2574.26   68.99 2574.95   65.83
 2606.97   66.11 2666.25   65.88 2683.19   65.92 2725.53   66.45 2759.42   67.01
 2801.76   67.09 2835.64   66.69 2884.36   66.47 2911.86   65.92  2938.8   65.54
 2941.56   63.67 2962.23   63.71 2972.57   66.13 2999.45   66.76 3036.66   68.63
 3052.51   68.64 3081.45    66.6 3119.35   66.36 3153.23   66.23  3174.4   66.29
 3208.28    66.1 3237.93   65.83 3259.09   66.24 3292.97    66.3 3318.37   66.44
 3343.78   66.26  3369.2   65.95 3377.67   65.97  3407.3   65.71 3432.71   65.93
 3475.05   65.84 3496.23   66.04  3504.7   65.87 3517.41   65.96 3568.22   66.03
 3589.39   65.92  3627.5   65.86  3640.2   65.77 3678.32    65.8 3703.72   65.91
 3733.37   65.82 3784.18   65.78 3801.12   65.95 3813.83   65.86 3864.64   66.36
 3906.99   66.61 3918.74    66.6 3931.83   67.56 3935.97   66.93 3938.73   67.52
  3957.8    67.3 3974.74   66.89 4050.96   67.22  4093.3   66.91 4122.95   66.99
    4178   67.51 4199.17   67.54 4211.87   67.75 4254.22   67.79 4277.77   67.67
 4300.79   67.16 4343.15   66.74 4355.85   64.31 4364.31   63.26 4377.02    62.4
 4385.49   62.59  4410.9   68.15 4427.84   69.46  4436.3    69.3    4449   69.76
 4457.48   69.67 4482.89   70.02 4495.59    70.4 4504.06   70.35 4520.99   69.34
 4542.17   68.43 4554.87   68.16 4580.29    67.9 4614.16   67.31  4643.8   67.13
 4681.91      67 4698.85   66.87 4749.53   67.01  4827.966.73883 4851.1266.65732
 4934.89   66.78 4951.74   67.16 4955.26   66.23 4962.26   62.78 4965.77   60.39
 4972.79   54.32 4982.45   51.97 4989.6550.67327  4997.8    49.9 4999.0448.84502
 5003.17   45.39 5007.47   44.54 5018.43   43.55  5027.2   43.23 5035.42   42.53
 5048.32   39.38 5065.63   38.98 5075.83   41.28 5093.1943.15184 5096.21   43.46
 5110.33   47.42 5110.35    49.5 5112.91   49.89 5118.03   52.04 5125.71   54.16
 5133.38   54.44 5143.61   56.01 5148.73    56.4 5153.84   56.06 5158.96   56.57
 5165.76   57.84 5174.33   57.99  5176.9   58.35 5182.03   59.88 5189.5860.40363
 5194.68   60.52  5207.7   61.56 5210.27   61.97 5217.97   64.17  5223.1   65.02
 5228.06   65.05 5233.36   65.73 5243.63   68.61 5251.85   68.46 5257.33   68.02
 5265.55   68.14 5287.47   67.85  5303.9   67.91 5320.33    67.8 5346.83   67.85
 5386.09   68.07 5394.31   68.05 5438.14   68.38 5465.54    68.7 5490.22   68.77
 5498.45   69.06 5520.41   69.17 5536.88   69.53 5553.35   69.48 5613.73   69.73
 5627.46   69.62  5660.4   69.59 5682.36   69.65 5704.31   69.58 5720.78   69.42
 5750.98   69.55 5770.19   69.45 5800.38   69.43 5811.36   69.55 5836.06   69.51
 5874.49   69.75 5896.45   69.63 5915.66   69.64 5929.39   70.18  5954.1   70.53
 5970.56   70.19 5984.29   69.74 6000.75   69.41 6017.22    69.5 6077.61   69.59
 6099.56   69.73 6121.53   69.75 6143.48   69.59 6168.19   69.58  6187.4   69.77
 6212.11   69.62 6228.57   69.74 6256.02   69.71 6275.23    69.6 6294.45   69.66
 6305.43    69.5 6321.89   69.64 6343.86   69.42 6357.57   69.57 6363.07   69.44
 6376.79   69.59 6415.22   69.64 6420.71   69.52 6431.69   69.64 6442.66   69.49
  6450.9   69.61 6481.09   69.53 6535.99   69.51 6549.71   69.44 6557.95   69.55
 6568.92   69.41 6604.61    69.5 6615.59   69.37  6659.5   69.51 6681.46   69.47
 6697.94   69.58 6755.57   69.47 6766.55   69.62 6783.03   69.46 6821.45   69.46
 6829.69   69.54 6862.62   69.61 6901.05   69.55 6914.78   69.67 6920.26   69.53
 6928.49   69.68 6936.73   69.45 6947.71   69.63 6958.69    69.5 6975.16    69.6
 6997.12   69.53 7041.04   69.53 7073.97   69.46  7087.7   69.62 7093.18   69.46
 7120.63    69.5 7142.59   69.61 7148.08   69.48  7167.3   69.56 7183.76    69.4
 7189.25   69.54 7219.45   69.55 7233.17   69.62 7260.62   69.53 7293.56   69.62
    7321   69.61  7351.2   69.76 7370.41   69.79 7411.58   69.71 7441.77   69.82
 7482.95   69.72 7515.89   69.81 7521.38   69.73 7568.04    69.8 7589.99   69.65
 7603.72   69.77 7622.93   69.75 7655.87   69.82 7677.83   69.77    7719   69.85
 7743.71   69.79 7751.93   69.85 7771.15   69.76 7779.39   69.87 7790.37   69.77
 7804.09   69.85 7845.26   69.79 7864.48   69.81 7872.71   69.66 7889.17   69.78
 7905.65   69.63 7941.33   69.73 7946.82   69.62 7966.04   69.75 7974.26   69.66
 8018.18   69.73 8031.91   69.66 8067.59   69.77 8100.52   69.63 8138.96   69.78
 8149.93   69.65 8160.91   69.71 8177.38   69.62 8213.06   69.72 8229.54   69.62
 8243.25   69.71 8248.75   69.61 8265.22   69.66 8287.17   69.54 8306.39   69.55
 8314.62   69.41 8339.32    69.4 8361.28   69.65 8383.24   69.59 8391.48   69.43
 8402.46    69.5 8424.41   69.33 8449.11   69.46 8465.58   69.39  8509.5   69.49
 8528.72   69.38 8553.42   69.41 8630.27   69.42 8649.49   69.36 8665.95   69.53
 8674.19   69.42  8693.4   69.51 8712.61   69.37  8742.8   69.46 8753.79   69.38
 8781.23   69.42 8808.68   69.31 8844.36   69.25 8866.32   69.35 8882.79   69.84
 8893.76   69.63 8899.25    69.9 8912.98   70.05 8923.96   69.97 8940.43   68.92
 8954.15   68.89 8962.39   69.38 8967.87   69.27 8976.11   68.72 8987.09   68.77
 8989.83   69.42  9006.3   68.93 9014.53   69.08 9020.02   68.86 9025.51   69.13
 9069.43   69.29 9105.11   69.51 9113.35   69.35 9143.54    69.3  9190.2   69.29
 9206.66   69.34 9225.88   69.22 9253.33   69.33 9267.05   69.25 9280.77   69.36
 9376.84   69.24 9407.03   69.29  9423.5   69.19 9431.74   69.27 9450.95   69.15
 9478.39   69.26 9489.37   69.09 9494.86   69.18 9525.05   69.13 9544.27   69.22
  9552.5   69.14 9579.95   69.23 9601.91    69.1 9615.63   69.22 9637.59   69.04
  9662.3   69.13 9676.01      69 9706.21   69.02  9711.7   68.94 9730.91   69.04
 9752.87   68.87 9758.36   68.97 9805.02   68.99 9813.26   69.05 9826.97    68.9
 9848.94   68.96  9865.4   68.81 9917.55   68.83 9936.77   68.67    9945   68.81
 9966.96   68.67 9991.66   68.6910021.85   68.5310071.26   68.3910090.48      68
10126.16   67.6510156.35   67.2510164.31   67.4110172.82   68.88 10178.3   69.23
10193.79   71.1110197.52   71.8310205.75   75.8710211.24   77.7710216.73   77.83

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    7.33    .085  138.66    .066 4554.87     .07  4997.8    .025 5110.35     .07
 5243.63    .066

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4951.74 5243.63          1041.61 1416.67  323.99             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    7.33 4951.74   67.16       T
 5243.6310216.73   68.61       T
Left Levee      Station=109.2533      Elevation=75.90666
Right Levee     Station=10212.36      Elevation=77.85333
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CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 112.47*

INPUT
Description:
Station Elevation Data num= 460

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
14.67	72.22	25.51	72.23	32.02	72.39	37.44	72.34	40.69	72.98
42.86	73.71	47.2	74.05	50.45	72.99	53.7	72.5	56.95	72.87
61.29	74.73	63.46	75.3	65.63	75.47	81.07	75.23	101.66	74.04
122.26	73.01	132.55	72.39	148	71.77	158.3	71.49	178.97	71.23
241.24	70.86	249.1270.86253		303.52	70.88	339.84	70.8	365.8	70.83
412.5	70.96	443.64	71.2	454.02	70.08	459.21	69.96	479.97	69.99
495.53	71.41	500.72	71.66	511.1	71.55	521.48	71.2	537.05	70.98
588.94	70.76	630.47	70.78	640.85	70.86	677.17	70.76	703.12	70.36
718.69	69.97	739.46	69.95	765.39	70.1	775.77	70.32	786.16	70.99
796.54	71.26	806.92	71.3	832.87	71.11	874.38	71.07	910.71	70.99
921.1	71.02	967.79	71.36	993.75	71.47	998.94	71.23	1009.32	70.3
1014.51	70	1030.08	69.97	1035.26	70.42	1040.45	71.21	1045.64	71.62
1056.02	71.66	1071.59	71.16	1076.78	71.1	1118.31	71.1	1216.9	71.22
1320.69	71.21	1414.11	71.32	1460.82	71.34	1554.24	71.5	1606.13	71.44
1694.35	71.41	1798.15	71.61	1865.61	71.81	1891.56	71.78	1953.85	71.59
1990.17	71.54	2036.89	71.67	2073.2	71.47	2197.76	71.59	2275.61	71.78
2358.64	71.79	2415.74	71.73	2509.15	71.68	2566.23	71.7	2597.38	71.67
2716.73	71.71	2753.06	71.79	2773.82	71.89	2836.1	71.81	2903.56	71.86
2955.46	71.76	3043.69	71.87	3086.63	72.02	3087.47	65.69	3126.72	65.85
3199.37	65.78	3220.14	65.82	3272.03	66.12	3313.55	66.42	3365.44	66.5
3406.97	66.32	3466.68	66.25	3500.38	65.38	3533.4	64.59	3536.78	60.86
3562.12	60.93	3574.79	65.79	3607.72	67.15	3653.33	70.83	3672.75	70.84
3708.23	66.97	3754.67	66.86	3796.2	66.8	3822.14	66.84	3863.66	66.76
3900	66.63	3925.93	66.85	3967.46	66.88	3998.58	66.97	4029.73	66.88
4060.87	66.74	4071.25	66.75	4107.57	66.63	4138.72	66.75	4190.61	66.72
4216.56	66.83	4226.94	66.74	4242.51	66.79	4304.78	66.84	4330.74	66.8
4377.44	66.78	4393.01	66.74	4439.72	66.77	4470.85	66.83	4507.19	66.8
4569.46	66.8	4590.22	66.89	4605.79	66.84	4624.58	66.91	4668.06	67.24
4719.97	67.53	4734.37	67.57	4750.42	69.3	4755.48	67.99	4758.86	69.13
4782.24	68.43	4794.33	67.96	4803	67.91	4896.42	67.96	4948.31	67.74
4984.64	67.73	5052.1	67.92	5084.86	67.92	5093.61	68.07	5145.52	68.56
5174.39	68.75	5202.6	68.42	5254.51	68.05	5270.08	66.79	5280.44	66.23
5296.01	65.76	5306.4	65.83	5337.54	68.52	5358.3	69.13	5368.67	69.02
5384.24	69.21	5394.62	69.13	5425.76	69.23	5441.34	69.38	5451.72	69.32
5472.46	68.76	5498.42	68.24	5513.99	68.06	5545.13	67.85	5586.64	67.45
5622.98	67.26	5669.67	67.08	5690.44	66.96	5752.55	66.86	5850.4566.46516	
5878.5666.34447		5879.6	66.34	5979.72	66.82	6000.37	67.1	6004.13	65.84
6011.63	62.51	6015.38	60.52	6022.89	55.65	6026.64	54.05	6033.3551.40067	
6041.52	48.7468	6043.55	48.09	6049.64	47.5	6055.39	44.92	6059.99	44.33
6071.71	43.24	6081.1	43.34	6089.9	42.61	6099.88	40.9	6103.7	40.51
6109.26	40.49	6118.65	39.91	6123.43	39.91	6125.32	39.91	6132.7	41.31
6141.44	42.27	6147.48	43.08	6157.71	45.69	6157.73	46.73	6159.58	47.08
6163.29	48.47	6168.85	49.99	6174.41	50.63	6181.83	52.4	6185.54	53.09
6189.82	53.51	6192.95	54.49	6197.88	56.29	6204.09	56.71	6207.2957.33776	
6211.54	58.26	6218.84	58.78	6228.27	60.92	6233.35	62.69	6239.43	63.85
6243.03	64.04	6246.87	65.58	6254.32	69.32	6260.94	69.32	6265.34	69.15
6271.96	69.22	6289.61	68.94	6302.84	68.88	6316.08	68.73	6337.42	68.6
6369.03	68.7	6375.65	68.68	6410.94	68.84	6433	68.99	6452.88	69.02
6459.51	69.16	6477.19	69.21	6490.45	69.38	6503.72	69.36	6552.34	69.47
6563.39	69.41	6589.91	69.38	6607.6	69.41	6625.28	69.37	6638.54	69.28
6662.85	69.34	6678.32	69.28	6702.63	69.26	6711.48	69.32	6731.37	69.3
6762.31	69.41	6779.99	69.34	6795.46	69.34	6806.52	69.61	6826.41	69.78
6833.04	69.63	6839.67	69.6	6850.72	69.37	6863.98	69.2	6877.24	69.25
6925.87	69.27	6943.55	69.34	6961.23	69.34	6978.91	69.26	6998.81	69.25
7014.28	69.34	7034.17	69.25	7047.43	69.31	7085	69.23	7100.48	69.25
7109.32	69.17	7122.58	69.23	7140.26	69.12	7151.31	69.19	7155.73	69.12
7166.78	69.19	7197.73	69.21	7202.15	69.15	7210.99	69.21	7219.83	69.13
7226.46	69.19	7250.77	69.14	7294.98	69.11	7306.03	69.07	7312.66	69.13
7321.5	69.06	7350.24	69.09	7359.07	69.02	7394.43	69.08	7412.12	69.05
7425.38	69.1	7471.79	69.03	7480.64	69.11	7493.9	69.02	7524.84	69.01
7531.48	69.05	7558	69.08	7588.94	69.04	7611.04	69.09	7617.67	68.98
7626.51	69.06	7635.36	69	7648.61	69.04	7666.3	69	7701.66	68.99
7728.18	68.95	7739.24	69.02	7743.65	68.94	7765.76	68.95	7783.44	69
7787.86	68.94	7803.33	68.97	7816.59	68.89	7821.01	68.96	7845.33	68.95
7856.37	68.99	7878.48	68.93	7905	68.97	7927.1	68.96	7966.89	69.03
8000.04	68.98	8024.35	69.03	8057.51	68.97	8084.03	69.01	8088.45	68.96
8126.03	68.99	8143.71	68.9	8154.76	68.96	8196.75	68.97	8214.43	68.94
8247.59	68.97	8267.48	68.93	8274.11	68.96	8289.58	68.91	8296.21	68.97
8305.06	68.91	8316.1	68.95	8364.73	68.91	8371.36	68.84	8384.62	68.89
8397.88	68.81	8426.62	68.85	8431.04	68.8	8446.51	68.86	8453.14	68.81
8470.82	68.84	8477.45	68.79	8488.5	68.83	8499.55	68.79	8528.29	68.84
8554.81	68.76	8585.75	68.83	8594.59	68.76	8616.7	68.74	8645.43	68.78
8658.69	68.72	8669.74	68.77	8674.16	68.71	8687.42	68.73	8705.1	68.67
8720.58	68.67	8727.21	68.6	8747.1	68.59	8764.78	68.7	8782.46	68.67
8789.09	68.58	8797.94	68.62	8815.62	68.53	8835.5	68.58	8848.77	68.55
8884.13	68.59	8899.61	68.53	8915.08	68.57	8919.5	68.53	8981.38	68.52
8996.86	68.48	9010.11	68.56	9016.75	68.51	9032.21	68.55	9047.69	68.47
9072	68.51	9080.84	68.46	9102.94	68.48	9125.05	68.41	9153.78	68.37
9171.46	68.42	9184.72	68.66	9193.56	68.55	9197.98	68.69	9209.03	68.76
9217.87	68.72	9231.13	68.19	9242.18	68.17	9248.82	68.41	9253.23	68.36
9259.86	68.08	9268.71	68.1	9270.92	68.42	9284.17	68.17	9290.81	68.25
9295.23	68.14	9299.65	68.27	9335.01	68.34	9363.74	68.44	9370.38	68.36
9394.69	68.32	9432.26	68.3	9445.52	68.32	9460.99	68.26	9483.09	68.31
9494.15	68.27	9505.19	68.32	9582.55	68.23	9606.86	68.25	9620.13	68.19
9626.76	68.23	9642.23	68.17	9664.33	68.22	9677.59	68.17	9701.9	68.14
9717.37	68.18	9724	68.13	9746.11	68.17	9763.79	68.1	9774.84	68.16
9792.52	68.06	9812.41	68.1	9823.46	68.03	9847.78	68.04	9852.19	67.99
9867.67	68.04	9885.34	67.95	9889.77	68	9933.97	68.02	9945.02	67.94
9962.7	67.97	9975.96	67.8910017.96		67.8810033.43		67.810040.06		67.87
10057.74	67.7910077.63		67.810101.94		67.7110141.73		67.63 10157.2		67.43
10185.93	67.2310210.24		6710216.65		67.0710223.51		69.3410227.92		70.5
10240.4	74.22 10243.4		74.6610250.03		76.8610254.45		77.9410258.86		78.08

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
14.67	.085	132.55	.066	6000.37	.07	6043.55	.025	6163.29	.07
6254.32	.066								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
6000.37	6254.32	1041.61	1416.67 323.99	.1	.3

Left Levee Station=65.62667 Elevation=75.47334
Right Levee Station=10256.68 Elevation=78.09666

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
3008.61	6003.44	67.16	6244.41	10347.68	69.25

CROSS SECTION

RIVER: Rio Grande
REACH: Lower Reach RS: 112.2

INPUT
Description: Original IBWC Cross-section data applied to this section
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
22	75.04	3599	75.04	3600	65.54	4049	66.04	4128	63.64
4132	58.04	4162	58.14	4177	65.44	4216	67.54	4270	73.04
4293	73.04	4335	67.34	4363	67.34	5420	67.84	5550	68.54
5569	71.04	5575	69.04	5579	70.74	5621	68.94	5965	68.24
6071	69.84	6188	69.24	6873	66.19	6906	66.04	7049	67.04
7070	58.64	7084	50.91	7087	49.55	7095	45.94	7105	44.64
7115	43.94	7125	42.94	7135	43.44	7145	42.64	7155	41.64
7165	41.64	7175	40.84	7185	40.84	7195	41.94	7205	43.94
7215	46.64	7221.8	49.54	7225	50.91	7230	54.74	7243	57.04
7252	62.04	7258	63.04	7265	70.04	7276	70.34	7328	69.34
10233	66.84	10269	66.74	10287	77.34	10301	78.34		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
22	.075	6873	.075	6906	.066	7084	.025	7225	.066
7265	.074								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
7049 7265 0 0 0 .1 .3
Left Levee Station= 22 Elevation= 75.04
Right Levee Station= 10301 Elevation= 78.34
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
22	5569	71.04	7265	10301	70.04

CROSS SECTION OUTPUT Profile #Design Flow

			Left OB	Channel	Right OB
E.G. Elev (ft)	72.20	Element			
Vel Head (ft)	0.10	Wt. n-Val.	0.073	0.042	0.074
W.S. Elev (ft)	72.10	Reach Len. (ft)			
Crit W.S. (ft)	52.36	Flow Area (sq ft)	7980.40	4951.85	6199.39
E.G. Slope (ft/ft)	0.000116	Area (sq ft)	7980.40	4951.85	6199.39
Q Total (cfs)	20000.00	Flow (cfs)	3332.40	14499.99	2167.62
Top Width (ft)	6639.64	Top Width (ft)	3410.54	216.00	3013.10
Vel Total (ft/s)	1.05	Avg. Vel. (ft/s)	0.42	2.93	0.35
Max Chl Dpth (ft)	31.26	Hydr. Depth (ft)	2.34	22.93	2.06
Conv. Total (cfs)	1857787.0	Conv. (cfs)	309544.3	1346894.0	201348.4
Length Wtd. (ft)		Wetted Per. (ft)	3412.35	228.23	3013.67
Min Ch El (ft)	40.84	Shear (lb/sq ft)	0.02	0.16	0.01
Alpha	5.73	Stream Power (lb/ft s)	0.01	0.46	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

SUMMARY OF MANNING'S N VALUES

River:Rio Grande

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7
Lower Reach	186	.114	.066	.015	.066	.062		
Lower Reach	185.50*	.085	.066	.07	.025	.07	.066	
Lower Reach	185	.085	.066	.07	.025	.07	.066	
Lower Reach	184.50*	.112	.066	.015	.066			
Lower Reach	184	.112	.066	.015	.066			
Lower Reach	183.80*	.112	.066	.015	.066			
Lower Reach	183.60*	.066	.07	.025	.07	.066		
Lower Reach	183.40*	.066	.07	.025	.07	.066		
Lower Reach	183.2	.066	.07	.025	.07	.066		
Lower Reach	183.00*	.082	.066	.015	.066	.061		
Lower Reach	182.80*	.082	.066	.015	.066	.061		
Lower Reach	182.60*	.082	.066	.015	.066	.061		
Lower Reach	182.4	.082	.066	.015	.066	.061		
Lower Reach	182.05*	.082	.066	.015	.066	.061		
Lower Reach	181.70*	.082	.066	.015	.066	.061		
Lower Reach	181.35	.085	.066	.066	.025	.066		
Lower Reach	181.01*	.085	.066	.066	.025	.066		
Lower Reach	180.66*	.085	.066	.025	.066			
Lower Reach	180.32	.085	.066	.025	.066			
Lower Reach	180.3	.157	.066	.015	.066	.074		
Lower Reach	180.08*	.157	.066	.015	.066	.074		
Lower Reach	179.85*	.066	.12	.025	.066			
Lower Reach	179.63*	.066	.12	.025	.066			
Lower Reach	179.4	.066	.12	.025	.066			
Lower Reach	179.10*	.066	.12	.025	.066			
Lower Reach	178.80*	.154	.066	.015	.066	.061		
Lower Reach	178.5	.154	.066	.015	.066	.061		
Lower Reach	178.23*	.154	.066	.015	.066	.061		
Lower Reach	177.97*	.154	.066	.015	.066	.061		
Lower Reach	177.7	.085	.12	.025	.066			
Lower Reach	177.40*	.085	.12	.025	.066			
Lower Reach	177.10*	.154	.066	.015	.066	.084		
Lower Reach	176.8	.154	.066	.015	.066	.084		
Lower Reach	176.40*	.154	.066	.015	.066	.084		
Lower Reach	176.00*	.066	.025	.066	.085			
Lower Reach	175.6	.066	.025	.066	.085			
Lower Reach	175.27*	.066	.025	.066	.085			
Lower Reach	174.93*	.198	.066	.015	.066	.069		
Lower Reach	174.6	.198	.066	.015	.066	.069		
Lower Reach	174.2	.066	.025	.066	.085			
Lower Reach	174.10*	.066	.025	.066	.085			
Lower Reach	174	.066	.025	.066	.085			

Lower Reach	173.33*	.066	.025	.066	.085			
Lower Reach	172.67*	.066	.025	.066	.085			
Lower Reach	172	.066	.025	.066	.085			
Lower Reach	171.90*	.081	.066	.015	.066	.067		
Lower Reach	171.8	.081	.066	.015	.066	.067		
Lower Reach	171.48*	.081	.066	.015	.066	.067		
Lower Reach	171.15	.066	.025	.085	.06			
Lower Reach	170.83*	.186	.066	.015	.066	.076		
Lower Reach	170.5	.186	.066	.015	.066	.076		
Lower Reach	170.38*	.186	.066	.015	.066	.076		
Lower Reach	170.26	.085	.12	.025	.12	.06	.085	
Lower Reach	170.02	.177	.066	.015	.066	.131		
Lower Reach	169.9	.188	.066	.015	.066	.187		
Lower Reach	169.83	.188	.066	.015	.066	.187		
Lower Reach	169.49	.066	.025	.085	.06	.06	.085	
Lower Reach	169.14	.048	.06	.015	.06			
Lower Reach	169.13	Inl Struct						
Lower Reach	169.12	.06	.015	.06				
Lower Reach	169.1	.14	.015	.14				
Lower Reach	168.85	.2	.2	.066	.015	.066	.116	
Lower Reach	168.58	.085	.12	.025	.085			
Lower Reach	168.3	.2	.2	.066	.015	.066	.116	
Lower Reach	168	.085	.066	.12	.025	.12	.085	
Lower Reach	167.70*	.085	.066	.12	.025	.12	.085	
Lower Reach	167.4	.106	.106	.066	.015	.066	.13	
Lower Reach	167	.085	.066	.025	.066	.085		
Lower Reach	166.6	.118	.066	.015	.066	.132		
Lower Reach	166	.118	.066	.015	.066	.132		
Lower Reach	165	.118	.066	.015	.066	.132		
Lower Reach	163	.066	.12	.025	.12	.085	.06	
Lower Reach	162.1	.066	.12	.025	.12	.085	.06	
Lower Reach	161.4	.108	.108	.066	.015	.066	.144	
Lower Reach	161.35	.108	.066	.015	.066	.144		
Lower Reach	161.3	.108	.066	.015	.066	.144		
Lower Reach	160	.108	.066	.015	.07	.066	.144	
Lower Reach	159	.108	.066	.015	.066	.144		
Lower Reach	157.2	.102	.066	.015	.066	.078		
Lower Reach	157.15	.102	.102	.066	.015	.066	.078	
Lower Reach	156.93	.14	.14	.066	.015	.066	.14	
Lower Reach	156.915	Bridge						
Lower Reach	156.9	.06	.06	.066	.015	.066	.06	
Lower Reach	156.87	.06	.066	.015	.066	.06		
Lower Reach	156.855	Bridge						
Lower Reach	156.84	.14	.14	.066	.015	.066	.04	
Lower Reach	156.7	.06	.085	.07	.025	.07	.085	.06
Lower Reach	156.6	.076	.076	.066	.015	.066	.06	
Lower Reach	156.15	.06	.066	.07	.025	.07	.066	.06
Lower Reach	155.7	.092	.066	.015	.066	.06		
Lower Reach	155.36	.066	.07	.025	.07	.066	.06	
Lower Reach	155.2	.066	.07	.025	.07	.066	.06	
Lower Reach	155.01	.092	.066	.015	.066	.099		
Lower Reach	154.81	.066	.12	.07	.025	.07	.066	.06
Lower Reach	154.6	.168	.168	.066	.015	.066	.067	
Lower Reach	154.23	.066	.12	.07	.025	.07	.066	.06
Lower Reach	153.85	.132	.066	.015	.066	.076		
Lower Reach	153.61	.066	.07	.025	.07	.066		
Lower Reach	153.36	.096	.066	.015	.066	.085		
Lower Reach	153.08*	.096	.066	.015	.066	.085		
Lower Reach	152.81*	.169	.066	.015	.066	.102		
Lower Reach	152.53	.169	.066	.015	.066	.102		
Lower Reach	152.25*	.169	.066	.015	.066	.102		
Lower Reach	151.98*	.1	.066	.015	.066	.082		
Lower Reach	151.7	.1	.1	.066	.015	.066	.082	
Lower Reach	151.49	.066	.085	.07	.025	.07	.066	.06
Lower Reach	151.27	.06	.06	.066	.015	.066	.067	
Lower Reach	151.255	Bridge						
Lower Reach	151.25	.06	.06	.066	.015	.066	.06	
Lower Reach	151.24	.06	.066	.015	.066	.067		
Lower Reach	150.78	.06	.066	.07	.025	.07	.066	.06
Lower Reach	150.31	.09	.066	.015	.066	.102		
Lower Reach	149.66*	.09	.12	.066	.015	.066	.102	
Lower Reach	149	.066	.12	.07	.025	.07	.066	
Lower Reach	148.34*	.105	.066	.015	.066	.095		
Lower Reach	147.68	.105	.066	.015	.066	.095		
Lower Reach	147.34*	.105	.066	.015	.066	.095		
Lower Reach	147.01*	.105	.066	.015	.066	.095		
Lower Reach	146.67*	.066	.07	.025	.07	.085	.066	
Lower Reach	146.34*	.066	.07	.025	.07	.085	.066	
Lower Reach	146	.066	.07	.025	.07	.085	.066	
Lower Reach	145.67*	.066	.07	.025	.07	.085	.066	
Lower Reach	145.5	.066	.066	.015	.066	.088		
Lower Reach	145.2	.066	.066	.015	.066	.088		
Lower Reach	145	.066	.066	.015	.066	.088		
Lower Reach	144.7	.09	.066	.015	.066	.088		
Lower Reach	144.55	.172	.066	.015	.066	.067		
Lower Reach	144	.172	.066	.015	.066	.067		
Lower Reach	143.5	.07	.12	.025	.07	.066	.085	
Lower Reach	143.25	.07	.12	.07	.025	.07	.066	.085
Lower Reach	143	.07	.12	.07	.025	.07	.066	.085
Lower Reach	142.5	.192	.066	.015	.066	.074		
Lower Reach	142	.07	.12	.07	.025	.07	.066	
Lower Reach	141.9	.066	.12	.07	.025	.07	.066	
Lower Reach	141.5	.07	.12	.07	.025	.07	.066	
Lower Reach	140.74	.183	.066	.015	.066	.068		
Lower Reach	140	.066	.12	.07	.025	.07	.066	
Lower Reach	139.85	.157	.066	.015	.066	.074		
Lower Reach	139.57*	.157	.066	.015	.066	.074		
Lower Reach	139.29*	.094	.066	.015	.066	.06		
Lower Reach	139.01	.094	.066	.015	.066	.06		
Lower Reach	138.69*	.066	.07	.025	.07	.066		
Lower Reach	138.36	.066	.07	.025	.07	.066		
Lower Reach	138.04*	.102	.066	.015	.066	.067		
Lower Reach	137.71	.102	.066	.015	.066	.067		
Lower Reach	137.43*	.066	.085	.07	.025	.07	.066	
Lower Reach	137.14	.066	.085	.07	.025	.07	.066	
Lower Reach	136.8	.101	.066	.015	.066	.074		
Lower Reach	136.2	.101	.066	.015	.066	.074		
Lower Reach	136	.101	.066	.015	.066	.074		
Lower Reach	135.5	.101	.066	.015	.066	.074		
Lower Reach	135	.101	.066	.015	.066	.074		
Lower Reach	134.65	.085	.066	.07	.025	.07	.066	
Lower Reach	134.33*	.085	.066	.07	.025	.07	.066	

Lower Reach	134.02*	.085	.066	.07	.025	.07	.066	
Lower Reach	133.70*	.118	.066	.015	.066	.067		
Lower Reach	133.38*	.118	.066	.015	.066	.067		
Lower Reach	133.07*	.118	.066	.015	.066	.067		
Lower Reach	132.75	.118	.066	.015	.066	.067		
Lower Reach	132.46*	.118	.066	.015	.066	.067		
Lower Reach	132.18*	.118	.07	.015	.07	.067		
Lower Reach	131.89*	.066	.07	.025	.07	.066		
Lower Reach	131.6	.066	.07	.025	.07	.066		
Lower Reach	131.35	.099	.066	.015	.066	.088		
Lower Reach	130.93	.066	.07	.025	.07	.066		
Lower Reach	130.51	.074	.066	.015	.066	.067		
Lower Reach	129.3	.068	.068	.066	.025	.066	.06	
Lower Reach	129.27	.085	.066	.07	.07	.025	.07	.066
Lower Reach	129.23	.144	.144	.066	.025	.066	.06	
Lower Reach	129.22	.144	.144	.066	.025	.066	.06	
Lower Reach	129.216	.015						
Lower Reach	129.215	Inl Struct						
Lower Reach	129.214	.015						
Lower Reach	129.213	.015						
Lower Reach	129.212	.015						
Lower Reach	129.211	.015						
Lower Reach	129.21	.015						
Lower Reach	129.2	.168	.066	.025	.066	.067		
Lower Reach	129.03	.14	.066	.025	.066	.071		
Lower Reach	128.5	.066	.085	.07	.025	.07	.066	
Lower Reach	128.23*	.066	.085	.07	.025	.07	.066	
Lower Reach	127.97*	.114	.066	.025	.066	.074		
Lower Reach	127.7	.114	.066	.025	.066	.074		
Lower Reach	127.4	.066	.07	.025	.07	.085		
Lower Reach	127.05*	.11	.066	.025	.066	.074		
Lower Reach	126.7	.11	.066	.025	.066	.074		
Lower Reach	126.35*	.11	.066	.025	.066	.074		
Lower Reach	126.00*	.066	.07	.025	.07	.066		
Lower Reach	125.65*	.066	.07	.025	.07	.066		
Lower Reach	125.3	.066	.07	.025	.07	.066		
Lower Reach	125	.108	.066	.025	.066	.074		
Lower Reach	124.80*	.108	.066	.025	.066	.074		
Lower Reach	124.60*	.085	.066	.085	.07	.025	.07	.066
Lower Reach	124.4	.085	.066	.085	.07	.025	.07	.066
Lower Reach	124.20*	.085	.066	.085	.07	.025	.07	.066
Lower Reach	124.00*	.1	.089	.066	.025	.066	.07	
Lower Reach	123.8	.1	.066	.025	.066	.07		
Lower Reach	123.48*	.066	.085	.07	.025	.07	.066	
Lower Reach	123.15	.066	.085	.07	.025	.07	.066	
Lower Reach	122.83*	.066	.085	.07	.025	.07	.066	
Lower Reach	122.5	.099	.099	.066	.025	.066		
Lower Reach	121.98*	.111	.066	.025	.066	.071		
Lower Reach	121.46	.111	.066	.025	.066	.071		
Lower Reach	121.13*	.044	.066	.025	.066	.075		
Lower Reach	120.8	.044	.066	.025	.066	.075		
Lower Reach	120.7	.044	.066	.025	.066	.075		
Lower Reach	120.62	.088	.088	.066	.025	.066	.08	
Lower Reach	120.605	Bridge						
Lower Reach	120.59	.104	.104	.066	.025	.066	.06	
Lower Reach	120.5	.159	.066	.025	.066	.076		
Lower Reach	120.4	.159	.066	.025	.066	.076		
Lower Reach	120.39*	.164	.066	.025	.066	.073		
Lower Reach	120.38	.164	.066	.025	.066	.073		
Lower Reach	120.07*	.164	.066	.025	.066	.073		
Lower Reach	119.75*	.164	.066	.025	.066	.073		
Lower Reach	119.44*	.066	.07	.025	.07	.085	.066	
Lower Reach	119.12*	.066	.07	.025	.07	.085	.066	
Lower Reach	118.81	.066	.07	.025	.07	.085	.066	
Lower Reach	118.50*	.066	.07	.025	.07	.085	.066	
Lower Reach	118.18*	.163	.066	.025	.066	.071		
Lower Reach	117.87	.163	.066	.025	.066	.071		
Lower Reach	117.54*	.167	.066	.025	.066	.068		
Lower Reach	117.2	.167	.066	.025	.066	.068		
Lower Reach	116.5	.13	.066	.025	.066	.068		
Lower Reach	116.1	.1	.066	.025	.066	.067		
Lower Reach	115.7	.052	.066	.025	.066	.067		
Lower Reach	115.45*	.052	.066	.025	.066	.067		
Lower Reach	115.2	.109	.066	.025	.066	.074		
Lower Reach	115	.109	.066	.025	.066	.074		
Lower Reach	114.8	.14	.066	.025	.066	.067		
Lower Reach	114.65	.174	.066	.025	.066	.068		
Lower Reach	114.47*	.174	.066	.025	.066	.068		
Lower Reach	114.28*	.11	.066	.025	.066	.071		
Lower Reach	114.1	.11	.066	.025	.066	.071		
Lower Reach	113.73*	.11	.066	.025	.066	.071		
Lower Reach	113.37*	.085	.066	.07	.025	.07	.066	
Lower Reach	113	.085	.066	.07	.025	.07	.066	
Lower Reach	112.73*	.085	.066	.07	.025	.07	.066	
Lower Reach	112.47*	.085	.066	.07	.025	.07	.066	
Lower Reach	112.2	.075	.075	.066	.025	.066	.074	

SUMMARY OF REACH LENGTHS

River: Rio Grande

Reach	River Sta.	Left	Channel	Right
Lower Reach	186	850	1950	1075
Lower Reach	185.50*	850	1950	1075
Lower Reach	185	850	1950	1075
Lower Reach	184.50*	850	1950	1075
Lower Reach	184	1037.5	1525	1100
Lower Reach	183.80*	1037.5	1525	1100
Lower Reach	183.60*	1037.5	1525	1100
Lower Reach	183.40*	1037.5	1525	1100
Lower Reach	183.2	1037.5	1525	1100
Lower Reach	183.00*	1037.5	1525	1100
Lower Reach	182.80*	1037.5	1525	1100
Lower Reach	182.60*	1037.5	1525	1100
Lower Reach	182.4	1987.52	1916.67	1916.38
Lower Reach	182.05*	1987.52	1916.67	1916.38
Lower Reach	181.70*	1987.52	1916.67	1916.38
Lower Reach	181.35	1561.05	1691.8	1675.24

Lower Reach	181.01*	1561.05	1691.8	1675.24
Lower Reach	180.66*	1561.05	1691.8	1675.24
Lower Reach	180.32	557.41	674.61	694.11
Lower Reach	180.3	1062.5	1652.05	1250
Lower Reach	180.08*	1062.5	1652.05	1250
Lower Reach	179.85*	1062.5	1652.05	1250
Lower Reach	179.63*	1062.5	1652.05	1250
Lower Reach	179.4	1754.79	1830.6	1749.92
Lower Reach	179.10*	1754.79	1830.6	1749.92
Lower Reach	178.80*	1754.79	1830.6	1749.92
Lower Reach	178.5	1087.82	1400	1513.92
Lower Reach	178.23*	1087.82	1400	1513.92
Lower Reach	177.97*	1087.82	1400	1513.92
Lower Reach	177.7	2073.72	1400	1374.03
Lower Reach	177.40*	2073.72	1400	1374.03
Lower Reach	177.10*	2073.72	1400	1374.03
Lower Reach	176.8	1153.45	2530	2395.52
Lower Reach	176.40*	1153.45	2530	2395.52
Lower Reach	176.00*	1153.45	2530	2395.52
Lower Reach	175.6	1212.33	1503.33	1122.85
Lower Reach	175.27*	1212.33	1503.33	1122.85
Lower Reach	174.93*	1212.33	1503.33	1122.85
Lower Reach	174.6	3662.8	2000	1560.98
Lower Reach	174.2	472.5	1764.5	2016
Lower Reach	174.10*	472.5	1764.5	2016
Lower Reach	174	1056.67	1804.67	1796
Lower Reach	173.33*	1056.67	1804.67	1796
Lower Reach	172.67*	1056.67	1804.67	1796
Lower Reach	172	2737	1911	1305.5
Lower Reach	171.90*	2737	1911	1305.5
Lower Reach	171.8	1869.27	1625	951.28
Lower Reach	171.48*	1869.27	1625	951.28
Lower Reach	171.15	859.81	1625	1934.01
Lower Reach	170.83*	859.81	1625	1934.01
Lower Reach	170.5	1270.17	1075	1060.89
Lower Reach	170.38*	1270.17	1075	1060.89
Lower Reach	170.26	1559.58	2150	1999.52
Lower Reach	170.02	2106.1	389.75	107.13
Lower Reach	169.9	2629.05	610.25	109.21
Lower Reach	169.83	1276.91	1300	905.72
Lower Reach	169.49	188.88	1299.95	1556.14
Lower Reach	169.14	48.38	50.04	47.52
Lower Reach	169.13	Inl Struct		
Lower Reach	169.12	100.93	99.44	96.53
Lower Reach	169.1	1118.21	1200.01	1232.42
Lower Reach	168.85	1531.01	1524.99	1539.3
Lower Reach	168.58	1510.38	1525.35	1543.94
Lower Reach	168.3	1645.88	1675	1663.72
Lower Reach	168	1221.72	1587.5	1609.1
Lower Reach	167.70*	1221.72	1587.5	1609.1
Lower Reach	167.4	1756.68	2500	2391.12
Lower Reach	167	1855.62	2500.27	1953.43
Lower Reach	166.6	417.4821	2330.936	2564.68
Lower Reach	166	203.14	3680.24	4630.8
Lower Reach	165	200.92	3697.62	2252.28
Lower Reach	163	2552.46	4131.21	2270.67
Lower Reach	162.1	2695.37	2260.89	1608.69
Lower Reach	161.4	2304.01	1690.29	1564.64
Lower Reach	161.35	427.09	384.49	366.72
Lower Reach	161.3	2822	2844	2893
Lower Reach	160	4690.55	4824.53	1212.75
Lower Reach	159	11213.44	11093.09	6165.786
Lower Reach	157.2	936.61	4252.55	5284.79
Lower Reach	157.15	2369.53	2114	2067.51
Lower Reach	156.93	86	86	86
Lower Reach	156.915	Bridge		
Lower Reach	156.9	198.66	198.52	198.75
Lower Reach	156.87	91	91	91
Lower Reach	156.855	Bridge		
Lower Reach	156.84	490.49	510	528.74
Lower Reach	156.7	520.54	510.48	507.59
Lower Reach	156.6	2582.86	2000	4032.36
Lower Reach	156.15	2250	2000.04	2300
Lower Reach	155.7	2226.15	2050	2058.78
Lower Reach	155.36	1101.32	1093.11	1083.33
Lower Reach	155.2	959.6	956.88	939.12
Lower Reach	155.01	1629.91	1325	767.57
Lower Reach	154.81	1120.03	1324.83	1829.96
Lower Reach	154.6	1291.37	1665	1771.03
Lower Reach	154.23	1440.02	1665.03	1862.69
Lower Reach	153.85	1187.43	1110	998.61
Lower Reach	153.61	1342.72	1110	910
Lower Reach	153.36	1522.36	1400.85	1430.05
Lower Reach	153.08*	1522.36	1400.85	1430.05
Lower Reach	152.81*	1522.36	1400.85	1430.05
Lower Reach	152.53	1576.77	1533.33	1581.16
Lower Reach	152.25*	1576.77	1533.33	1581.16
Lower Reach	151.98*	1576.77	1533.33	1581.16
Lower Reach	151.7	1340.35	1235	1164.92
Lower Reach	151.49	1074.69	1235.01	1212.32
Lower Reach	151.27	90	90	90
Lower Reach	151.255	Bridge		
Lower Reach	151.25	12.07	10	22.96
Lower Reach	151.24	2853.84	2485	1923.56
Lower Reach	150.78	2017.47	2485.16	3297.89
Lower Reach	150.31	881.09	1506.5	1723.2
Lower Reach	149.66*	881.09	1506.5	1723.2
Lower Reach	149	1249.78	1505.93	1342.39
Lower Reach	148.34*	1249.78	1505.93	1342.39
Lower Reach	147.68	1070.14	1752	1559.36
Lower Reach	147.34*	1070.14	1752	1559.36
Lower Reach	147.01*	1070.14	1752	1559.36
Lower Reach	146.67*	1070.14	1752	1559.36
Lower Reach	146.34*	1070.14	1752	1559.36
Lower Reach	146	2057.24	1788.32	1279.38
Lower Reach	145.67*	2076	870.68	188.51
Lower Reach	145.5	1658.45	1444.91	1082.27
Lower Reach	145.2	920.68	1243.87	995.11
Lower Reach	145	1054.14	1745.3	2394.82
Lower Reach	144.7	1041.28	836.82	499
Lower Reach	144.55	855.55	4265.19	3099.28
Lower Reach	144	1039.03	1363.41	2237.29

Lower Reach	143.5	1673.73	2335.33	3367.52
Lower Reach	143.25	1772.15	3068.24	1935.18
Lower Reach	143	889.07	960.39	837.85
Lower Reach	142.5	741.16	2145.86	2675.39
Lower Reach	142	2632.84	1550.77	1580.34
Lower Reach	141.9	2997	3385	3501.58
Lower Reach	141.5	1939.57	3724.88	726.46
Lower Reach	140.74	3623.66	4885.99	2026.76
Lower Reach	140	1951.2	1010	1431.32
Lower Reach	139.85	1378.43	1433.33	1501.58
Lower Reach	139.57*	1378.43	1433.33	1501.58
Lower Reach	139.29*	1378.43	1433.33	1501.58
Lower Reach	139.01	1872.8	1725	1469.48
Lower Reach	138.69*	1872.8	1725	1469.48
Lower Reach	138.36	1700	1725	1637.5
Lower Reach	138.04*	1700	1725	1637.5
Lower Reach	137.71	1088.69	1566	1979.92
Lower Reach	137.43*	1088.69	1566	1979.92
Lower Reach	137.14	1159.96	1152.38	1315.88
Lower Reach	136.8	6010.21	5782.22	1539.14
Lower Reach	136.2	2472.19	2469.54	881.5
Lower Reach	136	1496.01	1684.16	1239.16
Lower Reach	135.5	911.83	679.76	443.07
Lower Reach	135	1851.1	1850	1680.42
Lower Reach	134.65	439.55	1691.6	1780.35
Lower Reach	134.33*	439.55	1691.6	1780.35
Lower Reach	134.02*	439.55	1691.6	1780.35
Lower Reach	133.70*	439.55	1691.6	1780.35
Lower Reach	133.38*	439.55	1691.6	1780.35
Lower Reach	133.07*	439.55	1691.6	1780.35
Lower Reach	132.75	755.05	1535	1364.62
Lower Reach	132.46*	755.05	1535	1364.62
Lower Reach	132.18*	755.05	1535	1364.62
Lower Reach	131.89*	755.05	1535	1364.62
Lower Reach	131.6	1454.61	1509.52	1621.49
Lower Reach	131.35	2159.16	2175	2278.61
Lower Reach	130.93	2220.46	2174.42	1705.8
Lower Reach	130.51	1031.28	2400.25	3908.06
Lower Reach	129.3	1060.66	1050	1065.26
Lower Reach	129.27	704.22	1050	1152.61
Lower Reach	129.23	57.04	70	79.73
Lower Reach	129.22	79.88	70	67.66
Lower Reach	129.216	15.43	20	21.58
Lower Reach	129.215	Inl Struct		
Lower Reach	129.214	25.03	25.01	25.62
Lower Reach	129.213	25.03	25.01	25.62
Lower Reach	129.212	10.01	10.01	10.25
Lower Reach	129.211	112.99	100	95.7
Lower Reach	129.21	472.44	400	409.67
Lower Reach	129.2	1099.85	1148.64	1145.18
Lower Reach	129.03	3555.05	2827	2507.63
Lower Reach	128.5	1964.77	1391	1506.6
Lower Reach	128.23*	1964.77	1391	1506.6
Lower Reach	127.97*	1964.77	1391	1506.6
Lower Reach	127.7	1186.43	1486	1991.76
Lower Reach	127.4	1737.71	1757.01	769.76
Lower Reach	127.05*	1737.71	1757.01	769.76
Lower Reach	126.7	587.49	1806.25	1797.03
Lower Reach	126.35*	587.49	1806.25	1797.03
Lower Reach	126.00*	587.49	1806.25	1797.03
Lower Reach	125.65*	587.49	1806.25	1797.03
Lower Reach	125.3	2076.9	1775	1633.38
Lower Reach	125	941.35	1489.33	1466.35
Lower Reach	124.80*	941.35	1489.33	1466.35
Lower Reach	124.60*	941.35	1489.33	1466.35
Lower Reach	124.4	1288.43	1489.08	953.22
Lower Reach	124.20*	1288.43	1489.08	953.22
Lower Reach	124.00*	1288.43	1489.08	953.22
Lower Reach	123.8	1216.82	1719	1770.81
Lower Reach	123.48*	1216.82	1719	1770.81
Lower Reach	123.15	1667.19	1702.07	1720.26
Lower Reach	122.83*	1667.19	1702.07	1720.26
Lower Reach	122.5	1373.09	1755.19	2222.98
Lower Reach	121.98*	1373.09	1755.19	2222.98
Lower Reach	121.46	1874.31	1742.61	1664.76
Lower Reach	121.13*	1874.31	1742.61	1664.76
Lower Reach	120.8	249.26	264.4	279.46
Lower Reach	120.7	517.73	423.08	373.07
Lower Reach	120.62	119.42	110	109.64
Lower Reach	120.605	Bridge		
Lower Reach	120.59	604.8	598	590.27
Lower Reach	120.5	318.1	268.58	237.07
Lower Reach	120.4	1776.6	1865.74	1849.12
Lower Reach	120.39*	1776.6	1865.74	1849.12
Lower Reach	120.38	821.82	1653.32	845.1
Lower Reach	120.07*	821.82	1653.32	845.1
Lower Reach	119.75*	821.82	1653.32	845.1
Lower Reach	119.44*	821.82	1653.32	845.1
Lower Reach	119.12*	821.82	1653.32	845.1
Lower Reach	118.81	1046.54	1661.33	748.7
Lower Reach	118.50*	1046.54	1661.33	748.7
Lower Reach	118.18*	1046.54	1661.33	748.7
Lower Reach	117.87	2169.02	1775	1720.13
Lower Reach	117.54*	2169.02	1775	1720.13
Lower Reach	117.2	2233.4	2575	2667.55
Lower Reach	116.5	2319.56	2249.67	2048.62
Lower Reach	116.1	1908.51	1935	1844.83
Lower Reach	115.7	1409.57	1801.21	1569.56
Lower Reach	115.45*	1409.57	1801.21	1569.56
Lower Reach	115.2	375.54	332.57	344.1
Lower Reach	115	1929.76	1810	1594.01
Lower Reach	114.8	731.82	720	723.47
Lower Reach	114.65	1166.91	1551.67	1518.74
Lower Reach	114.47*	1166.91	1551.67	1518.74
Lower Reach	114.28*	1166.91	1551.67	1518.74
Lower Reach	114.1	1686.3	1916.67	202.14
Lower Reach	113.73*	1686.3	1916.67	202.14
Lower Reach	113.37*	1686.3	1916.67	202.14
Lower Reach	113	1041.61	1416.67	323.99
Lower Reach	112.73*	1041.61	1416.67	323.99
Lower Reach	112.47*	1041.61	1416.67	323.99
Lower Reach	112.2	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Rio Grande

Reach	River Sta.	Contr.	Expan.
Lower Reach	186	.1	.3
Lower Reach	185.50*	.1	.3
Lower Reach	185	.1	.3
Lower Reach	184.50*	.1	.3
Lower Reach	184	.1	.3
Lower Reach	183.80*	.1	.3
Lower Reach	183.60*	.1	.3
Lower Reach	183.40*	.1	.3
Lower Reach	183.2	.1	.3
Lower Reach	183.00*	.1	.3
Lower Reach	182.80*	.1	.3
Lower Reach	182.60*	.1	.3
Lower Reach	182.4	.1	.3
Lower Reach	182.05*	.1	.3
Lower Reach	181.70*	.1	.3
Lower Reach	181.35	.1	.3
Lower Reach	181.01*	.1	.3
Lower Reach	180.66*	.1	.3
Lower Reach	180.32	.1	.3
Lower Reach	180.3	.1	.3
Lower Reach	180.08*	.1	.3
Lower Reach	179.85*	.1	.3
Lower Reach	179.63*	.1	.3
Lower Reach	179.4	.1	.3
Lower Reach	179.10*	.1	.3
Lower Reach	178.80*	.1	.3
Lower Reach	178.5	.1	.3
Lower Reach	178.23*	.1	.3
Lower Reach	177.97*	.1	.3
Lower Reach	177.7	.1	.3
Lower Reach	177.40*	.1	.3
Lower Reach	177.10*	.1	.3
Lower Reach	176.8	.1	.3
Lower Reach	176.40*	.1	.3
Lower Reach	176.00*	.1	.3
Lower Reach	175.6	.1	.3
Lower Reach	175.27*	.1	.3
Lower Reach	174.93*	.1	.3
Lower Reach	174.6	.1	.3
Lower Reach	174.2	.1	.3
Lower Reach	174.10*	.1	.3
Lower Reach	174	.1	.3
Lower Reach	173.33*	.1	.3
Lower Reach	172.67*	.1	.3
Lower Reach	172	.1	.3
Lower Reach	171.90*	.1	.3
Lower Reach	171.8	.1	.3
Lower Reach	171.48*	.1	.3
Lower Reach	171.15	.1	.3
Lower Reach	170.83*	.1	.3
Lower Reach	170.5	.1	.3
Lower Reach	170.38*	.1	.3
Lower Reach	170.26	.1	.3
Lower Reach	170.02	.1	.3
Lower Reach	169.9	.1	.3
Lower Reach	169.83	.1	.3
Lower Reach	169.49	.1	.3
Lower Reach	169.14	.2	.5
Lower Reach	169.13 Inl Struct		
Lower Reach	169.12	.2	.5
Lower Reach	169.1	.1	.3
Lower Reach	168.85	.1	.3
Lower Reach	168.58	.1	.3
Lower Reach	168.3	.1	.3
Lower Reach	168	.1	.3
Lower Reach	167.70*	.1	.3
Lower Reach	167.4	.1	.3
Lower Reach	167	.1	.3
Lower Reach	166.6	.1	.3
Lower Reach	166	.1	.3
Lower Reach	165	.1	.3
Lower Reach	163	.1	.3
Lower Reach	162.1	.1	.3
Lower Reach	161.4	.1	.3
Lower Reach	161.35	.1	.3
Lower Reach	161.3	.1	.3
Lower Reach	160	.1	.3
Lower Reach	159	.1	.3
Lower Reach	157.2	.1	.3
Lower Reach	157.15	.1	.3
Lower Reach	156.93	.2	.5
Lower Reach	156.915 Bridge		
Lower Reach	156.9	.2	.5
Lower Reach	156.87	.2	.5
Lower Reach	156.855 Bridge		
Lower Reach	156.84	.2	.5
Lower Reach	156.7	.1	.3
Lower Reach	156.6	.1	.3
Lower Reach	156.15	.1	.3
Lower Reach	155.7	.1	.3
Lower Reach	155.36	.1	.3
Lower Reach	155.2	.1	.3
Lower Reach	155.01	.1	.3
Lower Reach	154.81	.1	.3
Lower Reach	154.6	.1	.3
Lower Reach	154.23	.1	.3
Lower Reach	153.85	.1	.3
Lower Reach	153.61	.1	.3
Lower Reach	153.36	.1	.3
Lower Reach	153.08*	.1	.3
Lower Reach	152.81*	.1	.3
Lower Reach	152.53	.1	.3

Lower Reach	152.25*		.1	.3
Lower Reach	151.98*		.1	.3
Lower Reach	151.7		.1	.3
Lower Reach	151.49		.1	.3
Lower Reach	151.27		.2	.5
Lower Reach	151.255	Bridge		
Lower Reach	151.25		.2	.5
Lower Reach	151.24		.1	.3
Lower Reach	150.78		.1	.3
Lower Reach	150.31		.1	.3
Lower Reach	149.66*		.1	.3
Lower Reach	149		.1	.3
Lower Reach	148.34*		.1	.3
Lower Reach	147.68		.1	.3
Lower Reach	147.34*		.1	.3
Lower Reach	147.01*		.1	.3
Lower Reach	146.67*		.1	.3
Lower Reach	146.34*		.1	.3
Lower Reach	146		.1	.3
Lower Reach	145.67*		.1	.3
Lower Reach	145.5		.1	.3
Lower Reach	145.2		.1	.3
Lower Reach	145		.1	.3
Lower Reach	144.7		.1	.3
Lower Reach	144.55		.1	.3
Lower Reach	144		.1	.3
Lower Reach	143.5		.1	.3
Lower Reach	143.25		.1	.3
Lower Reach	143		.1	.3
Lower Reach	142.5		.1	.3
Lower Reach	142		.1	.3
Lower Reach	141.9		.1	.3
Lower Reach	141.5		.1	.3
Lower Reach	140.74		.1	.3
Lower Reach	140		.1	.3
Lower Reach	139.85		.1	.3
Lower Reach	139.57*		.1	.3
Lower Reach	139.29*		.1	.3
Lower Reach	139.01		.1	.3
Lower Reach	138.69*		.1	.3
Lower Reach	138.36		.1	.3
Lower Reach	138.04*		.1	.3
Lower Reach	137.71		.1	.3
Lower Reach	137.43*		.1	.3
Lower Reach	137.14		.1	.3
Lower Reach	136.8		.1	.3
Lower Reach	136.2		.1	.3
Lower Reach	136		.1	.3
Lower Reach	135.5		.1	.3
Lower Reach	135		.1	.3
Lower Reach	134.65		.1	.3
Lower Reach	134.33*		.1	.3
Lower Reach	134.02*		.1	.3
Lower Reach	133.70*		.1	.3
Lower Reach	133.38*		.1	.3
Lower Reach	133.07*		.1	.3
Lower Reach	132.75		.1	.3
Lower Reach	132.46*		.1	.3
Lower Reach	132.18*		.1	.3
Lower Reach	131.89*		.1	.3
Lower Reach	131.6		.1	.3
Lower Reach	131.35		.1	.3
Lower Reach	130.93		.1	.3
Lower Reach	130.51		.1	.3
Lower Reach	129.3		.1	.3
Lower Reach	129.27		.1	.3
Lower Reach	129.23		.1	.3
Lower Reach	129.22		.1	.3
Lower Reach	129.216		.2	.5
Lower Reach	129.215	Inl Struct		
Lower Reach	129.214		.2	.5
Lower Reach	129.213		.2	.5
Lower Reach	129.212		.2	.5
Lower Reach	129.211		.2	.5
Lower Reach	129.21		.2	.5
Lower Reach	129.2		.1	.3
Lower Reach	129.03		.1	.3
Lower Reach	128.5		.1	.3
Lower Reach	128.23*		.1	.3
Lower Reach	127.97*		.1	.3
Lower Reach	127.7		.1	.3
Lower Reach	127.4		.1	.3
Lower Reach	127.05*		.1	.3
Lower Reach	126.7		.1	.3
Lower Reach	126.35*		.1	.3
Lower Reach	126.00*		.1	.3
Lower Reach	125.65*		.1	.3
Lower Reach	125.3		.1	.3
Lower Reach	125		.1	.3
Lower Reach	124.80*		.1	.3
Lower Reach	124.60*		.1	.3
Lower Reach	124.4		.1	.3
Lower Reach	124.20*		.1	.3
Lower Reach	124.00*		.1	.3
Lower Reach	123.8		.1	.3
Lower Reach	123.48*		.1	.3
Lower Reach	123.15		.1	.3
Lower Reach	122.83*		.1	.3
Lower Reach	122.5		.1	.3
Lower Reach	121.98*		.1	.3
Lower Reach	121.46		.1	.3
Lower Reach	121.13*		.1	.3
Lower Reach	120.8		.1	.3
Lower Reach	120.7		.1	.3
Lower Reach	120.62		.2	.5
Lower Reach	120.605	Bridge		
Lower Reach	120.59		.2	.5
Lower Reach	120.5		.1	.3
Lower Reach	120.4		.1	.3
Lower Reach	120.39*		.1	.3
Lower Reach	120.38		.1	.3
Lower Reach	120.07*		.1	.3

Lower Reach	119.75*	.1	.3
Lower Reach	119.44*	.1	.3
Lower Reach	119.12*	.1	.3
Lower Reach	118.81	.1	.3
Lower Reach	118.50*	.1	.3
Lower Reach	118.18*	.1	.3
Lower Reach	117.87	.1	.3
Lower Reach	117.54*	.1	.3
Lower Reach	117.2	.1	.3
Lower Reach	116.5	.1	.3
Lower Reach	116.1	.1	.3
Lower Reach	115.7	.1	.3
Lower Reach	115.45*	.1	.3
Lower Reach	115.2	.1	.3
Lower Reach	115	.1	.3
Lower Reach	114.8	.1	.3
Lower Reach	114.65	.1	.3
Lower Reach	114.47*	.1	.3
Lower Reach	114.28*	.1	.3
Lower Reach	114.1	.1	.3
Lower Reach	113.73*	.1	.3
Lower Reach	113.37*	.1	.3
Lower Reach	113	.1	.3
Lower Reach	112.73*	.1	.3
Lower Reach	112.47*	.1	.3
Lower Reach	112.2	.1	.3

ATTACHMENT C

Construction Documents

ATTACHMENT D

USIBWC Coordination and Documentation

- Tactical Infrastructure Design Standards
- June 28th Meeting Notes
- July 13th Email
- August 10th Email

- **Tactical Infrastructure Design Standards**

- **June 28th Meeting Notes**

- **July 13th Conference Call Notes and Email**

- **August 10th Email Coordination**